PUBLIC REVIEW DRAFT

INITIAL STUDY/ MITIGATED NEGATIVE DECLARATION

FOR THE

QUAIL LAKES ELEMENTARY SCHOOL

Stockton, CA

December 19, 2018

Prepared for:

Stockton Unified School District
1944 El Pinal Drive
Stockton, CA 95205

Prepared by:

BaseCamp Environmental
115 S. School Street, Suite 14
Lodi, CA 95240
209-224-8213

BaseCamp Environmental

PUBLIC REVIEW DRAFT

INITIAL STUDY/
MITIGATED NEGATIVE DECLARATION

FOR THE

QUAIL LAKES ELEMENTARY SCHOOL

Stockton, CA

December 19, 2018

Prepared for:

Stockton Unified School District
1944 El Pinal Drive
Stockton, CA 95205

Prepared by:

BaseCamp Environmental
115 S. School Street, Suite 14
Lodi, CA 95240
209-224-8213

FACILITIES & PLANNING DIVISION
Steve L. Breakfield, Director
1944 N. El Pinal Drive
Stockton, CA 95205
(209) 933-7045, Ext. 2341
FAX (209) 933-7046

Superintendent
John Deasy, Ph.D.

NOTICE OF INTENT TO ADOPT NEGATIVE DECLARATION AND NOTICE OF PUBLIC MEETING

PROPOSED QUAIL LAKES SCHOOL ELEMENTARY SCHOOL

Notice is hereby given that the Stockton Unified School District (SUSD) has prepared an Initial Study of environmental effects and intends to adopt an Initial Study and Negative Declaration for a proposed elementary school located at 2111 Quail Lakes Drive in Stockton. The project proposes to demolish structures currently used by a church on an approximately 6.01-acre parcel owned by SUSD and to construct a public elementary school that would accommodate 558 students from kindergarten to 8th grade. These students would come from three other elementary schools. The elementary school would consist of two classroom buildings with a combined total of 21 classrooms. It also would have a multipurpose building and a combined library/administration building. Outdoor play areas would be installed in the southern portion of the site.

Copies of the Initial Study and Negative Declaration are available for public review at the Stockton Unified School District Offices, 701 North Madison Street, Stockton, CA 95202; the Cesar Chavez Central Library, 605 North El Dorado Street, Stockton, CA 95202; and the Troke Library, 502 West Benjamin Holt Drive, Stockton, CA 95207.

The SUSD will accept public and agency comments on the Initial Study/Negative Declaration from the 19th of December 2018 to the 17th of January 2019. Comments may be sent to Stockton Unified School District, Facility Planning Department, 1944 El Pinal Drive, Stockton, CA 95205, Attn: Steve L. Breakfield, Director. Alternatively, comments may be sent by e-mail to sbreakfield@stocktonusd.net.

In addition, notice is hereby given that the Stockton Unified School District Board of Education will hold a public meeting to consider adoption of the Initial Study and Negative Declaration and approval of the project on February 12, 2018 at 7:00 PM at the District Boardroom, 701 Madison Street, Stockton, California.

Steve L. Breakfield, Director
Facilities and Planning, SUSD

Dated: Dec 19, 2018

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

LIST OF ACRONYMS AND ABBREVIATIONS USED IN THIS DOCUMENT

AB	Assembly Bill
ARB	California Air Resources Board
BMP	Best Management Practice
Cal-OSHA	California Occupational Safety and Health Administration
Cal Water	California Water Service Company
CAP	Climate Action Plan
CEQA	California Environmental Quality Act
CESA	California Endangered Species Act
CO	carbon monoxide
CO_2e	carbon dioxide equivalent
dB	decibel
dBA	decibel, A-weighted
DTSC	California Department of Toxic Substances Control
EIR	Environmental Impact Report
EPA	U.S. Environmental Protection Agency
ESA	Endangered Species Act (federal)
FEMA	Federal Emergency Management Agency
GAMAQI	Guide for Assessing and Mitigating Air Quality Impacts
GHG	greenhouse gas
IS/MND	Initial Study/Mitigated Negative Declaration
L_{dn}	Day-Night Average Level
L_{eq}	equivalent continuous sound level
LOS	Level of Service
NESHAP	National Emission Standards for Hazardous Air Pollutants
NPDES	National Pollutant Discharge Elimination System
NO_x	nitrogen oxide
PM_{10}	particulate matter 10 micrometers or less in diameter
$PM_{2.5}$	particulate matter 2.5 micrometers or less in diameter
ROG	reactive organic gas
RWQCB	Regional Water Quality Control Board
SB	Senate Bill
SJCOG	San Joaquin Council of Governments
SJMSCP Plan	San Joaquin County Multi-Species Open Space and Habitat Conservation
SJRTD	San Joaquin Regional Transit District
SJVAPCD	San Joaquin Valley Air Pollution Control District
SUSD	Stockton Unified School District
SWMP	Storm Water Management Plan
SWPPP	Storm Water Pollution Prevention Plan
SWQCCP	Storm Water Quality Control Criteria Plan

SWRCB	State Water Resources Control Board
TAC	toxic air contaminant

NEGATIVE DECLARATION

A. General Project Information

Project Title:	Quail Lakes Elementary School
Lead Agency and Project Sponsor Name and Address:	Stockton Unified School District 701 N Madison Street Stockton, CA 95202
Contact Person and Phone Number:	Michelle S. Spragg, Facilities Planner (209) 933-7045, extension 2345
Project Location:	2111 Quail Lakes Drive, Stockton, CA
General Plan Designation:	Medium Density Residential (City of Stockton)
Zoning:	Low Density Residential/Medium Density Residential (City of Stockton)
Description of Project:	The District proposes to demolish existing church- and Christian school-related structures on a parcel owned by the District and to construct a K-8 elementary school that would accommodate 558 students. The school would consist of one two-story building with 14 classrooms, one one-story building with three classrooms for kindergarten students, a multipurpose building, and a library/administration building. Play fields and play courts would be in the southern portion of the site. Parking lots and drop-off areas would be installed off Alexandria Place and Cedar Ridge Drive.
Surrounding Land Uses and Setting:	The project site is in a predominantly residential area of the Quail Lakes development in Stockton. Multifamily development is located to the north and east, while single-family residential development is located to the south and west. Warren Atherton Park is across Quail Lakes Drive from the project site.
Other Public Agencies Whose Approval is Required:	The Department of Toxic Substances Control requires a site assessment be conducted to determine the potential presence of hazardous materials. The California Department of Education reviews the site and building layout to determine if it adequately supports the educational program and provides a safe environment for students. The Division of the State Architect reviews the completed building plans and specifications for compliance with building code and specifically for Americans with Disabilities Act (ADA) code compliance, Fire, Life, Safety and Structural code compliance.

B. Environmental Factors Potentially Affected

The environmental factors checked below may be significantly affected by this project, involving at least one impact that is a “Potentially Significant Impact” prior to mitigation. Mitigation measures that would avoid potential effects or reduce them to a less than significant level have been prescribed for each of these effects, as described in the checklist and narrative on the following pages, and in the Summary Table at the end of Chapter 1.0.

√	Aesthetics		Agriculture/Forestry Resources		Air Quality
√	Biological Resources	√	Cultural Resources	√	Geology/Soils
	Greenhouse Gas Emissions	√	Hazards/Hazardous Materials		Hydrology/Water Quality
	Land Use/Planning		Mineral Resources	√	Noise
	Population/Housing		Public Services		Recreation
	Transportation/Traffic		Tribal Cultural Resources		Utilities/Service Systems
	Mandatory Findings of Significance				

C. Lead Agency Determination

On the basis of this initial evaluation:

☐ I find that the proposed project COULD NOT have a significant effect on the environment, and a NEGATIVE DECLARATION will be prepared.

√ I find that although the proposed project could have a significant effect on the environment, there will not be a significant effect in this case because revisions in the project and/or mitigation measures that would reduce potential effects to a less than significant level have been made by or agreed to by the project proponent. A MITIGATED NEGATIVE DECLARATION will be prepared. *All applicable mitigation measures are shown in the Summary Table (Table 1-1) at the end of the Initial Study, Chapter 1.0.*

☐ I find that the proposed project MAY have a significant effect on the environment, and an ENVIRONMENTAL IMPACT REPORT is required.

☐ I find that the proposed project MAY have a “potentially significant impact” or “potentially significant unless mitigated” impact on the environment, but at least one effect 1) has been adequately analyzed in an earlier document pursuant to applicable legal standards, and 2) has been addressed by mitigation measures based on the earlier analysis as described on attached sheets. An ENVIRONMENTAL IMPACT REPORT is required, but it must analyze only the effects that remain to be addressed.

☐ I find that although the proposed project could have a significant effect on the environment, because all potentially significant effects (a) have been analyzed adequately in an earlier EIR or NEGATIVE DECLARATION pursuant to applicable standards, and (b) have been avoided or mitigated pursuant to that earlier EIR or NEGATIVE DECLARATION, including revisions or mitigation measures that are imposed upon the proposed project, nothing further is required.

STOCKTON UNIFIED SCHOOL DISTRICT

Steve L. Breakfield
Director, Facilities and Planning

12/18/18
Date

1.0 INTRODUCTION

1.1 Project Brief

This document is an Initial Study/Mitigated Negative Declaration (IS/MND) for the Quail Lakes Elementary School Project (project). The project site is located at 2111 Quail Lakes Drive in west-central Stockton, California (Figures 1-1 through 1-5). The IS/MND has been prepared in compliance with the requirements of the California Environmental Quality Act (CEQA). The Stockton Unified School District (SUSD) is the CEQA Lead Agency for the project.

The project proposes to demolish existing church- and Christian school-related structures located on an approximately 6.01-acre parcel owned by SUSD and to construct a public elementary school that would accommodate 558 students from kindergarten to 8th grade (K-8). These students would come from three other existing SUSD elementary schools. The proposed school would consist of two classroom buildings with a combined total of 21 classrooms. The proposed campus would also include a multipurpose building and a library/administration building. Outdoor play areas would be located in the southern portion of the site.

1.2 Purpose of Initial Study

CEQA requires that public agencies document and consider the potential environmental effects of the agency's actions that meet CEQA's definition of a "project." Briefly summarized, a "project" is an action that has the potential to result in direct or indirect physical changes in the environment. A project includes the agency's direct activities as well as activities that involve public agency approvals or funding. Guidelines for an agency's implementation of CEQA are found in the CEQA Guidelines (California Code of Regulations Title 14, Chapter 3).

Provided that a project is not exempt from CEQA, the first step in the agency's consideration of its potential environmental effects is the preparation of an Initial Study. The purpose of an Initial Study is to determine whether the project would involve "significant" environmental effects as defined by CEQA and to describe feasible mitigation measures that would avoid significant effects or reduce them to a level that is less than significant. If the Initial Study indicates that a project would not have significant effects, then the agency prepares a Negative Declaration. If the Initial Study indicates that a project would have significant effects, but these effects would be avoided or reduced to a level that is less than significant with identified mitigation measures, then the agency prepares a Mitigated Negative Declaration. If the project would involve significant effects that cannot be readily mitigated, then the agency must prepare an Environmental Impact Report (EIR). The agency may also decide to proceed directly with the preparation of an EIR without preparation of an Initial Study.

The proposed project is a "project" as defined by CEQA and is not exempt from CEQA consideration. The SUSD has determined that the project involves the potential for significant environmental effects and requires preparation of this Initial Study. The Initial Study describes the proposed project and its environmental setting, analyzes the potential environmental effects of the project, and identifies feasible mitigation measures for significant environmental effects. The Initial Study considers the project's potential for significant environmental effects in the following subject areas:

- Aesthetics
- Agricultural Resources
- Air Quality
- Biological Resources
- Cultural Resources
- Geology and Soils
- Greenhouse Gas Emissions
- Hazards and Hazardous Materials
- Hydrology and Water Quality
- Land Use and Planning
- Mineral Resources
- Noise
- Population and Housing
- Public Services
- Recreation
- Transportation/Traffic
- Tribal Cultural Resources
- Utilities and Service Systems
- Mandatory Findings of Significance

The Initial Study concluded that the project would have significant environmental effects, but all these effects would be avoided or reduced to a level that would be less than significant with recommended mitigation measures. The SUSD has accepted all the recommended mitigation measures. As a result, the SUSD has prepared a Mitigated Negative Declaration and is notifying the public of its intent to adopt the IS/MND. The Notice of Intent, and the time available for comment on the IS/MND, is shown immediately preceding the Negative Declaration.

1.3 Project Background

The SUSD currently has no schools in the Quail Lakes area; therefore, the SUSD acquired the project site, located at 2111 Quail Lakes Drive in Stockton, which was listed for sale on the commercial market, in order to provide an elementary school for students residing in the Quail Lakes area. These students currently attend three elementary schools located outside the neighborhood. Nearly half of the students attending Tyler Elementary School at 3830 Webster Avenue in Stockton either live in the Quail Lakes area or require transportation to Tyler Elementary from Quail Lakes and surrounding areas. Other existing SUSD schools with students from the Quail Lakes area are Hoover Elementary at 2900 Kirk Street and Madison Elementary at 2939 Mission Road.

The project site currently contains two buildings, along with paved parking areas, play courts and landscaping. The site was formerly used by the Lakeview Assembly Church, which held services on Sundays and Wednesday evenings and occasionally hosted special events on other days. The church hosted a private Christian school operated by United Christian Schools (UCS) for 27 years; UCS enrollment ranged from 400 to 450 students at the Lakeview site. UCS relocated to a new site in Stockton approximately five years ago. The existing buildings continue to be used by the current occupant: the Oasis

Church, which holds services on Sunday mornings only. This use will continue on the site until January 31, 2019.

1.4 Environmental Evaluation Checklist Terminology

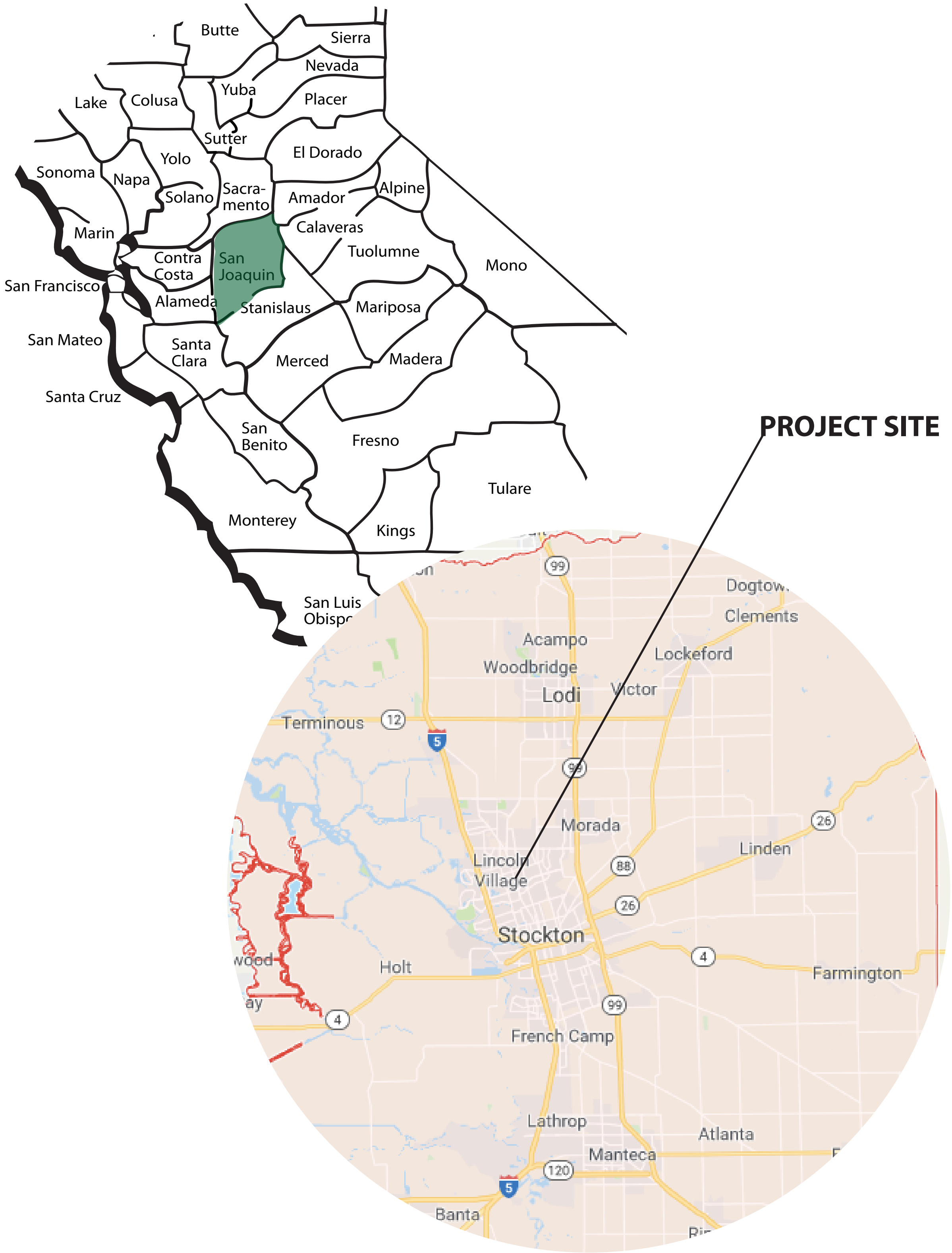
The project's potential environmental effects are evaluated in the Environmental Evaluation Checklist shown in Chapter 3.0 of this IS/MND. The checklist includes a list of environmental considerations against which the project is evaluated. For each question, the SUSD determines whether the project would involve 1) a Potentially Significant Impact, 2) a Less Than Significant Impact, 3) a Less Than Significant Impact with Mitigation Incorporated, or 4) No Impact.

> A Potentially Significant Impact occurs when there is substantial evidence that the project would involve a substantial adverse change to the physical environment, i.e., that the environmental effect may be significant, and feasible mitigation measures have not been defined that would reduce the impact to a less than significant level. If there are one or more Potentially Significant Impact entries in the Initial Study, an EIR is required.
>
> A Less Than Significant Impact occurs when the project would involve effects on a resource, but the project would not involve a substantial adverse change to the physical environment, and no mitigation measures are required.
>
> An environmental effect that is Less Than Significant with Mitigation Incorporated is a Potentially Significant Impact that can be avoided or can be reduced to a Less Than Significant Impact with the application of mitigation measures.
>
> A determination of No Impact is self-explanatory.

This IS/MND identifies potentially significant environmental effects related to the project. Some effects are mitigated by the operation of existing law and standards of practice related to environmental protection. These provisions are considered in the environmental impact analysis, and the degree to which they would reduce potential environmental effects is discussed. Where needed, additional mitigation measures are specifically identified to reduce potential environmental effects to a level that would be less than significant.

1.5 Summary of Environmental Effects and Mitigation Measures

Table 1-1, which follows Figures 1-1 through 1-5, summarizes the results of the Environmental Checklist Form and associated narrative discussion in Chapter 3.0. The potential environmental impacts of the proposed project are summarized in the left-most column of this table. The level of significance of each impact is indicated in the second column. Mitigation measures proposed to avoid or minimize the impacts are shown in the third column, and the significance of the impact after mitigation measures are applied is shown in the fourth column.



BaseCamp Environmental

Figure 1-1
REGIONAL LOCATION MAP

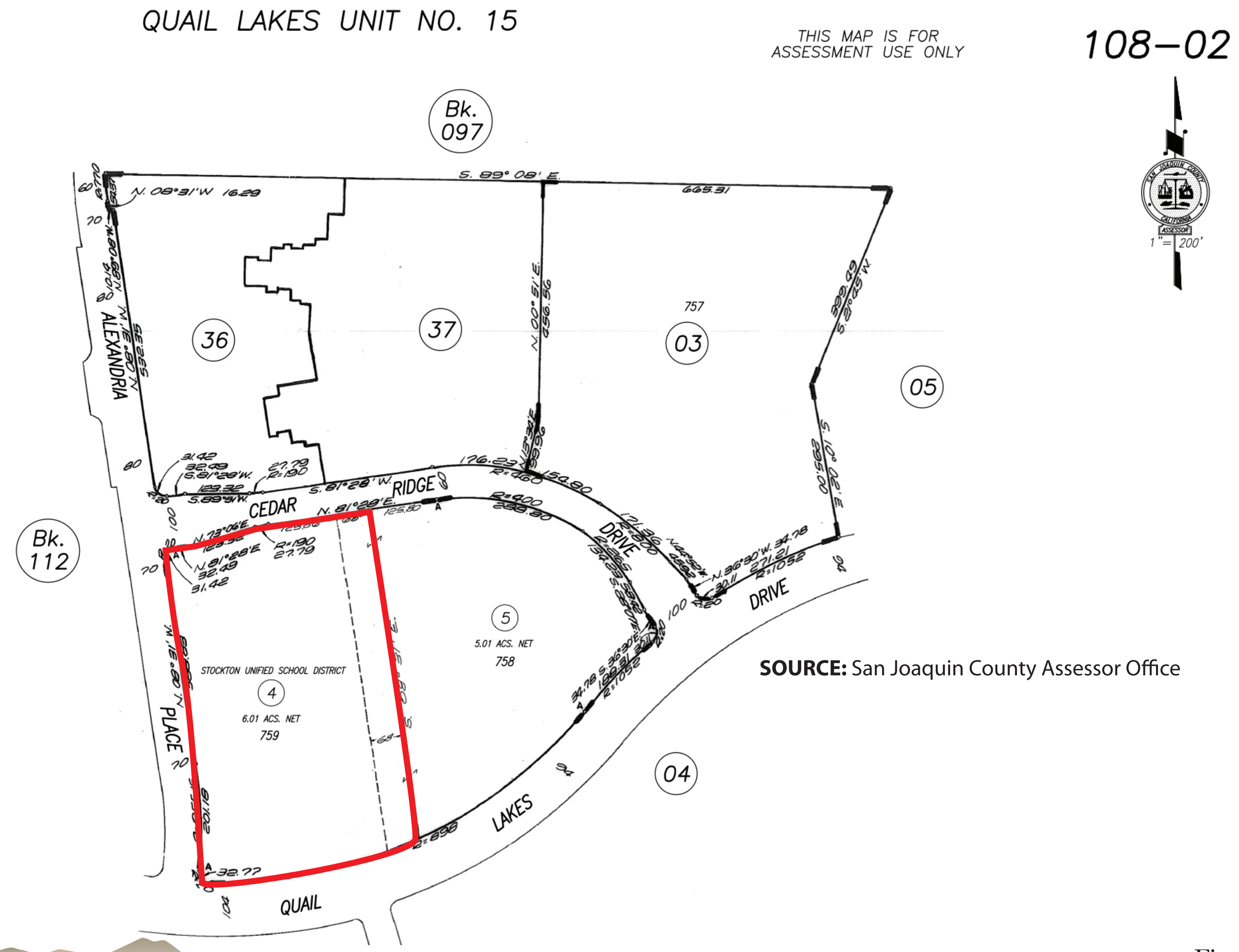
BaseCamp Environmental

Figure 1-2
STREET MAP

SOURCE: Stockton West Quadrangle Map, 1968

BaseCamp Environmental

Figure 1-3
USGS MAP



SOURCE: San Joaquin County Assessor Office

BaseCamp Environmental

Figure 1-4
ASSESSOR PARCEL MAP

SOURCE: Google Maps

BaseCamp Environmental

Figure 1-5
AERIAL PHOTO

TABLE 1-1
SUMMARY OF ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

Potential Impact	Significance Before Mitigation Measures	Mitigation Measures	Significance After Mitigation Measures
3.1 AESTHETICS			
a) Scenic Vistas	NI	None required	-
b) Scenic Routes and Resources	NI	None required	-
c) Visual Character and Quality	LS	None required	-
d) Light and Glare	PS	AESTH-1: The project shall comply with the provisions of Stockton Municipal Code Section 16.32.070, Light and Glare. This section requires that all lights must be shielded to direct light and glare towards the ground. Also, exterior lighting shall be located so as to eliminate spillover illumination or glare onto adjoining properties and to prohibit any interference with the normal operation or enjoyment of adjacent property. The Stockton Community Development Department shall verify compliance with Stockton Municipal Code Section 16.32.070, and the SUSD shall take corrective action on any lighting that is found not in compliance.	LS
3.2 AGRICULTURE AND FORESTRY RESOURCES			
a) Agricultural Land Conversion	NI	None required	-
b) Agricultural Zoning and Williamson Act	NI	None required	-
c, d) Forest Land Conversion and Zoning	NI	None required	-
e) Indirect Conversion of Farmland and Forest Land	NI	None required	-

LEGEND: NI = No Impact; LS = Less Than Significant; PS = Potentially Significant

TABLE 1-1
SUMMARY OF ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

Potential Impact	Significance Before Mitigation Measures	Mitigation Measures	Significance After Mitigation Measures
3.3 AIR QUALITY			
b, b) Air Quality Plan Consistency and Violation of Air Quality Standards	LS	None required	-
c) Cumulative Emissions	LS	None required	-
d) Exposure of Sensitive Receptors	LS	None required	-
e) Odors	NI	None required	-
3.4 BIOLOGICAL RESOURCES			
a) Special-Status Species	LS	None required	-
b) Riparian and Other Sensitive Habitats	NI	None required	-
c) Wetlands and Waters of the U.S.	NI	None required	-
d) Fish and Wildlife Movement	PS	BIO-1: Any tree that needs to be removed to facilitate development of the project site shall be felled outside of the general bird nesting season, which is February 1 through August 31. If tree removal is proposed during the bird nesting season, a nesting bird survey shall be conducted by a qualified biologist prior to tree removal. If active nests are found, tree removal shall be delayed until the young have fledged. If no active nests are found, then tree removal may proceed.	LS
e) Local Biological Requirements	NI	None required	-
f) Conflict with Habitat Conservation Plans	LS	None required	-

LEGEND: NI = No Impact; LS = Less Than Significant; PS = Potentially Significant

TABLE 1-1
SUMMARY OF ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

Potential Impact	Significance Before Mitigation Measures	Mitigation Measures	Significance After Mitigation Measures
3.5 CULTURAL RESOURCES			
b) Historical, Archaeological, and Paleontological Resources	PS	CULT-1: If any subsurface cultural or paleontological resources are encountered during construction of the project, all construction activities in the vicinity of the encounter shall be halted until a qualified archaeologist, or paleontologist as appropriate, can examine these materials, make a determination of their significance and, if significant, recommend further mitigation measures that would reduce potential effects to a level that is less than significant. Such measures could include 1) preservation in place or 2) excavation, recovery and curation by qualified professionals. The SUSD shall be responsible for retaining qualified professionals, implementing recommended mitigation measures and documenting mitigation efforts in a written report, consistent with the requirements of the CEQA Guidelines.	LS
d) Human Burials	PS	CULT-2: Project construction shall comply with the provisions of CEQA Guidelines Section 15064.5(e) regarding the treatment of any human burials encountered, including halting all work in the vicinity of the find and notifying the County Coroner.	LS
3.6 GEOLOGY AND SOILS			
a-1) Fault Rupture Hazards	NI	None required	-
a-2) Seismic Ground Shaking	LS	None required	-
a-3) Other Seismic Hazards	LS	None required	-
a-4) Landslides	NI	None required	-

LEGEND: NI = No Impact; LS = Less Than Significant; PS = Potentially Significant

TABLE 1-1
SUMMARY OF ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

Potential Impact	Significance Before Mitigation Measures	Mitigation Measures	Significance After Mitigation Measures
b) Soil Erosion	LS	None required	-
c) Geologic Instability	PS	GEO-1: In project design and construction, the SUSD shall incorporate recommendations contained in Geologic Hazards and Geotechnical Engineering Study, Stockton Unified School District, Oasis Church Property, 2111 Quail Lakes Drive, Stockton, California, prepared by Condor Earth on August 23, 2018. The recommendations include, but are not limited to, site preparation, excavations and fill, underground utility trenches, surface drainage control, foundations, slabs-on-grade, and pavement, among other issues.	LS
d) Expansive Soils	PS	Mitigation Measure GEO-1	LS
e) Adequacy of Soils for Wastewater Disposal	NI	None required	-
3.7 GREENHOUSE GAS EMISSIONS			
a, b) Project GHG Emissions and Consistency with GHG Reduction Plans	LS	None required	-
3.8 HAZARDS AND HAZARDOUS MATERIALS			
a) Hazardous Material Transport, Use and Storage	LS	None required	-
b) Release of Hazardous Materials	PS	HAZ-1: Prior to demolition activities, the Lead Agency shall conduct an asbestos inspection of the buildings identified for demolition, in accordance with San Joaquin Valley Air Pollution Control District (SJVAPCD) regulations. The inspection report shall be submitted to the SJVAPCD along with the asbestos notification form, which must be submitted to the SJVAPCD ten (10) working days before demolition activity begins. In accordance with SJVAPCD Rule 3050, applicable fees must	LS

LEGEND: NI = No Impact; LS = Less Than Significant; PS = Potentially Significant

TABLE 1-1
SUMMARY OF ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

Potential Impact	Significance Before Mitigation Measures	Mitigation Measures	Significance After Mitigation Measures
		be submitted along with the notification form. If asbestos-containing materials are discovered which would be disturbed during demolition activities, these materials must be removed prior to demolition. Removal work shall be conducted by a contractor whose employees are properly trained and equipped for such work in accordance with Cal-OSHA regulations. The handling, transport and disposal of the asbestos-containing materials shall be conducted in accordance with California Environmental Protection Agency and National Emission Standards for Hazardous Air Pollutants (NESHAP) regulations.	
c) Emission of Hazardous Materials Near Schools	LS	None required	-
d) Hazardous Materials Sites	LS	None required	-
e, f) Airport and Airstrip Operations	NI	None required	-
g) Emergency Response and Evacuation	LS	None required	-
h) Wildland Fire Hazards	NI	None required	-
3.9 HYDROLOGY AND WATER QUALITY			
a, f) Surface Waters and Quality	LS	None required	-
b) Groundwater Supplies	LS	None required	-
c, d, e) Drainage Patterns and Runoff	LS	None required	-
g, h) Flooding Hazards	NI	None required	-
i) Dam and Levee Failure Hazards	LS	None required	-

LEGEND: NI = No Impact; LS = Less Than Significant; PS = Potentially Significant

TABLE 1-1
SUMMARY OF ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

Potential Impact	Significance Before Mitigation Measures	Mitigation Measures	Significance After Mitigation Measures
j) Seiche, Tsunami and Mudflow Hazards	NI	None required	-
3.10 LAND USE AND PLANNING			
a) Division of Established Communities	NI	None required	-
b) Conflict with Applicable Plans, Policies and Regulations	LS	None required	-
c) Conflict with Habitat Conservation Plans	LS	None required	-
3.11 MINERAL RESOURCES			
a, b) Loss of Mineral Resource Availability	NI	None required	-
3.12 NOISE			
a) Exposure to Noise Exceeding Local Standards			
b) Groundborne Vibrations	LS	None required	-
c) Permanent Increases in Ambient Noise			
d) Temporary Increases in Ambient Noise	PS	NOISE-1: Project construction shall be restricted to the hours of 7:00 a.m. to 7:00 p.m. Monday through Saturday. No construction work shall occur on Sundays and on federally recognized holidays. All equipment used on the construction site shall be fitted with mufflers in accordance with manufacturers' specifications. Mufflers shall be installed on the equipment at all times on the construction site.	LS
e, f) Exposure to Airport/Airstrip Noise	NI	None required	-

LEGEND: NI = No Impact; LS = Less Than Significant; PS = Potentially Significant

TABLE 1-1
SUMMARY OF ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

Potential Impact	Significance Before Mitigation Measures	Mitigation Measures	Significance After Mitigation Measures
3.13 POPULATION AND HOUSING			
a) Population Growth Inducement	NI	None required	-
b, c) Displacement of Housing and People	NI	None required	-
3.14 PUBLIC SERVICES			
a) Fire Protection	LS	None required	-
b) Police Protection	LS	None required	-
c) Schools	LS	None required	-
d, e) Parks and Other Public Facilities	LS	None required	-
3.15 RECREATION			
a, b) Recreational Facilities	LS	None required	-
3.16 TRANSPORTATION/TRAFFIC			
a) Conflict with Transportation Plans, Ordinances and Policies	LS	None required	-
b) Conflict with Congestion Management Program	NI	None required	-
c) Air Traffic Patterns	NI	None required	-
d) Traffic Hazards	PS	TRANS-1: The SUSD will, in consultation with City of Stockton staff, develop and implement a pedestrian safety crossing plan. The objective of the plan will be to provide pedestrians with safe access between the Quail Lakes School project site, and the west side of Alexandria Place and the north side of Cedar Ridge Drive. Various marking,	LS

LEGEND: NI = No Impact; LS = Less Than Significant; PS = Potentially Significant

TABLE 1-1
SUMMARY OF ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

Potential Impact	Significance Before Mitigation Measures	Mitigation Measures	Significance After Mitigation Measures
		signing, street surface treatments, including mid-block crosswalks may be considered. The number, location, and type of features shall be to the satisfaction of City of Stockton staff. Potential designs and features are presented in the *City of Stockton Traffic Calming Guidelines* (City of Stockton 2008). TRANS-2: Parking shall be prohibited on the east side of Alexandria Place between Quail Lakes Drive and the West Inbound Driveway. The SUSD shall install signs notifying vehicles of this prohibition.	
e) Emergency Access	NI	None required	-
f) Conflict with Non-vehicular Transportation Plans	LS	None required	-
3.17 TRIBAL CULTURAL RESOURCES			
a, b) Tribal Cultural Resources	PS	Mitigation Measure CULT-1	LS
3.18 UTILITIES AND SERVICE SYSTEMS			
a, e) Wastewater Systems	NI	None required	-
b, d) Water Systems and Supply	NI	None required	-
c) Storm Water Systems	NI	None required	-
f, g) Solid Waste Services	NI	None required	-
3.19 MANDATORY FINDINGS OF SIGNIFICANCE			
a) Findings on Biological and Cultural Resources	PS	Mitigation measures in Sections 3.4 and 3.5.	LS

LEGEND: NI = No Impact; LS = Less Than Significant; PS = Potentially Significant

TABLE 1-1
SUMMARY OF ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

Potential Impact	Significance Before Mitigation Measures	Mitigation Measures	Significance After Mitigation Measures
b) Findings on Individually Limited but Cumulatively Considerable Impacts	LS	None required	-
c) Findings on Adverse Effects on Human Beings	PS	Mitigation measures in Section 3.16.	LS

LEGEND: NI = No Impact; LS = Less Than Significant; PS = Potentially Significant

2.0 PROJECT DESCRIPTION

2.1 Project Location

The project site is located at 2111 Quail Lakes Drive, at the northeast corner of the intersection of Quail Lakes Drive and Alexandria Place. The project is within the Quail Lakes development in west-central Stockton (see Figures 1-1 through 1-5). The site is bounded on the south by Quail Lakes Drive, on the west by Alexandria Place, and on the north by Cedar Ridge Drive; multi-family residential units are located along the east boundary of the site.

The site comprises Assessor's Parcel Number (APN) 108-020-04 and is shown on the U.S. Geological Survey's Stockton West 7.5-minute quadrangle map. The site is in an unsectioned portion of Township 2 North, Range 6 East, Mt. Diablo Base and Meridian. Approximate latitude of the site is 37° 59' 48" North, and approximate longitude is 121° 20' 09" West.

2.2 Project Details

The proposed elementary school would enroll a potential total of 558 elementary school students. Of the total enrollment, 48 students would be in kindergarten, 144 students would be in grades 1-3, 186 students would be in grades 4-6, and 128 students would be in grades 7-8. In addition, 24 students would be enrolled in a Transitional Kindergarten program, and 28 students would be enrolled in a special day class.

The SUSD intends to transfer students currently enrolled at three other elementary schools in Stockton to the new school: Tyler Elementary, Hoover Elementary, and Madison Elementary all of which are located south of the Quail Lakes area. Students from the Quail Lakes area are presently bussed to these campuses but would be re-assigned to the proposed school.

Demolition of Existing Structures

The project site consists of approximately 6.01 acres. Existing buildings on the site are currently used by Oasis Church but will become unoccupied on January 31, 2019. Existing buildings include a main church building along with classrooms, a kitchen/cafeteria, and assembly areas that were for many years used on weekdays by a private school. Total floor area of the existing structures is 79,060 square feet.

The initial phase of the proposed project will involve demolition of the existing structures and site improvements by a licensed demolition contractor. A hazardous materials survey of the existing buildings will be completed by the District to rule out any Asbestos Containing Building Materials (ACBMs) or other environmental concerns that should be addressed in advance of demolition. Removal of hazardous materials, if any, will be performed by a licensed abatement contractor according to State and local laws and regulations and with the appropriate permits. Hazardous materials removal will be overseen by the District's Hazardous Materials and Environmental Compliance Departments.

Demolition would also include removal of all of the existing on-site circulation, parking and landscaping materials. The site will require grading to establish proposed site subgrades and surface drainage.

Solid waste generated in demolition would be hauled to a commercial recycling facility by a permitted hauler or salvaged, if feasible. Non-recyclable debris would be removed to one of the three sanitary landfills in San Joaquin County.

Elementary School Construction

Once demolition work is completed, the project proposes to construct a new elementary school on the site to accommodate students from kindergarten to 8th grade (Figure 2-1). The project proposes the construction of a two-story classroom building and a one-story kindergarten building, along with a combination administration/library building and a multipurpose building referred to as a "cafetorium." The project also proposes play courts and turf playfields in the south portion of the site, and a play area adjacent to the kindergarten building. Figures 2-2 and 2-3 provide greater detail of the site plan. A more detailed description of proposed site development is provided below.

Classroom Buildings

The project proposes construction of a permanent, two-story modular classroom building that would serve 1st to 8th grade students (Figure 2-4). The classroom building would have a total floor area of 28,135 square feet and a height of approximately 32.5 feet. Each story would have nine classrooms, for a total of 18 classrooms. Each story also would have work rooms and boys and girls restrooms. An auxiliary office, an electrical utility room, a data room, and a resource specialist program room would be located on the first floor. An elevator and two stairwells would connect the two stories.

The project also proposes to construct a permanent, one-story kindergarten classroom building near the northeast corner of the project site (see Figure 2-4). The building, approximately 6,810 square feet in floor area and 8.5 feet in height, would contain two classrooms for kindergarten students and one room for a Transitional Kindergarten program for students who have a fifth birthday between September 2 and December 2 of the school year. The building also would contain restrooms, work rooms, an electrical utility room, and an information technology room.

Other Buildings

A one-story multipurpose building, known as a "cafetorium," would be constructed in the northwest corner of the project site (see Figure 2-4). Building construction would be of cold-formed steel stud and structural steel framing, with metal decks and metal wall and roof framing, erected on on-grade concrete slabs. The cafetorium would be approximately 15,398 square feet in floor area and a maximum 27 feet in height, serving as a cafeteria or a gymnasium, depending on the time of day. The cafetorium would include a kitchen area, physical education rooms and a room for music and visual and performing arts classes as well as offices, restrooms, storage and custodial rooms. The building would include a stage, stage prop room, control room and an entry lobby.

A permanent, one-story modular building south of the cafetorium would accommodate administrative offices and a library (see Figure 2-4) in approximately 8,343 square feet of floor area; the building would be a maximum 24 feet in height. The library would occupy approximately 2,746 square feet and would contain stacks area, open study areas, circulation desk, and lobby. This building would provide offices for the principal and vice principal, staff work room, administrative work area, conference room, health facilities, lounge, and a lobby reception area.

Play Areas

The southern portion of the project site would be mostly dedicated to outdoor play areas including basketball, tetherball, and foursquare, along with other play equipment and an obstacle course. The project includes a turf field adjacent to Quail Lakes Drive for various outdoor sports. A separate enclosed play area is proposed adjacent to the kindergarten classroom building.

Circulation and Parking

Access to the elementary school would be provided from Alexandria Place and Cedar Ridge Drive (see Figure 2-1). Drop-off areas for students brought by parents and buses would be provided off Alexandria Place in front of the library/administration building. Another student drop-off area, for parental vehicles only, would be provided off Cedar Ridge Drive in front of the kindergarten classroom building.

The project would include three parking lots providing a total of 55 parking spaces. These would include staff and visitors lots, including spaces for disabled drivers.

Utilities

The project on-site water, sewer, and storm drainage facilities that would connect to existing City facilities located in the streets adjacent to the project site (Figures 2-5 and 2-6). The on-site water system would include a 6-inch diameter main for fire protection supply. The project would connect to the existing Pacific Gas and Electric system via a new transformer to be installed in the southeast corner of the project site.

Other Project Features

Areas not occupied by proposed buildings and hard surfaces would be landscaped. A monument sign would be placed at the southwest corner of the project site.

An eight-foot chain link fence will be erected down the eastern boundary of the project site between the school and the adjacent multifamily residential complex. The existing wood fence between the school and the multifamily residential complex will remain undisturbed. A black vinyl coated eight-foot chain link fence is planned to encompass the ball-fields on the south side of the project, terminating at the pedestrian walkway on the southern side of the Alexandria parking lot where it will intersect with the six foot ornamental iron fencing. This ornamental iron fencing will be placed around the Alexandria and Cedar Ridge sides of the campus, between the buildings, so as to secure the site, requiring all visitors to access the site through the administration office. Four-foot ornamental fencing will be strategically placed at selected areas in order to control pedestrian routes.

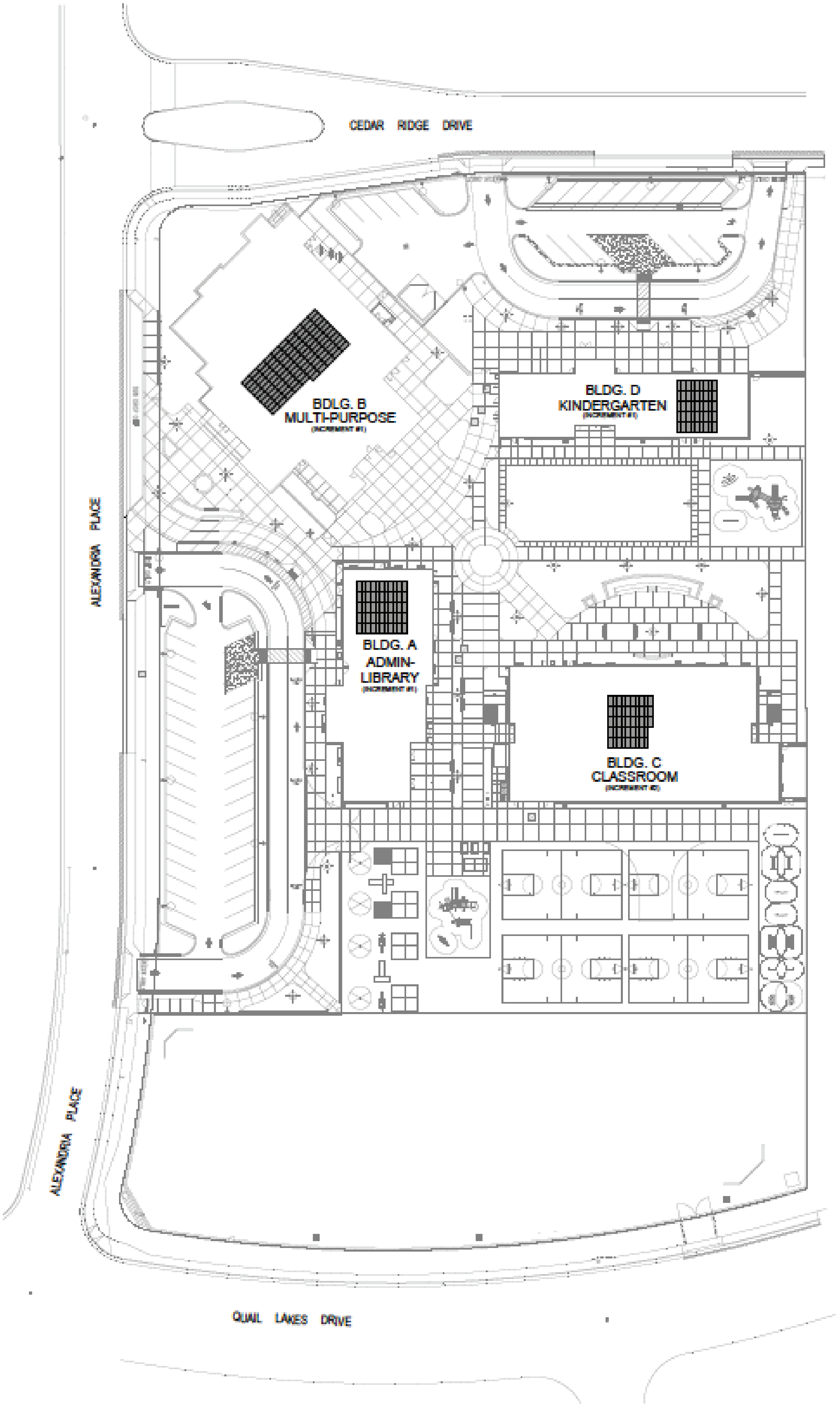
2.3 Permits and Approvals

The project would require the approval of the SUSD Board of Education. As the CEQA lead agency, the SUSD would be required to adopt the IS/MND prior to a final decision on the project, along with a Mitigation Monitoring and Reporting Program to ensure implementation of the mitigation measures specified in the IS/MND.

Proposed school construction plans would require approval from the Department of Education as to the conformity of the proposed site with location and program support criteria. Proposed parking, safety and access requirements would be reviewed for compliance by the Division of the State Architect (State Architect). The Approval of Plans letter is the document that conveys official approval of the plans and specifications for a project based on site plans, structural, mechanical, plumbing, electrical, fire alarm, and fire sprinkler drawings of the project together with supporting documents.

As part of the approval process for school site development, the California Department of Toxic Substances Control (DTSC) requires that a site assessment known as a Preliminary Endangerment Assessment (PEA) be conducted to determine the potential presence of hazardous materials. The PEA has been completed, advertised for public review, adopted by the SUSD Board of Education and submitted to the DTSC. DTSC declared in October 2018 that No Further Action was required with respect to the project site.

The project proposes to connect to sewer, water, and storm drainage facilities managed by the City of Stockton. The proposed connections would be reviewed and approved by the City subject to existing City ordinances, along with any off-site improvements that may be required.



SOURCE: TETER, LLP

Figure 2-1
OVERALL SITE PLAN

3.0 ENVIRONMENTAL CHECKLIST FORM

3.1 AESTHETICS

Would the project:	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
a) Have a substantial adverse effect on a scenic vista?				√
b) Substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings within a state scenic highway?				√
c) Substantially degrade the existing visual character or quality of the site and its surroundings?			√	
d) Create a new source of substantial light or glare which would adversely affect day or nighttime views in the area?		√		

NARRATIVE DISCUSSION

Environmental Setting

The project site is developed as a church, with large buildings, parking areas and other pavement covering most of the site. Unpaved areas of the existing site are landscaped with trees, shrubs and turf. Many of the existing are relatively mature; street trees line the boundaries of the project site along Quail Lakes Drive, Alexandria Place, and Cedar Ridge Drive.

The project site is enclosed within an urban, developed area of the City of Stockton known as Quail Lakes. Quail Lakes is a predominantly residential area that contains limited other land uses such as churches, including the Oasis Church on the project site, and Warren Atherton Park across Quail Lakes Drive from the project site. Quail Lake is a predominant visual feature in the neighborhood; the lake is visible from the southern portions of the project site. The Quail Lakes development is surrounded by commercial development along Pershing Avenue, March Lane and Quail Lakes Drive.

In the general project area, distance views of the Coast Ranges and Mount Diablo to the west and the Sierra Nevada to the east are the major scenic vistas, when visibility conditions permit and when not obstructed by buildings or trees. Due to the level of existing development and landscaping in the project area, scenic vistas are not available from the site or vicinity. San Joaquin County has designated 26 local roadways within the County as scenic routes (San Joaquin County 2016). One of these, Interstate 5 from State Route 4 to the Sacramento County line, is near the project area. No State scenic highways have been designated in the immediate vicinity of the project (Caltrans 2017).

Existing night lighting in the project area consists primarily of street lighting along the adjoining streets and on-site security lighting.

Environmental Impacts and Mitigation Measures

a) Scenic Vistas.

Potential scenic vistas visible from the project site are obstructed by existing off-site development and trees. The project would not affect existing off-site conditions related to distance views. The project would have no impact on scenic vistas.

b) Scenic Routes and Resources.

No scenic routes have been identified in the project vicinity. The only scenic resource in the area is Warren Atherton Park, a City park located south of Quail Lakes Drive that would not be materially affected by this project. The project would have no impact on scenic resources.

c) Visual Character and Quality.

The project site currently contains church buildings and related site improvements, including landscaping and paved parking and circulation areas; some paved areas are used for playground activities. Proposed development of the project site would remove existing buildings and some existing tree cover, which would result in temporary adverse visual resource effects during the construction and early post-construction period. As development of the site, and in particular new landscaping, matures, the appearance of the site will be visually similar to existing conditions, that is, the site appearance could be characterized as a set of institutional buildings of similar scale on a landscaped campus. Landscaping on the site would be more extensive than under existing conditions, since play fields are proposed, and these fields would dominate views from Quail Lakes Drive and southern Alexandria Avenue. The project can be expected to result in long-term visual and aesthetic improvement on the site. Project impacts related to visual character and quality are therefore considered be less than significant.

d) Light and Glare.

The project would involve the replacement of existing parking and security lighting with new lighting systems. Since the project is adjacent to or near existing residential areas to the west, north, and east, some "spillover" lighting could reach these residential areas, potentially disturbing residents. The project would not, however, result in any changes in existing lighting of streets surrounding the site. This would be a potentially significant impact without mitigation. Mitigation presented below would require the project to include controls on light and glare from new lighting facilities similar to those required by the City of Stockton for new development. Implementation of this mitigation measure would reduce light and glare impacts to a level that would be less than significant.

Level of Significance: Potentially significant

Mitigation Measures:

AESTH-1: New lighting design for the project shall require that new fixtures be shielded to direct light and glare towards the ground. Exterior lighting shall be located so as to eliminate spillover illumination or glare onto adjoining residential properties and to prohibit any interference with the normal operation or enjoyment of adjacent property.

Significance After Mitigation: Less than significant

3.2 AGRICULTURE AND FORESTRY RESOURCES

Would the project:	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
a) Convert Prime Farmland, Unique Farmland, or Farmland of Statewide Importance (Farmland), as shown on the maps prepared pursuant to the Farmland Mapping and Monitoring Program of the California Resources Agency, to non-agricultural use?				√
b) Conflict with existing zoning for agricultural use, or a Williamson Act contract?				√
c) Conflict with existing zoning for, or cause rezoning of, forest land (as defined in Public Resources Code Section 12220(g)), timberland (as defined by Public Resources Code Section 4526), or timberland zoned Timberland Production (as defined by Government Code Section 51104(g))?				√
d) Result in the loss of forest land or conversion of forest land to non-forest use?				√
e) Involve other changes in the existing environment, which, due to their location or nature, could result in conversion of Farmland, to non-agricultural use or conversion of forest land to non-forest use?				√

NARRATIVE DISCUSSION

Environmental Setting

The project site is located in an urban area comprised mostly of residential development. There are no lands in the area that are used for agricultural production. The Important Farmland Maps, prepared by the California Department of Conservation as part of the Farmland Mapping and Monitoring Program, designate the viability of lands for farmland use, based on the physical and chemical properties of the soils. The maps categorize farmland, in decreasing order of soil quality, as "Prime Farmland," "Farmland of Statewide Importance," and "Unique Farmland." Collectively, these categories are referred to as “Farmland” in the Environmental Checklist in CEQA Guidelines Appendix

G. According to the 2016 Important Farmland Map of San Joaquin County, the project site and surrounding area are designated as Urban and Built-Up Land.

The Williamson Act is State legislation that seeks to preserve farmland by offering property tax breaks to farmers who sign a contract pledging to keep their land in agricultural use. The project site is not subject to a Williamson Act contract, and there are no lands under Williamson Act contract in the project vicinity.

There are no designated forest lands in the project area or in San Joaquin County. Because of this, forestry resources will not be discussed in any detail in this IS/MND.

Environmental Impacts and Mitigation Measures

a) Agricultural Land Conversion.

The project site is in an urban area where no farmland exists or has been so-designated. No Farmland would be converted because of the project. The project would have no impact on farmland conversion.

b) Agricultural Zoning and Williamson Act.

Neither the project site nor surrounding land is zoned for agricultural use. Neither the project site or any nearby lands are under Williamson Act contract. The project would have no impact on agricultural zoning or Williamson Act lands.

c, d) Forest Land Conversion and Zoning.

There is no forest land in the project vicinity. The project would have no impact on forest lands.

e) Indirect Conversion of Farmland and Forest Land.

As noted above, there is no Farmland in the vicinity, so no indirect conversion of Farmland would occur because of the project. Since no forest land is in the area, the project would have no impact on indirect conversion of forestland to non-forest use. The project would have no impact on indirect conversion of Farmland or forest land.

3.3 AIR QUALITY

Where available, the significance criteria established by the applicable air quality management or air pollution control district may be relied upon to make the following determinations. Would the project:	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
a) Conflict with or obstruct implementation of the applicable Air Quality Attainment Plan?			√	
b) Violate any air quality standard or contribute to an existing or projected air quality violation?			√	
c) Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is non-attainment under an applicable federal or state ambient air			√	

quality standard (including releasing emissions which exceed quantitative thresholds for ozone precursors)?				
d) Expose sensitive receptors to substantial pollutant concentrations?			√	
e) Create objectionable odors affecting a substantial number of people?				√

NARRATIVE DISCUSSION

Environmental Setting

Air Quality Background

The project area is within the San Joaquin Valley Air Basin. The San Joaquin Valley Air Pollution Control District (SJVAPCD), which includes San Joaquin County, has jurisdiction over most air quality matters in the Air Basin. The SJVAPCD is tasked with implementing programs and regulations required by both the federal and California Clean Air Acts. Under their respective Clean Air Acts, both the State of California and the federal government have established ambient air quality standards for six criteria air pollutants: ozone, particulate matter, carbon monoxide, nitrogen dioxide, sulfur dioxide, and lead. California has four additional criteria pollutants under its Clean Air Act.

Table 3-1 shows the current attainment status of the Air Basin relative to the federal and State ambient air quality standards for criteria pollutants. Except for ozone and particulate matter, which are discussed below, the Air Basin is in attainment of, or unclassified for, all federal and State ambient air quality standards.

The San Joaquin Valley Air Basin is designated a non-attainment area for ozone. Ozone is not emitted directly into the air but is formed when reactive organic gases (ROG) and nitrogen oxides (NO_x) react in the atmosphere in the presence of sunlight. The SJVAPCD currently has a 2007 Ozone Plan and a 2013 Plan for the Revoked 1-Hour Ozone Standard for the Air Basin to attain federal ambient air quality standards for ozone.

The Air Basin is also designated a non-attainment area for respirable particulate matter, a mixture of solid and liquid particles suspended in air, including dust, pollen, soot, smoke, and liquid droplets. In San Joaquin County, particulate matter is generated by a mix of rural and urban sources, including agricultural operations, industrial emissions, dust suspended by vehicle traffic, and secondary aerosols formed by reactions in the atmosphere. The SJVAPCD currently has a 2015 $PM_{2.5}$ Plan for the 1997 federal $PM_{2.5}$ standard, a 2012 $PM_{2.5}$ Plan for the 2006 federal $PM_{2.5}$ standard, a 2016 Moderate Area Plan for the 2012 federal $PM_{2.5}$ standard, and a 2007 PM_{10} Maintenance Plan to maintain the Air Basin's attainment status of the federal PM_{10} standard.

TABLE 3-1
SAN JOAQUIN VALLEY AIR BASIN ATTAINMENT STATUS

	Designation/Classification	
Criteria Pollutant	**Federal Primary Standards**	**State Standards**
Ozone - One hour	No Federal Standard	Nonattainment/Severe
Ozone - Eight hour	Nonattainment/Extreme	Nonattainment
PM_{10}	Attainment	Nonattainment
$PM_{2.5}$	Nonattainment	Nonattainment
Carbon Monoxide (CO)	Attainment/Unclassified	Attainment/Unclassified
Nitrogen Dioxide (NO_x)	Attainment/Unclassified	Attainment
Sulfur Dioxide (SO_x)	Attainment/Unclassified	Attainment
Lead	No Designation/Classification	Attainment
Hydrogen Sulfide	No Federal Standard	Unclassified
Sulfates	No Federal Standard	Attainment
Visibility Reducing Particles	No Federal Standard	Unclassified
Vinyl Chloride	No Federal Standard	Attainment

Source: SJVAPCD 2018.

Carbon monoxide (CO) is an odorless, colorless gas that is highly toxic. It is formed by the incomplete combustion of fuels and is emitted directly into the air, unlike ozone. The main source of CO in the San Joaquin Valley is on-road motor vehicles (SJVAPCD 2015b). The San Joaquin Valley Air Basin is in attainment/unclassified status for CO; as such, the SJVAPCD has no CO attainment plans. High CO concentrations may occur in areas of limited geographic size, sometimes referred to as “hotspots,” which are ordinarily associated with areas of heavy traffic volumes and congestion.

In addition to the criteria pollutants, the California Air Resources Board (ARB) has also identified other air pollutants as toxic air contaminants (TACs) - pollutants that are carcinogenic (i.e., cause cancer) or that may cause other adverse short-term or long-term health effects. Diesel particulate matter, considered a carcinogen, is the most common TAC, as it is a product of combustion in diesel engines. Other TACs are less common and are typically associated with industrial operations.

The SJVAPCD regulations that are potentially applicable to the project are summarized below.

Regulation VIII (Fugitive Dust PM_{10} Prohibitions)

Rules 8011-8081 are designed to reduce PM_{10} emissions (predominantly dust/dirt) generated by human activity, including construction and demolition activities, road construction, bulk materials storage, paved and unpaved roads, carryout and track out, landfill operations, etc.

Rule 4101 (Visible Emissions)

This rule prohibits emissions of visible air contaminants to the atmosphere and applies to any source operation that emits or may emit air contaminants.

Rule 4601 (Architectural Coatings)

This rule sets limits on the volatile organic compounds, a component of ROG, allowed in various paints and other coatings.

Rule 9510 (Indirect Source Review)

Rule 9510, also known as the Indirect Source Rule (ISR), is intended to reduce or mitigate construction and operational emissions of NO_x and PM_{10} generated by new development, either directly and/or by payment of off-site mitigation fees. Construction emissions of NO_x and PM_{10} exhaust must be reduced by 20% and 45%, respectively. Operational emissions of NO_x and PM_{10} must be reduced by 33.3% and 50%, respectively. The ISR applies to educational development projects of 9,000 square feet and larger; therefore, the proposed project would not be subject to the ISR.

Environmental Impacts and Mitigation Measures

In 2015, the SJVAPCD adopted a revised Guide for Assessing and Mitigating Air Quality Impacts (GAMAQI). GAMAQI defines an analysis methodology, thresholds of significance, and mitigation measures for the assessment of air quality impacts for projects within SJVAPCD's jurisdiction. Table 3-2 shows the CEQA thresholds for significance for pollutant emissions within the SJVAPCD. The significance thresholds apply to emissions from both project construction and project operations.

Based on these thresholds of significance, and using project type and size, the SJVAPCD has pre-quantified emissions and determined a size below which it is reasonable to conclude that a project would not exceed applicable thresholds of significance for criteria pollutants. The Small Project Analysis Level in GAMAQI includes incorporates the project sizes and vehicle trips below which projects are considered so small as to not exceed the SJVAPCD significance thresholds. For elementary schools, the threshold at which a project is not considered small is 1,875 students. For junior high schools, the threshold is 1,680 students, and for high schools 1,325 students (SJVAPCD 2017).

TABLE 3-2
SJVAPCD SIGNIFICANCE THRESHOLDS AND ESTIMATED PROJECT EMISSIONS

Pollutant	**SJVAPCD Significance Threshold**	**Maximum Construction Emissions (tons/year)**	**Annual Operational Emissions (tons/year)**
ROG	100	0.22	0.37
NO_x	10	1.61	1.17
CO	10	1.29	1.79
PM_{10}	15	0.17	0.43
$PM_{2.5}$	15	0.10	0.12

Sources: CalEEMod v. 2016.3.1, SJVAPCD 2015

a, b) Air Quality Plan Consistency and Violation of Air Quality Standards.

Construction emissions were estimated using the California Emissions Estimator Model (CalEEMod) computer program, which is approved by the SJVAPCD. Results of the CalEEMod run, available in Appendix A of this IS/MND and shown in Table 3-2, indicate that project construction emissions would not be greater than 1.61 tons for any year in which project construction occurs. All construction emissions would be below the SJVAPCD significance thresholds. Compliance with SJVAPCD Regulation VIII, with provisions that control dust emissions, would further minimize particulate matter emissions already determined to have an impact that would be less than significant.

The project proposes to accommodate an enrollment of 558 students at grade levels from kindergarten to 8th grade. This total is below the Small Project Analysis Level threshold for elementary schools, which is 1,875 students. This indicates that the project would not have a significant impact on air pollutant emissions. This is confirmed by the annual operational emissions estimated by the CalEEMod run for the project, the results of which are shown in Table 3-2. None of the pollutants generated by project operations would exceed the SJVAPCD significance thresholds.

Project emissions would be consistent with the pollutant reduction objectives of the ozone and particulate matter plans of the SJVAPCD. Moreover, the project would be subject to the ISR, which would further limit NO_x and PM_{10} emissions. Project impacts related to air quality plans and air quality standards would be less than significant.

c) Cumulative Emissions.

As described in a, b) above, the project would not generate pollutant emissions that exceed SJVAPCD significance thresholds. Because of this, the project is not expected to make a cumulatively considerable contribution to any criteria pollutant emissions. Project impacts would be less than significant.

d) Exposure of Sensitive Receptors.

“Sensitive receptors” refer to those segments of the population most susceptible to poor air quality (i.e., children, the elderly, and those with pre-existing serious health problems affected by air quality). Land uses where sensitive individuals are most likely to spend time also may be called sensitive receptors; these include schools and schoolyards, parks and playgrounds, daycare centers, nursing homes, hospitals, and residential communities (SJVAPCD 2015). Land uses that may be considered sensitive receptors include the existing schools on the project site and the residences to the southeast.

As previously noted, the project would not generate any operational air emissions that would exceed SJVAPCD significance thresholds, and therefore would have the potential to affect sensitive receptors. Emissions from traffic would occur only at certain times of the day and would dissipate after peak hours, thereby limiting the exposure of off-site residences. Construction equipment using diesel fuel could generate the TAC diesel particulate matter; however, such emissions would be temporary and would be readily dispersed before reaching any sensitive receptors.

CO hotspots have the potential to expose nearby sensitive receptors to emissions that violate state and/or federal CO standards, even if the Air Basin is in attainment for federal and state levels. The GAMAQI indicates that a project would create no violations of the carbon monoxide standards if neither of the following criteria are met (SJVAPCD 2015):

- A traffic study for the project indicates that the Level of Service (LOS) on one or more streets or at one or more intersections in the project vicinity will be reduced to LOS E or F; or
- A traffic study indicates that the project will substantially worsen an already existing LOS F on one or more streets or at one or more intersections in the project vicinity (See Section 3.16, Transportation/Traffic, for an explanation of LOS).

As described in more detail in Section 3.16, Transportation/Traffic, a traffic impact study for the project was conducted, in which potential impacts on several intersections in the project vicinity were evaluated. The results indicate that no intersection would have a LOS of E or F, under all study conditions. Therefore, the project would not generate CO hotspots. Project impacts on sensitive receptors would be less than significant.

e) Odors.

In accordance with CEQA Guidelines Appendix G, the GAMAQI states that a project should be evaluated to determine the likelihood that it would result in nuisance odors (SJVAPCD 2015). The project does not have any features that would generate noticeable odors during either construction or operation. The project would have no impact related to odors.

3.4 BIOLOGICAL RESOURCES

Would the project:	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
a) Adversely impact, either directly or through habitat modifications, any endangered, rare, or threatened species, as listed in Title 14 of the California Code of Regulations (Sections 670.2 or 670.5) or in Title 50, Code of Federal Regulations (Sections 17.11 or 17.12)?			√	
b) Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, or regulations, or by the California Department of Fish and Wildlife or US Fish and Wildlife Service?				√
c) Have a substantial adverse effect on federally protected wetlands as defined by Section 404 of the Clean Water Act (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means?				√
d) Interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites?		√		
e) Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance?				√
f) Conflict with the provisions of an adopted Habitat Conservation Plan, Natural Conservation Community Plan, or other approved local, regional, or state habitat conservation plan?			√	

NARRATIVE DISCUSSION

Environmental Setting

The project site has been and is fully urbanized and does not, with the exception of some mature ornamental trees, contain habitat that would be suitable for special-status biological resources. Nonetheless, this analysis in this section is based upon a search of the California Department of Fish and Wildlife's California Natural Diversity Database, an IPaC Trust Resource Report from the U.S. Fish and Wildlife Service, and a visit to the project site. Appendix B of this IS/MND contains the referenced biological resource information.

General Setting

The project site is in an urban, developed area of the City of Stockton known as the Quail Lakes area. The Quail Lakes area consist predominantly of single-family residential development, along with some multifamily residential development and scattered other land uses. The only significant open space area in the vicinity of the project site is Warren Atherton Park, located south of Quail Lakes Drive and managed by the City of Stockton.

Urban landscaping is the primary vegetation in the project vicinity, mainly street trees, lawns, and shrubbery. There is also a riparian area established along Fourteen-Mile Slough, approximately 0.20 miles north of the project site. Given the presence of trees and shrubs in and near the project site, it is possible that a variety of songbirds and other migratory birds nest in and/or near the site. Wildlife in the project vicinity would consist mainly of wildlife adaptable to urban areas, primarily rodents and other small mammals. Amphibians may be found near bodies of water.

Waters of the U.S. and Wetlands

Waters of the U.S., including wetlands, are broadly defined under 33 Code of Federal Regulations 328 to include navigable waterways, their tributaries, and adjacent wetlands. Jurisdictional wetlands and Waters of the U.S. include, but are not limited to, perennial and intermittent creeks and drainages, lakes, seeps, and springs; emergent marshes; riparian wetlands; and seasonal wetlands. No Waters of the U.S. or wetlands were observed on or adjacent to the project site. The nearest stream is Fourteen-Mile Slough, a leveed waterway. The nearest surface body of water is Quail Lake, an artificially created lake immediately south of Quail Lakes Drive at its nearest point.

Special-Status Species

Special-status species are plants and animals that are legally protected under the federal Endangered Species Act (ESA) and/or the California Endangered Species Act (CESA) or other regulations. Special-status wildlife species also includes species that are considered rare enough by the scientific community and trustee agencies to warrant special consideration, particularly with regard to protection of isolated populations, nesting or denning locations, communal roosts and other essential habitat. Special-status plant species are those which are designated rare, threatened, or endangered and candidate species for listing by the U.S. Fish and Wildlife Service, and species considered rare or endangered under the conditions of CEQA Guidelines Section 15380, such as those plant species identified on Lists 1A, 1B and 2 in the Inventory of Rare and Endangered Vascular Plants of California prepared by the California Native Plant Society. Special-status plants may include other species that are considered sensitive or of special concern due to limited distribution or lack of adequate information to permit listing or rejection for state or federal status, such as those included on List 3 of the California Native Plant Society.

Typical special-status species of concern that occur in the Stockton area include the Swainson’s hawk (threatened under CESA), burrowing owl, and tri-colored blackbird (both State Species of Special Concern). Other species of concern include giant garter snake (threatened under ESA and CESA), California tiger salamander (threatened under ESA and CESA), Pacific pond turtle (State Species of Special Concern), and valley elderberry longhorn beetle (threatened under ESA). In addition, migratory bird species protected under the Migratory Bird Treaty Act may be found seasonally in the Stockton area.

The project site is within an urbanized area, and the site itself has been extensively disturbed and paved in conjunction with past development. Because of this, the project site is unlikely to support any habitat for special-status species. Swainson's hawk requires extensive open field areas for foraging, which the project vicinity does not provide, although Swainson's hawks could potentially nest in trees on or near the site. Because of the development and ongoing maintenance of the project site, it is highly unlikely that nesting or foraging habitat would be available for burrowing owl. Tri-colored blackbird requires open water, which the project site does not provide. Giant garter snake, California tiger salamander, and Pacific pond turtle all require water habitats, which are not available on or adjacent to the project site. The valley elderberry longhorn beetle requires blue elderberry shrubs, which were not found on the project site. The project site is within the designated critical habitat for the Delta smelt, but the project site is not located on or adjacent to a waterway that provides smelt habitat.

Biological Resource Plans and Ordinances

ESA declares that all federal departments and agencies shall utilize their authority to conserve endangered and threatened plant and animal species. CESA parallels the policies of ESA and pertains to native California species. Both ESA and CESA prohibit unauthorized "take" (i.e., killing) of listed species, with take broadly defined in both acts to include actions such as harassment, pursuit and possession. Along with ESA and CESA, the federal Migratory Bird Treaty Act and the California Fish and Game Code protect special-status bird species year-round, as well as their eggs and nests during the nesting season. The Fish and Game Code also provides protection for mammals and fish.

The City of Stockton has a Heritage Tree Ordinance that requires a permit for the removal of specific types of oak trees. Trees on the project site are all ornamental assumed to have been planted in conjunction with existing site development. There are no mature oak trees on the project site.

The project site is within the coverage area of the San Joaquin County Multi-Species Open Space and Habitat Conservation Plan (SJMSCP), a habitat conservation plan adopted by San Joaquin County and its incorporated cities and managed by the San Joaquin Council of Governments (SJCOG). The SJMSCP is a program that assesses a habitat conservation fee on participating projects that convert open space land to an urban use. The SJMSCP also sets forth Incidental Take Minimization Measures that participating projects must implement to prevent impacts to special-status species (SJCOG 2000). Participation in the SJMSCP is voluntary on the part of SUSD; if SUSD chooses to not participate, it remains responsible for potential impacts on biological resources.

Environmental Impacts and Mitigation Measures

a) Special-Status Species.

The project site is a previously urbanized site within an urbanized area with very limited open spaces nearby. The largest of these is Quail Lake, a constructed water feature of the overall Quail Lakes development. The site and surroundings are extensively disturbed and do not support any substantial areas of habitat for the potentially-occurring special-status species described above.

The project would involve demolition and new construction in an urbanized area, and the re-development of the project site would maintain its urbanized condition for the long term. While construction could involve temporary impacts on species commonly using the urbanized environment, it is unlikely that special-status species would be adversely affected by project construction or its operations, and therefore the project would have a less than significant effect on special-status species. The project site is within the coverage area of the San Joaquin County Open Space and Habitat Conservation Plan (SJMSCP); if the SUSD decides to participate in the SJMSCP, participation would further reduce any potential special status species effects of the project.

b) Riparian and Other Sensitive Habitats.

The project site is not located on, adjacent to or near a stream. No riparian habitat exists on the site. No sensitive natural communities have been identified on or adjacent to the project site. The project would have no impact on sensitive habitats.

c) Wetlands and Waters of the U.S.

No potentially jurisdictional Waters of the U.S. or wetlands were observed on or adjacent to the project site. The nearest potential jurisdictional waters are Quail Lake and Fourteen-Mile Slough, neither of which the project would disturb. The project would have no impact on wetlands and Waters of the U.S.

d) Fish and Wildlife Movement.

The project would not affect any waterways that could be used by migratory fish in the area, since the site is not located on or adjacent to such waterways. Trees on and near the project site could be used by birds protected by the Migratory Bird Treaty Act of 1918 and/or the California Fish and Game Code. Because the project could potentially affect nests of migratory birds, mitigation is prescribed that would reduce the potential impacts on these habitats. Implementation of this mitigation measure would reduce potential impacts on migratory birds to a level that would be less than significant.

Level of Significance: Potentially significant

Mitigation Measures:

BIO-1: Any tree that needs to be removed to facilitate development of the project site shall be felled outside of the general bird nesting season, which is February 1 through August 31. If tree removal is proposed during the bird nesting season, a nesting bird survey shall be conducted by a qualified biologist prior to tree removal. If active nests are found, tree removal shall be delayed until the young have fledged. If no active nests are found, then tree removal may proceed.

Significance After Mitigation: Less than significant

e) Local Biological Requirements.

The only significant local biological requirements are set forth in the City of Stockton’s Heritage Tree Ordinance. The field survey did not identify any oak trees on the project site, so the City's Heritage Tree Ordinance would not apply to the project. The project would have no impact on local biological requirements.

f) Conflict with Habitat Conservation Plans.

The project is within the jurisdictional area of the SJMSCP but would not convert existing open space areas to developed land uses, as the project site is already developed. The SJMSCP Habitat Map indicates that the project site is a Category A site, which applies mainly to developed areas and exempts designated areas from SJMSCP fees. Participation in the SJMSCP is required by the City of Stockton. As a result, the project would involve no conflict with the SJMSCP. No other habitat conservation plans apply to the project site. Project impacts related to habitat conservation plans would be less than significant.

3.5 CULTURAL RESOURCES

Would the project:	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
a) Cause a substantial adverse change in the significance of a historical resource as defined in Section 15064.5?				√
b) Cause a substantial adverse change in the significance of a unique archaeological resource (i.e., an artifact, object, or site about which it can be clearly demonstrated that, without merely adding to the current body of knowledge, there is a high probability that it contains information needed to answer important scientific research questions, has a special and particular quality such as being the oldest or best available example of its type, or is directly associated with a scientifically recognized important prehistoric or historic event or person)?		√		
c) Directly or indirectly destroy a unique paleontological resource or site or unique geologic feature?		√		
d) Disturb any human remains, including those interred outside of formal cemeteries?		√		

NARRATIVE DISCUSSION

Environmental Setting

Prehistoric Background

The project site is located within territory claimed by the Northern Valley Yokuts. The Yokuts occupied an extensive area, from the Coast Ranges to the Sierra Nevada foothills, and from the American River to the upper San Joaquin River. Yokut villages typically consisted of a scattering of small structures, numbering from four or five to several dozen in larger villages and were often located on flats adjoining streams. These villages were inhabited mainly in the winter, because it was necessary to go into the hills and higher elevation zones to establish temporary camps during food-gathering seasons. As with most California Indian groups, economic life for the Yokuts revolved around hunting, fishing, and collecting plants, with deer, acorns and avian and aquatic resources representing primary staples. The Yokuts used a wide variety of wooden, bone, and stone artifacts to collect and process their food, and they used local resources to manufacture an array of primary and secondary tools and implements. Only fragmentary evidence of their material culture remains, due in part to perishability and in part to impacts to archaeological sites resulting from later land uses.

Historic-Era Background

Historically, this part of the Central Valley was first visited by Anglo-American fur trappers, Russian scientists and Spanish-Mexican expeditions during the first half of the 19th century. By the late 1830s and early 1840s, small permanent European-American settlements had settled in the Central Valley and surrounding foothills. In 1841, Charles Weber arrived in California as part of the Bidwell-Bartleson party and settled in what would become present-day downtown Stockton. Weber, partnering with others, established a colony at this location and received the Rancho del Campo de los Franceses land grant in 1844. During the spring of 1849, the town of Stockton was surveyed and established.

The discovery of gold in the Sierra Nevada in 1848 triggered a massive influx of people. Demand for commodities from the mining communities led quickly to the expansion of ranching and agriculture throughout the Central Valley, followed by permanent communities along major transportation corridors. The Southern Pacific and Central Pacific Railroads and a host of smaller interurban lines began intensive projects in the late 1860s, eventually connecting Stockton with other cities. Agriculture became an important part of the Stockton economy, as the city with its port became a major processing center for wheat and other agricultural products.

Record Search Results

A search of the California Historical Resources Information System (CHRIS) was conducted during the preparation of this Initial Study. No archaeological or historical sites have been recorded on or in the immediate vicinity of the project. A recorded historic is located approximately 0.25 miles north of the site and north of 14-mile Slough near Swain Road.

Existing church buildings and site improvements on the project site are relatively recent, having been constructed within the last 40 years, and would not be considered historical. The project site and vicinity has been extensively disturbed by previous development, including mass grading of the site during construction of the Quail Lakers development, and fine grading and excavation for existing building foundations, paved areas and utilities. Development of the proposed would involve comparable amounts and depths of disturbance. As a result, it is unlikely that any intact archaeological or paleontological resources would be uncovered in conjunction with the project.

Paleontological Resources

Remains of extinct animals, such as mammoth, can be found virtually anywhere in San Joaquin County, especially along watercourses such as the San Joaquin River and its tributaries. The majority of paleontological specimens from San Joaquin County have been found in rock formations in the foothills of the Diablo Mountain Range (San Joaquin County 2016).

Environmental Impacts and Mitigation Measures

a, b, c) Historical, Archaeological, and Paleontological Resources.

Existing church buildings and site improvements on the project site are relatively recent and would not be considered historical. There are no known historic sites on or in the immediate vicinity of the site. The project site and vicinity has been extensively disturbed by previous development, and as a result, it is unlikely that any intact archaeological or paleontological resources would be uncovered in conjunction with the project.

Although unlikely, it is conceivable that resources of significance could be unearthed during excavation or other earth-moving work in portions of the project site that escaped deep disturbance during past construction activity. The establishment of procedures to address archaeological and paleontological discoveries, if they should occur, would reduce potential impacts to a level that would be less than significant. These procedures are set forth in the following mitigation measure.

Level of Significance: Potentially significant

Mitigation Measures:

CULT-1: If any subsurface cultural or paleontological resources are encountered during construction of the project, all construction activities in the vicinity of the encounter shall be halted until a qualified archaeologist, or paleontologist as appropriate, can examine these materials, make a determination of their significance and, if significant, recommend further mitigation measures that would reduce potential effects to a level that is less than significant. Such measures could include 1) preservation in place or 2) excavation, recovery and curation by qualified professionals. The SUSD shall be responsible for retaining qualified professionals, implementing recommended mitigation measures and documenting mitigation efforts in a written report, consistent with the requirements of the CEQA Guidelines.

Significance After Mitigation: Less than significant

d) Human Burials.

Given past disturbance of the project site, it is unlikely that any human burials, particularly Native American burials, would be uncovered during project construction work. Even so, it is conceivable that excavation or other earth-moving work could uncover a previously unknown burial. As documented in Section 3.17, potentially-affected tribes were notified of the project pursuant to AB 52 with no response to date.

CEQA Guidelines Section 15064.5(e) describes the procedure to be followed when human remains are uncovered in a location outside a dedicated cemetery. All work in the vicinity of the find shall be halted and the County Coroner shall be notified to determine if an investigation of the death is required. If the County Coroner determines that the remains are Native American in origin, then the County Coroner must contact the Native American Heritage Commission within 24 hours. The Native American Heritage Commission shall identify the most likely descendants of the deceased Native American, and the most likely descendants may make recommendations on the disposition of the remains and any associated grave goods with appropriate dignity. If a most likely descendant cannot be identified, the descendant fails to make a recommendation, or the landowner rejects the recommendations of the most likely descendant, then the landowner shall rebury the remains and associated grave goods with appropriate dignity on the property in a location not subject to further disturbance.

Mitigation presented below would require compliance with CEQA Guidelines Section 15064.5(e). Implementation of the mitigation measure would ensure that human remains and any associated grave goods encountered during project construction would be treated with appropriate dignity. Project impacts on human remains after mitigation would be less than significant.

Level of Significance: Potentially significant

Mitigation Measures:

CULT-2. Project construction shall comply with the provisions of CEQA Guidelines Section 15064.5(e) regarding the treatment of any human burials encountered, including halting all work in the vicinity of the find and notifying the County Coroner.

Significance After Mitigation: Less than significant

3.6 GEOLOGY AND SOILS

Would the project:	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
a) Expose people or structures to potential substantial adverse effects, including the risk of loss, injury, or death involving:				
i) Rupture of a known earthquake fault, as delineated on the most recent Alquist-Priolo Earthquake Fault Zoning Map issued by the State Geologist for the area or based on other substantial evidence of a known fault? Refer to Division of Mines and Geology Special Publication 42.				√
ii) Strong seismic ground shaking?			√	
iii) Seismic-related ground failure, including liquefaction?			√	
iv) Landslides?				√
b) Result in substantial soil erosion or the loss of topsoil?			√	
c) Be located on strata or soil that is unstable, or that would become unstable as a result of the project, and potentially result in on- or off-site landslide, lateral spreading, subsidence, liquefaction or collapse?		√		
d) Be located on expansive soil, as defined in Table 18-1-B of the Uniform Building Code, creating substantial risks to life or property?		√		
e) Have soils incapable of adequately supporting the use of septic tanks or alternative wastewater disposal systems where sewers are not available for the disposal of wastewater?				√

NARRATIVE DISCUSSION

Environmental Setting

The analysis in this section is based primarily upon a geotechnical engineering study conducted for the project by Condor Earth. Appendix C of this IS/MND contains the geotechnical engineering study.

Topography and Soils

The project area lies in the San Joaquin Valley, which is in the southern portion of the Great Valley Geomorphic Province. The San Joaquin Valley is filled with thick sedimentary rock sequences that were deposited as much as 130 million years ago. Large alluvial fans have developed on each side of the Valley. The larger and more gently sloping fans are on the east side of the Valley and overlie metamorphic and igneous basement rocks. These basement rocks are exposed in the Sierra Nevada foothills and consist of metasedimentary, volcanic, and granitic rocks. The sediments that form the Valley floor were derived largely from erosion of the Sierra Nevada. The Geologic Map of the San Francisco-San Jose Quadrangle (Wagner et al. 1991) designates the underlying geology of the project area as Modesto Formation, consisting of Quaternary sediments.

According to the U.S. Department of Agriculture's Soil Survey of San Joaquin County (USDA SCS 1992, USDA NRCS 2017), the soil type underlying the project site is Jacktone-Urban complex, a soil unit that is 50% Jacktone clay and 35% urban land, with small areas of other soil types. The Jacktone soil is moderately deep to a hardpan and is somewhat poorly drained. It was formed in alluvium derived from mixed rock sources. Permeability is slow in the Jacktone soil, as is runoff. The water erosion hazard is slight, and the soil is classified as not susceptible to wind erosion. The shrink-swell potential of the Jacktone soil is high.

Seismic Hazards

The project area, along with the rest of San Joaquin County, is in a seismically active region. The California Geological Survey does not include the project site in an Alquist-Priolo Earthquake Fault Zones (California Geological Survey 2015). However, San Joaquin County is subject to seismic shaking from fault features east and west of the County, including the Hayward/Rodgers Creek, San Andreas, and Calaveras Faults (San Joaquin County 2016).

Potential seismic hazards include ground rupture (also called surface faulting), ground shaking, liquefaction, and lateral spreading. Soil compaction and settlement can result from seismic ground shaking. If the sediments that compact during an earthquake are saturated, water from voids is forced to the ground surface, where it emerges in the form of mud spouts or sand boils – a process called liquefaction. Based on known information, areas of the County with groundwater less than 50 feet from ground surface in unconsolidated sediment are susceptible to liquefaction, including lands near river courses (San Joaquin County 2016). According to the project geotechnical engineering study, the approximate depth to groundwater on the project site ranges from 14 to 22 feet below ground surface (Condor Earth 2018).

Environmental Impacts and Mitigation Measures

a-1) Fault Rupture Hazards.

As noted above, there are no active or potentially active faults within or near the project site, nor are there Alquist-Priolo zones. The project would have no impact related to fault rupture.

a-2) Seismic Ground Shaking.

The project site, along with the rest of the County, is subject to seismic shaking from fault features east and west of the County. The project geotechnical engineering study evaluated ground shaking hazards and concluded that a hazard analysis is not required because no active or potentially active faults of recent geological age are located within

10 kilometers of the project site (Condor Earth 2018). It is expected that building construction would follow applicable building codes, which include seismic safety requirements. Project impacts related to ground shaking would be less than significant.

a-3) Other Seismic Hazards.

As noted above, depth to groundwater on the project site ranges from 14 to 22 feet. This indicates that the project site may be susceptible to liquefaction. The project geotechnical engineering study analyzed the potential for liquefaction and liquefaction-induced seismic settlement. The study concluded that some settlement would occur, but the settlement is within an acceptable range, because the settlement would occur 30-50 feet below the ground surface and a thick cap of stiff clay overlies the potentially affected layers. Also, differential settlement (from one end of a building to the other) would be within an acceptable range (Condor Earth 2018). Based on the conclusions of the project geotechnical engineering report, project impacts related to other seismic hazards are considered less than significant.

a-4) Landslides.

The project site is in a topographically flat area, so there would be no landslide hazard. The project would have no impact related to landslides.

b) Soil Erosion.

The Jacktone-Urban complex on the project site has a low potential for erosion by itself. However, project construction may loosen soils, leaving them exposed to potential water and wind erosion.

Measures associated with SJVAPCD Regulation VIII, which is discussed in Chapter 6.0, Air Quality, would reduce potential wind erosion impacts. Also, development projects that disturb one or more acres of soil are required to obtain the Construction General Permit, administered by the State Water Resources Control Board (SWRCB). The Construction General Permit requires preparation of a Storm Water Pollution Prevention Plan (SWPPP) to address potential water quality issues associated with construction discharges. The SWPPP includes a site map and description of construction activities and identifies the Best Management Practices (BMPs) that will be employed to prevent soil erosion and discharge of other construction-related pollutants that could contaminate nearby water resources. A monitoring program is generally required to ensure that BMPs are implemented according to the SWPPP and are effective at controlling discharges of stormwater-related pollutants.

Compliance with the requirements of SJVAPCD Regulation VIII and the Construction General Permit would minimize the amount of erosion that may occur because of soil disturbance associated with project construction. Once construction work is completed, no soil erosion is expected to occur because of the development and landscaping. Project impacts related to soil erosion would be less than significant.

c) Soil Instability.

The geotechnical engineering study evaluated the suitability of the project site for proposed construction. The conclusion was that the project site was suitable, provided recommendations contained in the report are incorporated into the project design (Condor Earth 2018). Specifically, the study recommended that all grading and site work should be performed in accordance with the 2016 California Building Code, Title 24, Chapter 33 (Safeguards During Construction), Appendix J (Grading), and Chapter 18A (Soils and Foundations), and with the recommendations of the Geotechnical Engineer of Record during construction. The study recommended the use of engineered fill materials and placement. Mitigation presented below would ensure that recommendations in the geotechnical engineering study are incorporated into the project design, thereby reducing potential soil instability impacts to a level that would be less than significant.

Level of Significance: Potentially significant

Mitigation Measures:

GEO-1: In project design and construction, the SUSD shall incorporate recommendations contained in Geologic Hazards and Geotechnical Engineering Study, Stockton Unified School District, Oasis Church Property, 2111 Quail Lakes Drive, Stockton, California, prepared by Condor Earth on August 23, 2018. The recommendations include, but are not limited to, site preparation, excavations and fill, underground utility trenches, surface drainage control, foundations, slabs-on-grade, and pavement, among other issues.

Significance After Mitigation: Less than significant

d) Expansive Soils.

The shrink-swell potential of the Jacktone soil has been classified as high. Expansive soils can lead to damage of building foundations and pipelines if not addressed. The project geotechnical engineering study noted that existing site concrete flatwork showed distress due to expansive soils, and the presence of expansive soils on the project site was identified as a primary geotechnical consideration (Condor Earth 2018). Recommendations by the study to address this issue include subgrade preparation and the use of engineered fill. Mitigation Measure GEO-1, described above, would require the project to incorporate the geotechnical engineering study recommendations in project design and construction, including recommendations related to expansive soils. With implementation of the mitigation measure, expansive soil impacts would be less than significant.

e) Adequacy of Soils for Wastewater Disposal.

The proposed new school on the project site would connect to the wastewater system of the City of Stockton. It would not use, and does not propose to install, any septic systems. The project would have no impact related to this issue.

3.7 GREENHOUSE GAS EMISSIONS

Would the project:	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
a) Generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment?			√	
b) Conflict with an applicable plan, policy or regulation adopted for the purpose of reducing the emissions of greenhouse gases?			√	

NARRATIVE DISCUSSION

Environmental Setting

Greenhouse gases (GHGs) are gases that absorb and emit radiation within the thermal infrared range, trapping heat in the earth's atmosphere. GHGs are both naturally occurring and are emitted by human activity. GHGs include carbon dioxide, the most abundant GHG, as well as methane, nitrous oxide and other gases. GHG emissions in California in 2016 were estimated at 429.33 million metric tons carbon dioxide equivalent (CO_2e) – a decrease of approximately 13.0% from the peak level in 2004. Transportation was the largest contributor to GHG emissions in California, with approximately 41% of total emissions. Other significant sources include industrial activities, with 21% of total emissions, and electric power generation, both in-state and imported, with 16.0% of total emissions (ARB 2018). Increased atmospheric concentrations of GHGs are considered a primary contributor to global climate change, which is a subject of concern for the State of California. Potential impacts of global climate change in California include reduced Sierra Nevada snowpack, increased wildfire hazards, greater number of hot days with associated decreases in air quality, and potential decreases in agricultural production (Climate Action Team 2010).

The State of California has implemented GHG emission reduction strategies through Assembly Bill (AB) 32, the Global Warming Solutions Act of 2006, which requires total statewide GHG emissions to reach 1990 levels by 2020, or an approximately 29% reduction from 2004 levels. In compliance with AB 32, the State adopted the Climate Change Scoping Plan in 2008 and updated the plan in 2014. Primary strategies addressed in the original Scoping Plan included new industrial and emission control technologies; alternative energy generation technologies; advanced energy conservation in lighting, heating, cooling and ventilation; fuels with reduced carbon content; hybrid and electric vehicles; and methods for improving vehicle mileage (ARB 2008). The 2014 update highlights California's progress toward meeting the 2020 GHG emission reduction goal of the original Scoping Plan, and it establishes a broad framework for continued emission reductions beyond 2020, on the path to 80% below 1990 levels by 2050 (ARB 2014). The 2016 state GHG emissions were approximately two million metric tons CO_2e below the 2020 target established by AB 32 (ARB 2018).

In 2016, Senate Bill (SB) 32 became law. SB 32 extends the GHG reduction objectives of AB 32 by mandating statewide reductions in GHG emissions to levels that are 40% below 1990 levels by the year 2030. The State has adopted an updated Scoping Plan that sets forth strategies for achieving the SB 32 target. The updated Scoping Plan continues many of the programs that were part of the previous Scoping Plans, including the cap-and-trade program, low-carbon fuel standards, renewable energy, and methane reduction strategies. It also addresses for the first time GHG emissions from the natural and working lands of California, including the agriculture and forestry sectors (ARB 2017).

The City of Stockton adopted a Climate Action Plan (CAP) in 2014, in compliance with a legal settlement related to its General Plan and associated EIR. The CAP set a GHG emission reduction target of 10% below 2005 GHG emission levels by 2020. To achieve this target, the CAP incorporates a Development Review Process through which development projects document the incorporation of measures that would produce a 29% reduction from 2020 business-as-usual GHG emissions. The majority of the GHG reductions in Stockton would occur through State regulatory programs and local programs that are producing or will produce GHG emission reductions that would help to reduce total emissions associated with a project by approximately 25% from business-as-usual levels. Development must identify the BMPs that would provide the additional 4% reduction in GHG emissions (City of Stockton 2014). While the project would not be subject to the City's CAP, it does take into consideration the CAP objectives.

Environmental Impacts and Mitigation Measures

a, b) Project GHG Emissions and Consistency with GHG Reduction Plans.

CalEEMod was used to estimate the total GHG construction and operational emissions associated with the project (see Appendix A of this IS/MND). Table 3-3 presents the results of the CalEEMod run.

TABLE 3-3
PROJECT GHG EMISSIONS

GHG Emission Type	Unmitigated Emissions	Mitigated Emissions
Construction[1]	254.35	254.35
Operational[2]	721.97	516.70

[1] Total GHG emissions for construction period in metric tons CO_2e.
[2] Annual emissions in metric tons CO_2e.
Source: California Emissions Estimator Model v. 2016.3.1.

Based on results from the CalEEMod run, total project construction GHG emissions would be approximately 254 metric tons CO_2e. Neither the State nor SJVAPCD has established significance thresholds for GHG emissions from construction activities or from project operations. However, construction emissions would be limited to a relatively short time period and would cease once work is completed. In addition, implementation of SJVAPCD Regulation VIII, noted in Section 3.3, Air Quality, is expected to reduce incrementally the amount of GHGs generated by project construction.

Project operational GHG emissions would be approximately 722 metric tons CO_2e annually under “unmitigated” conditions (i.e., without implementation of any project features or regulations that would reduce GHG emissions). The CalEEMod run incorporated the following project features and regulations that would reduce GHG emissions:

- Installation of sidewalk along currently unimproved frontage per City standards.
- Availability of existing public transit service.
- Proximity to downtown Stockton.
- In accordance with SBX7-7, new development would implement water conservation measures that lead to a 20% reduction in indoor and outdoor water use.
- In accordance with AB 341, new commercial development would divert 75% of its solid waste stream through recycling and other measures.

With incorporation of these measures, estimated operational GHG emissions would be reduced to approximately 517 metric tons CO_2e annually, a 28.43% reduction in GHG emissions from unmitigated levels. This would exceed the 4% local share as indicated by the Stockton CAP. Although the project would not be subject to the CAP, the GHG reduction would be consistent with CAP objectives, which in turn are consistent with State GHG reduction objectives. Project impacts related to GHG emissions would be less than significant.

3.8 HAZARDS AND HAZARDOUS MATERIALS

Would the project:	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
a) Create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials?			√	
b) Create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment?		√		
c) Emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school?				√
d) Be located on a site which is included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5 and, as a result, would it create a			√	

significant hazard to the public or the environment?				
e) For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project result in a safety hazard for people residing or working in the project area?				√
f) For a project within the vicinity of a private airstrip, would the project result in a safety hazard for people residing or working in the project area?				√
g) Impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan?				√
h) Expose people or structures to a significant risk of loss, injury or death involving wildland fires, including where wildlands are adjacent to urbanized areas or where residences are intermixed with wildlands?				√

NARRATIVE DISCUSSION

Environmental Setting

This section focuses on hazards associated with hazardous materials, proximity to airports, and wildfires. Geologic and soil hazards are discussed in Section 3.6, Geology and Soils, and flooding hazards are discussed in Section 3.9, Hydrology and Water Quality.

Data on hazardous material sites are kept in the GeoTracker database, maintained by the SWRCB, and in the EnviroStor database, maintained by the DTSC. Both GeoTracker and EnviroStor provide the names and addresses of hazardous material sites, along with their cleanup status. A search of the GeoTracker and EnviroStor databases indicated no record of active or closed hazardous material sites (i.e., sites not cleaned up) at or in the vicinity of the project site (DTSC 2017, SWRCB 2017). No other open cleanup projects were found on record.

A list of solid waste disposal sites identified by SWRCB with waste constituents above hazardous waste levels outside the waste management unit did not show any locations within the project area (CalEPA 2016a). Likewise, a list by SWRCB containing sites under Cease and Desist Orders and Cleanup and Abatement Orders showed no locations (CalEPA 2016b).

Wildland fires are an annual hazard in San Joaquin County. Wildland fires burn natural vegetation on undeveloped lands and include rangeland, brush, and grass fires. Long, hot, and dry summers with temperatures often exceeding 100°F add to the County's fire hazard. Human actions are the major causes of wildland fires, while lightning causes most of the remaining fires. High hazard areas for wildland fires are the grass-covered areas in the east and the southwest foothills of the County (San Joaquin County 2016). The project site is not within these areas. As an urban, developed area locted several miles from wildlands with high fire risk, the project vicinity is unlikely to experience wildfires.

Environmental Impacts and Mitigation Measures

a) Hazardous Materials Transportation, Use and Disposal.

Construction activities on the project site may involve the use of hazardous materials such as fuels and solvents. Construction vehicles would transport and use fuels in ordinary quantities. Other substances used in the construction process would be stored in approved containers and used in relatively small quantities, in accordance with the manufacturers' recommendations and/or applicable regulations.

Schools do not require large quantities of hazardous materials in their operations. The only potentially hazardous materials typically used by schools are consumer and cleaning products, which are used in small amounts and do not present a hazard when properly used and stored. Project impacts related to transport, use, and disposal of hazardous materials would be less than significant.

b, c) Release of Hazardous Materials

Construction activities on the project site may involve the potential for fuel spills. Fuel spills, if any occur, would be minimal and would not typically have significant adverse effects. Potential hazardous materials spills during construction are addressed in the required SWPPP, described in Section 3.6, Geology and Soils. In accordance with SWPPP requirements, contractors have absorbent materials at construction sites to clean up minor spills. As noted in a) above, the school would involve minimal use of hazardous materials. No hazardous materials would be used that would present a general health hazard to students and staff if released into the environment.

Existing structures on the project site would be demolished. Depending on their age, these structures may contain asbestos products, and demolition of these structures may release asbestos dust or fibers into the environment. Asbestos has been classified as a carcinogen. The SJVAPCD has regulations which require compliance with the asbestos demolition and renovation requirements developed by the EPA in the National Emission Standards for Hazardous Air Pollutants (NESHAP) regulation, found in 40 Code of Federal Regulations, Part 61, Subpart M. The SJVAPCD regulations require an asbestos inspection before any demolition that occurs at a regulated facility. A "regulated facility" is defined as a facility subject to the NESHAP, and includes all commercial buildings, residential buildings with more than four dwelling units, other structures, and non-portable equipment. SJVAPCD regulations require the inspection to be conducted by or under the direction of a consultant certified by the California Occupational Safety and Health Administration (Cal-OSHA).

Should the asbestos inspection discover any asbestos-containing materials that would be disturbed during a renovation or demolition, these materials must be removed prior to further project work. Also, Cal-OSHA and California Environmental Protection Agency hazardous waste regulations apply in most cases. A project must submit an asbestos notification form to the SJVAPCD for any regulated demolition, 10 working days before the activity begins. The notification requirement applies even if the asbestos inspection does not discover any asbestos-containing materials.

It is not known if the existing structures contain any asbestos materials, but they are considered to be regulated facilities under NESHAP, as the facility is on public land. Project demolition activities would be subject to the SJVAPCD's asbestos regulations. The following mitigation measure would require the project to follow SJVAPCD regulations regarding demolition of structures potentially containing asbestos, which are designed to minimize the release of asbestos fibers into the environment. Implementation of this measure would reduce impacts related to asbestos to a level that would be less than significant.

Level of Significance: Potentially significant

Mitigation Measures:

HAZ-1: Prior to demolition activities, the Lead Agency shall conduct an asbestos inspection of the buildings identified for demolition, in accordance with San Joaquin Valley Air Pollution Control District (SJVAPCD) regulations. The inspection report shall be submitted to the SJVAPCD along with the asbestos notification form, which must be submitted to the SJVAPCD ten (10) working days before demolition activity begins. In accordance with SJVAPCD Rule 3050, applicable fees must be submitted along with the notification form. If asbestos-containing materials are discovered which would be disturbed during demolition activities, these materials must be removed prior to demolition. Removal work shall be conducted by a contractor whose employees are properly trained and equipped for such work in accordance with Cal-OSHA regulations. The handling, transport and disposal of the asbestos-containing materials shall be conducted in accordance with California Environmental Protection Agency and National Emission Standards for Hazardous Air Pollutants (NESHAP) regulations.

Significance After Mitigation: Less than significant

c) Emission of Hazardous Materials Near Schools.

As noted in a) above, the school would involve minimal use of hazardous materials. No hazardous materials would be used that would present a general health hazard to students and staff if released into the environment. Project impacts would be less than significant.

d) Hazardous Materials Sites.

None of the lists of hazardous materials sites compiled pursuant to Government Code Section 65962.5 contains sites within the project area. As noted in the Environmental Setting, a search of the GeoTracker and EnviroStor databases did not identify any active hazardous material sites on or near the project site.

As noted in Chapter 2.0, Project Description, the DTSC requires that a site assessment be conducted to determine the potential presence of hazardous materials. The project geotechnical report indicates that the site is being evaluated for potential contamination caused by past site use under direction of the DTSC. However, based on the findings to date, it is not anticipated that significant grading adjustments would be required to meet DTSC requirements (Condor Earth 2018). If any site contamination is identified by the site assessment, it shall be remediated in a cleanup process overseen by DTSC. Project impacts related to hazardous materials sites are considered less than significant.

e, f) Airport and Airstrip Operations.

A review of aerial photographs in Google Earth revealed no public use airports or private airstrips within two miles of the project area. The project would have no impact on this issue.

g) Emergency Response and Evacuation.

Project construction work such as vehicle access and utility connections could extend into adjacent streets. These streets are used by emergency vehicles to access nearby residential areas and likely would be used in evacuations. Project work in the adjacent streets is not expected to require closure or any major restriction on public use of the roads, so project construction is not expected to substantially obstruct emergency vehicles or any evacuation activity that may be required in the area. Project operations would not obstruct any roadways. Project impacts on emergency response or emergency evacuation plans would be less than significant.

h) Wildland Fire Hazards.

The project site is in a developed urban area with few open spaces. This area is not susceptible to wildfires. The project would have no impact related to wildland fire hazards.

3.9 HYDROLOGY AND WATER QUALITY

Would the project:	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
a) Violate any water quality standards or waste discharge requirements?			√	
b) Substantially deplete groundwater supplies or interfere substantially with groundwater recharge such that there would be a net deficit in aquifer volume or a lowering of the local groundwater table level (e.g., the production rate of pre-existing nearby wells would drop to a level which would not support existing land uses or planned uses for which permits have been granted)?			√	
c) Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, in a manner which would result in substantial erosion or siltation on- or off-site?			√	

d) Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, or substantially increase the rate or amount of surface runoff in a manner which would result in flooding on- or off-site?			√	
e) Create or contribute runoff water which would exceed the capacity of existing or planned stormwater drainage systems?			√	
f) Otherwise substantially degrade water quality?			√	
g) Place housing within a 100-year flood hazard area as mapped on a federal Flood Hazard Boundary or Flood Insurance Rate Map or other flood hazard delineation map?				√
h) Place within a 100-year flood hazard area structures which would impede or redirect flood flows?				√
i) Expose people or structures to a significant risk of loss, injury or death involving flooding, including flooding as a result of a levee or dam?			√	
j) Inundation by seiche, tsunami, or mudflow?				√

NARRATIVE DISCUSSION

Environmental Setting

Surface Waters

The project site is within the legally-defined secondary zone of the Sacramento-San Joaquin Delta. The Sacramento-San Joaquin Delta is a 600-square-mile area of waterways and islands of reclaimed land at the confluence of the Sacramento and San Joaquin Rivers. The Delta receives runoff from a watershed that covers approximately 45 percent of the State's land area, including flows from the Sacramento, San Joaquin, Mokelumne, and Cosumnes Rivers (Lund et al. 2007). The Delta supports agricultural and recreational uses, is the focal point for water distribution throughout the southern half of the State, and provides habitat for many species of fish, birds, mammals, and plants.

The project site is in an essentially flat, urbanized area. As noted in Section 3.4, Biological Resources, the nearest stream is Fourteen-Mile Slough, a leveed waterway approximately 0.20 miles to the north. The nearest surface body of water is Quail Lake, an artificially created lake immediately south of the site. Storm water runoff on the project site is collected by a storm drainage system managed by the City of Stockton (see also Section 3.18, Utilities and Service Systems).

Surface water quality in the Valley and Delta regions is managed by the Central Valley Regional Water Quality Control Board (RWQCB) by means of The Water Quality Control Plan for the Sacramento River and San Joaquin River Basins, revised in June 2015. The beneficial uses of surface waters in the region include municipal and domestic water supply; industrial service and process supply; agricultural irrigation; groundwater recharge; navigation; contact and non-contact recreation; commercial and sport fishing;

migration of aquatic organisms; wildlife habitat; and habitat for rare, threatened, and endangered species. (RWQCB 2015).

The SWRCB has the responsibility under the federal Clean Water Act and the National Pollutant Discharge Elimination System (NPDES) program for the control of storm water quality. Additional storm water regulation is established in the NPDES area-wide municipal separate storm sewer system permit system administered by the SWRCB, which requires affected jurisdictions, including the City of Stockton, to adopt and implement a Storm Water Management Program (SWMP). The City of Stockton has adopted a SWMP, which is intended to minimize the potential storm water quality impacts of development, including both construction and post-construction activity. The Stockton SWMP consists of a variety of programs, including controls on illicit discharges, public education, controls on City operations, and water quality monitoring (City of Stockton 2009a). The requirements of the SWMP are enforced primarily through the City's Storm Water NPDES permit, issued by the Central Valley RWQCB.

Post-construction elements of the SWMP are governed by City ordinances that require compliance with the City's adopted Storm Water Quality Control Criteria Plan (SWQCCP), as outlined in the City's Phase 3 Storm Water NPDES permit issued by the RWQCB, Central Valley Region (Order No. R5-2007-0173). The SWQCCP identifies a range of post-construction BMPs that must be incorporated into development plans. BMPs include provisions for water quality control as well as volume reduction (City of Stockton 2009b).

Groundwater

The project site is within the Eastern San Joaquin County groundwater basin. At the project site, groundwater is very shallow as a result of the low elevation. As noted in Section 3.6, Geology and Soils, groundwater levels at the project site are between 14 and 22 feet below ground surface. Fluctuations in groundwater levels occur due to changes in seasons, variations in rainfall, construction impacts, and other factors (Condor Earth 2018).

Groundwater has been an important source of domestic water in the Stockton area, but currently supplies only 25% of the City's water. A significant portion of water consumed in Stockton now comes from surface water supplied by the Stockton East Water District during years of normal or greater rainfall. The surface water supply has been augmented with the completion of the City's Delta Water Supply Project, which draws surface water from the Delta region.

Groundwater used for the City's water supply is generally of good quality, with iron and manganese sequestering and chlorination being the only treatment required. However, there is concern regarding the deterioration of groundwater quality due to salt water intrusion from connate brines under the Delta into Stockton's western regions. Small annual increases in salinity have been noted during years with low surface water availability.

Flooding Hazards

According to a Flood Insurance Rate Map prepared by the Federal Emergency Management Agency (FEMA), the project site lies within an area classified as Zone X (FEMA 2009). Zone X denotes areas outside the 100-year floodplain, which is the standard flood used in flooding evaluations, but within the 500-year floodplain. According to a dam failure plan prepared by the County Office of Emergency Services, the project site is potentially subject to inundation from failure of New Melones Dam, Camanche Dam, the south dikes of Camanche Reservoir, and New Hogan Dam (San Joaquin County OES 2003).

SB 5 and associated legislation requires protection for a 200-year flood for urban and urbanized areas in the Central Valley. Under SB 5, new development in moderate or special hazard areas within the Central Valley is permitted if the local agency can provide substantial evidence that the development would be subject to less than 3 feet of flooding during a 200-year flood event. Based on information provided by the California Department of Water Resources, the project site potentially would be subject to a 200-year flood depth of greater than three feet (City of Stockton 2016).

Environmental Impacts and Mitigation Measures

a, f) Surface Waters and Quality.

The project site does not have, nor is adjacent to, any streams or bodies of water. Discharges from project construction would not reach any surface waters, particularly with the implementation of Mitigation Measure GEO-1, which requires a SWPPP. Project operations would lead to no discharges into surface waters. The project would have no direct impact on surface waters or water quality. The City of Stockton has adopted a SWMP and a SWQCCP, which would minimize the potential storm water quality impacts of development on surface waters. The project would conform to these plans. Overall, project impacts on surface waters and their quality would be less than significant.

b) Groundwater Supplies.

The project would not affect groundwater aquifers nor draw upon groundwater supplies. The project site has substantial existing pavement and other impervious surfaces, and the project would not change substantially change these conditions, other than installation of a play field in the southern portion of the site, which would provide a recharge area. The project would be connected to the City's water system, which relies in part on groundwater. As noted above, the City relying more on surface water sources, and as discussed in Section 3.18, Utilities and Service Systems, the City has adequate water supplies to serve the project. Project impacts on groundwater supplies would be less than significant.

c, d, e) Drainage Patterns and Runoff.

As noted in b) above, the project site already is substantially covered with buildings, pavement and other impervious surfaces. The project would not increase the coverage of impervious surface, generally, but the area dedicated to a new play field would reduce the impervious surface area and promote more absorption of rainfall. The project site is and will continue to be connected to the City of Stockton's storm water drainage system with the proposed project. Given the reduction in impervious surface, it is expected that the project would not generate additional runoff than under existing conditions, and the existing storm water system should accommodate project runoff without any adverse impacts. Project impacts on drainage patterns and runoff would be less than significant.

g, h) Flooding Hazards.

No housing would be constructed as part of the project. The project site is not located within a 100-year floodplain as designated by FEMA; as such, no structures would impede or redirect flows from 100-year floods. The project site is within an area potentially subject to a 200-year flood, but the SUSD is not subject to SB-5 requirements. The project would not involve placement of any structures within identified flood hazard areas or floodways and would therefore have less than significant effects related to flooding hazards.

i) Dam and Levee Failure Hazards.

As noted above, the project site is within potential inundation zones of several facilities were they to fail. The probability of failure of these facilities is considered low, and the project would have no change on the potential dam failure hazard within the project site. The nearest levee to the project site is along Fourteen-Mile Slough to the north. The project site is not in a designated Special Flood Hazard Area, which covers areas inadequately protected by existing levees, among other factors (City of Stockton 2016). In any case, the project would have no change on the potential levee failure hazard within the project site. Project impacts related to dam and levee failure are considered less than significant.

j) Seiche, Tsunami and Mudflow Hazards.

The project area is in a topographically flat area away from large bodies of water, so the project would not be subject to seiche, tsunami or mudflow hazards. The project would have no impact on this issue.

3.10 LAND USE AND PLANNING

Would the project:	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
a) Physically divide an established community?				√
b) Conflict with any applicable land use plan, policy, or regulation of an agency with jurisdiction over the project (including, but not limited to the general plan, specific plan, local coastal program, or zoning ordinance) adopted for the purpose of avoiding or mitigating an environmental effect?			√	
c) Conflict with any applicable habitat conservation plan or			√	

natural communities conservation plan?				

NARRATIVE DISCUSSION

Environmental Setting

The project site has been developed as a church, with two large buildings, play areas, and parking spaces. The buildings were formerly used by the Lakeside Assembly, which offered religious services on Sundays and on Wednesday evenings. The church buildings were used for special events and for a time hosted a private school on weekdays (see Chapter 1.0, Introduction). Lakeside Assembly recently sold the church property to the SUSD. The buildings are currently being leased to Oasis Church, which limits its activities to Sunday mornings. On May 1, 2019, Oasis Church will no longer occupy these buildings.

The project site is in the Quail Lakes area of the City of Stockton. This is a predominantly residential area, with commercial land uses along March Lane. The Stockton General Plan designates the site as Medium Density Residential; the portion of the project site adjacent to Alexandria Place is zoned Low Density Residential and the remainder as Medium Density Residential. Schools are allowable and expected uses in both zoning district. The recently-adopted General Plan update retains the existing Medium Density Residential designation on the project site.

Environmental Impacts and Mitigation Measures

a) Division of Established Communities.

The project site is within an established residential community. The project would not substantially alter existing community character or divide the existing residential community. Establishment of a school on the project will add a new community facility to the neighborhood, which would provide a new community gathering area and thereby contribute to community identity and integration. No impact related to division of an established community would occur.

b) Conflict with Applicable Plans, Policies and Regulations.

The proposed new school on the project site would be consistent with existing City of Stockton general plan designations and zoning, as public schools are an allowed land use in the Low Density Residential and Medium Density Residential zones. The project site is in an urbanized, developed area; therefore, the project is not expected to affect environmentally sensitive areas protected by City of Stockton General Plan policies and zoning. This IS/MND evaluated the impacts of the project on environmentally sensitive areas in Section 3.4 Biological Resources and did not identify significant impacts. Project impacts related to environmental protection plans, policies, and regulations would be less than significant.

c) Conflict with Habitat Conservation Plans.

As discussed in Section 3.4, Biological Resources, the SJMSCP Habitat Map indicates that the project site is a Category A site, which applies mainly to developed areas and exempts development on the project site from SJMSCP fees. Participation in the SJMSCP is voluntary. The project is anticipated to have no impacts on biological resources other than on migratory birds, for which mitigation has been described in this document. The mitigation would be consistent with the conservation objectives of the SJMSCP. Project impacts related to habitat conservation plans would be less than significant.

3.11 MINERAL RESOURCES

Would the project:	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
a) Result in the loss of availability of a known mineral resource that would be of value to the region and the residents of the state?				√
b) Result in the loss of availability of a locally-important mineral resource recovery site delineated on a local general plan, specific plan or other land use plan?				√

NARRATIVE DISCUSSION

Environmental Setting

The California Division of Mines and Geology, now part of the California Geological Survey, has classified portions of the state into Mineral Resource Zones. The lands within and surrounding the project site are not classified within a Mineral Resource Zone, indicating that no significant mineral deposits have been identified (San Joaquin County 2016). No oil, natural gas, or geothermal fields have been identified in the vicinity of the project site (DOGGR 2001).

Environmental Impacts and Mitigation Measures

a, b) Loss of Mineral Resource Availability.

There are no identified mineral resources areas in the project vicinity, nor are there any oil, gas, or geothermal fields. The project would have no impact on the availability of, or access to, known or locally designated mineral resources.

3.12 NOISE

Would the project result in:	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
a) Exposure of persons to or generation of noise levels in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies?			√	
b) Exposure of persons to or generation of excessive groundborne vibration or groundborne noise levels?				√
c) A substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project?			√	
d) A substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project?		√		
e) For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project expose people residing or working in the project area to excessive noise levels?				√
f) For a project within the vicinity of a private airstrip, would the project expose people residing or working in the project area to excessive noise levels?				√

NARRATIVE DISCUSSION

Environmental Setting

Sound is defined as any pressure variation in air that the human ear can detect. To provide a manageable way to measure sound, the decibel (dB) scale was devised. The perceived loudness of sounds is dependent upon many factors, including sound pressure level and frequency content. Within the usual range of environmental noise levels, perception of loudness is relatively predictable, and can be approximated by the A-weighting network. There is a strong correlation between A-weighted sound levels (expressed as dBA) and the way the human ear perceives noise.

Community noise is commonly described in terms of the "ambient" noise level, which is defined as the all-encompassing noise level associated with a given noise environment. A common statistical tool to measure the ambient noise level is the average, or equivalent, sound level (L_{eq}), which corresponds to a steady-state, A-weighted sound level containing the same total energy as a time-varying signal over a given time period (usually one hour). The L_{eq} shows very good correlation with community response to noise as is the basis for other noise descriptors such as the Day-Night Average Level (L_{dn}). The L_{dn} is based upon the average hourly L_{eq} over a 24-hour day, with a +10-dB weighting applied to noise during the hours between 10:00 p.m. and 7:00 a.m. to account for greater sensitivity during that period.

The area surrounding the project site is composed primarily of residential land uses. The existing ambient noise environment is defined primarily by traffic on local surface roadways. The project site is currently being used by a church. Noise associated with the church consists mainly of vehicle traffic entering and exiting the site during services on Sunday morning. The site previously was the location of Lakeside Assembly church, which had a playground in the back of one building and also formerly hosted a private school operated by United Christian Schools for 27 years, with enrollment ranging from 400 to 450 students.

The project site is within the City of Stockton. The City's zoning ordinance, in Section 16.60.040 (Standards) of the Stockton Municipal Code, states that commercial, industrial, or public facilities land uses adjacent to any noise-sensitive land uses or vacant residential (RE, RL, RM, or RH) or open space (OS) zoning districts shall comply with the performance standards set forth in Table 3-4 below. In addition, Stockton Municipal Code Section 16.60.030(A) prohibits the operation of construction equipment on private property during the hours of 10:00 p.m. to 7:00 a.m. such that the sound creates a noise disturbance across a residential property line.

TABLE 3-4
CITY OF STOCKTON NOISE PERFORMANCE STANDARDS

	Outdoor Activity Areas, RE, RL, RM, RH, and OS zones	
Noise Level Descriptor	**Day (7:00 a.m. to 10:00 p.m.)**	**Night (10:00 p.m. to 7:00 a.m.)**
Hourly Equivalent sound level (L_{eq}), dB	55	45
Maximum sound level, dB	75	65

Source: Stockton Municipal Code Section 16.60.030(A).

Environmental Impacts and Mitigation Measures

a) Exposure to Noise Exceeding Local Standards.

Noise-sensitive land uses in the vicinity include existing residences to the north, west, and east of the project site, including a multifamily residential complex adjacent to the eastern boundary of the project site. The main source of noise that would be generated by the project would be traffic to and from the school. The potential increase in traffic noise exposure due to the project is a factor in determining the significance of project-related traffic noise impacts. Research into the human perception of changes in sound level indicates the following:

- A +3-dB change is barely perceptible,

- A +5-dB change is clearly perceptible, and
- A +10-dB change is perceived as being twice as loud.

Traffic noise was estimated using traffic volumes from the traffic impact study for the project, available in Appendix D of this document, plus a model developed by the FHWA. The traffic study focused on segments of Quail Lakes Drive, which would have the highest volume of traffic in the vicinity. Table 3-5 shows the results of the FHWA model run, based on the traffic volumes under various conditions analyzed in the traffic impact study. As shown in Table 3-5, noise levels on Quail Lakes Drive would not increase by more than 0.9 dB Ldn from existing conditions, which is not considered perceptible. Moreover, noise levels would not exceed the maximum sound level standards set by the Stockton Noise Ordinance. Noise from traffic on other streets is expected to be less because the traffic volume would be less than on Quail Lakes Drive. In addition, noise levels would be minimal at nighttime, when the school would be closed. Impacts on nearby residential areas are considered less than significant.

TABLE 3-5
ESTIMATED NOISE LEVELS ALONG ROADWAY SEGMENTS

	Noise Level, L_{dn} at 50 feet from centerline		
Roadway Segment	**Existing**	**EPAP Plus Project**	**Cumulative Plus Project**
Quail Lakes Dr., west of Alexandria Pl.	62.0	62.5	62.9
Quail Lakes Dr., east of Grouse Run Dr.	62.4	62.6	62.6

See Section 3.16, Transportation/Traffic for definition of traffic conditions.
Sources: FHWA, KD Anderson and Associates 2018.

b) Groundborne Vibration.

Groundborne vibration is not a common environmental problem. It is typically associated with transportation facilities, although it is unusual for vibration from sources such as buses and trucks to be perceptible, even in locations close to major roads.

The project would not involve any ground disturbance of the site, so it would have no impact on this issue. Future site development could involve the use of construction equipment that may generate groundborne vibrations. This potential impact would be analyzed in the CEQA review of the site plans once they are available. Given the short-term duration of construction work, project impacts related to groundborne vibrations would be less than significant.

c) Permanent Increases in Ambient Noise.

Noises typically associated with a school include noise from play areas on the school site and vehicle traffic associated with picking up and dropping off students, as well as traffic associated with special events on the campus. As indicated in a) above, traffic noise levels would not increase by a significant amount as a result of the project.

Use of the play area by students would generate noise; however, ordinary use of these facilities would not cause noise standards to be exceeded. The play areas are in the southern portion of the site, where there are relatively fewer adjacent residential areas. Also, use of these fields would be intermittent and would not occur at night, when residents would be especially sensitive to noise. No loudspeaker sound system, stadium development or development of other facilities for intensive outdoor use would be developed in conjunction with school construction. Project impacts regarding permanent increases in ambient noise would be less than significant.

d) Temporary Increases in Ambient Noise.

Noise from construction activities would temporarily increase ambient noise in the immediate project vicinity. Noise would also be generated by increased truck traffic associated with transport of heavy materials and equipment to and from the construction site, as well as vehicles transporting construction workers. As indicated in Table 3-6, activities involved in construction would generate maximum noise levels ranging from 76 to 90 dBA L_{max} at 50 feet.

TABLE 3-6
CONSTRUCTION EQUIPMENT NOISE LEVELS

Type of Equipment	Maximum Level, dBA at 50 feet
Auger Drill Rig	84
Backhoe	78
Compactor	83
Compressor (air)	78
Concrete Saw	90
Dozer	82
Dump Truck	76
Excavator	81
Generator	81
Jackhammer	89
Paver	77
Pneumatic Tools	85

Source: FHWA 2006.

Most of the building construction would occur at distances of 50 feet or greater from the nearest residences. Moreover, noise levels decrease by 6 dBA with every doubling of distance from a source (Harris 1991). Construction noise associated with parking lot paving would be similar to noise that would be associated with public works projects, such as a roadway widening or street paving projects. Construction activities would be temporary in nature and are anticipated to occur during normal daytime working hours. Nevertheless, some construction work would occur close to some residential areas, particularly the multifamily residential development to the east. It is anticipated that some construction noise would exceed City standards for residential land uses. This is considered a potentially significant impact.

Stockton Municipal Code Section 16.60.030 includes restrictions on construction noise. Operating or causing the operation of tools or equipment on private property used in alteration, construction, demolition, drilling, or repair work between the hours of 10:00 p.m. and 7:00 a.m., so that the sound creates a noise disturbance across a residential property line, is prohibited, except for emergency work of public service utilities. However, daytime noise also could have an adverse impact on nearby residences, even if the noise would be temporary. Mitigation presented below would reduce the time nearby residences would be exposed to construction noise and would require muffling of noise. Implementation of this mitigation would reduce impacts to a level that would be less than significant.

Level of Significance: Potentially significant

Mitigation Measures:

NOISE-1: Project construction shall be limited to the hours of 8:00 a.m. to 6:00 p.m. Monday through Saturday. Construction equipment shall not operate on Sundays or on federal holidays. All equipment used on the construction site shall be fitted with mufflers in accordance with manufacturers' specifications. Mufflers shall be installed on the equipment at all times on the construction site.

Significance After Mitigation: Less than significant

e, f) Exposure to Airport/Airstrip Noise.

As noted in Section 3.8, Hazards and Hazardous Materials, there are no public airports or private airstrips in the vicinity. The project would have no impact related to this issue.

3.13 POPULATION AND HOUSING

Would the project:	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
a) Induce substantial population growth in an area, either directly (for example, by proposing new homes and businesses) or indirectly (for example, through extension of roads or other infrastructure)?				√
b) Displace substantial numbers of existing housing, necessitating the construction of replacement housing elsewhere?				√

c) Displace substantial numbers of people, necessitating the construction of replacement housing elsewhere?				√

NARRATIVE DISCUSSION

Environmental Setting

As of January 1, 2018, the population of Stockton was estimated at 320,554, an increase of 31.5% from its 2010 population as recorded by the U.S. Census Bureau (California Department of Finance 2012, 2018). The current City of Stockton General Plan projects the population of Stockton to grow to 700,000 by 2035 (City of Stockton 2007a). As of January 1, 2018, Stockton had an estimated 100,593 housing units. Single-family detached units (typical houses) accounted for approximately 64.6% of total housing units in Stockton, with multifamily units of two or more per building accounting for approximately 27.0%. The remaining units were single-family attached units and mobile homes (California Department of Finance 2018).

Environmental Impacts and Mitigation Measures

a) Population Growth Inducement.

The project would not directly induce population growth, as no housing or employment centers would be constructed. The project is in a developed residential area, so no indirect inducement of population growth is expected. As indicated in Chapter 1.0, Introduction, many students which would be served by the project are from the Quail Lakes area, and these students would be relocated to the proposed school. The project would have no impact on this issue.

b, c) Displacement of Housing and People.

The project would not affect existing housing in the vicinity; consequently, it would not displace housing or people. The project would have no impact on this issue.

3.14 PUBLIC SERVICES

Would the project result in substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities, need for new or physically altered governmental facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times or other performance objectives for any of the public services:	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
a) Fire protection?			√	
b) Police protection?			√	
c) Schools?			√	
d) Parks?			√	

e) Other public facilities?			√	

NARRATIVE DISCUSSION

Environmental Setting

Fire protection services in the project vicinity are provided by the Stockton Fire Department. The nearest fire station to the project site is Station 10 at 2903 West March Lane. Law enforcement services are provided by the Stockton Police Department, with its main station at 22 East Market Street.

The SUSD provides school services to K-12 students residing in the Quail Lakes area of Stockton. As described in Chapter 1.0, Introduction, elementary school students residing in Quail Lakes currently attend three elementary schools outside the neighborhood: Tyler Elementary, Hoover Elementary, and Madison Elementary.

The City of Stockton Community Services Department provides park and recreational services to City residents. Warren Atherton Park is located across Quail Lakes Drive from the project site. Libraries in the City of Stockton and San Joaquin County have merged. The nearest library to the project site is the Margaret K. Troke Library on Benjamin Holt Drive, approximately 1.5 miles to the northeast. San Joaquin County has courthouses staffed and maintained by the State of California. The main County courthouse is in downtown Stockton, the closest courthouse to the project site.

Environmental Impacts and Mitigation Measures

a) Fire Protection.

The project site is currently served by the Stockton Fire Department. Project development could increase demand for fire protection services. However, it is not expected that the project would require new or expanded fire protection facilities to be served. The project site previously had a private school of 400-450 students that was served by the Stockton Fire Department. In addition, the proposed school would be required to comply with the requirements of the Fire and Life Safety Program of the State Architect. These requirements are related to fire-resistive building materials, fire alarms, fire suppression equipment, safe occupant egress, and firefighting equipment access. Project impacts on fire protection services would be less than significant.

b) Police Protection.

The project site is currently served by the Stockton Police Department. However, it is not expected that the project would require new or expanded fire protection facilities to be served. The project site previously had a private school of 400-450 students that was served by the Stockton Police Department. Project impacts on police protection services would be less than significant.

c) Schools.

As described in Chapter 1.0, Introduction, the intent of the project is to provide a new elementary school facility for students residing in an area that currently has no schools. The result would be new learning facilities for students in a more convenient location. Adverse project impacts related to schools and educational services would be less than significant, and the project would have a beneficial impact.

d, e) Parks and Other Public Facilities.

The project site is currently served by City of Stockton parks, libraries, and other public facilities in the vicinity. The proximity of the project site to Warren Atherton Park may lead to an increase in the use of the park, but this use can be accommodated without new or expanded park facilities. The project is not expected to increase demand for other public facilities such as libraries and courthouses, particularly since the students that would attend the school already reside in Stockton. Project impacts on parks and other public facilities would be less than significant.

3.15 RECREATION

	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
a) Would the project increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated?			√	
b) Does the project include recreational facilities or require the construction or expansion of recreational facilities which might have an adverse physical effect on the environment?			√	

NARRATIVE DISCUSSION

Environmental Setting

As noted in Section 3.14, Public Services, the Stockton Community Services Department provides park and recreational services to City residents. Warren Atherton Park is located across Quail Lakes Drive from the project site. This neighborhood park, approximately 10 acres in size, has several recreational facilities, including a tot lot, tennis courts, a softball field, a basketball court, and handball courts, along with picnic tables and barbecue facilities.

Other recreational facilities in the vicinity include Village West Marina, a privately-owned marina on Fourteen-Mile Slough approximately two miles west of the project site. This marina has 680 covered boat berths and 20 open boat slips, guest and gas docks, and a service and detail facility. Two restaurants are on the marina site, and a fitness facility is nearby.

Environmental Impacts and Mitigation Measures

a, b) Recreational Facilities.

As discussed in Section 3.14, the project site is currently served by City of Stockton parks, as well as by other recreational facilities in the vicinity. Warren Atherton Park may experience increased use because of the project, but this use can be accommodated without new or expanded park facilities. The project is not expected to increase demand for other parks and recreational facilities. Project impacts related to recreation would be less than significant.

3.16 TRANSPORTATION/TRAFFIC

Would the project:	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
a) Conflict with an applicable plan, ordinance or policy establishing measures of effectiveness for the performance of the circulation system, taking into account all modes of transportation including mass transit and non-motorized travel and relevant components of the circulation system, including but not limited to intersections, streets, highways and freeways, pedestrian and bicycle paths, and mass transit?			√	
b) Conflict with an applicable congestion management program, including but not limited to level of service standards and travel demand measures, or other standards established by the county congestion management agency for designated roads or highways?				√
c) Result in a change in air traffic patterns, including either an increase in traffic levels or a change in location that results in substantial safety risks?				√
d) Substantially increase hazards to a design feature (e g., sharp curves or dangerous intersections) or incompatible uses (e g, farm equipment)?		√		
e) Result in inadequate emergency access?				√
f) Conflict with adopted policies, plans or programs regarding public transit, bicycle or pedestrian facilities, or otherwise decrease the performance or safety of such facilities?			√	

NARRATIVE DISCUSSION

Environmental Setting

The potential transportation effects of the proposed project are addressed in a traffic impact study prepared for the SUSD by KD Anderson and Associates. Appendix D contains the study, which provides a detailed explanation of the analysis methodology. Except where noted, information in this section is primarily from the traffic impact study. Figure 3-1 shows the intersections analyzed in the traffic impact study.

Streets and Intersections

The following streets are located near the project site:

- *Quail Lakes Drive* is a four-lane street adjacent to and south of the project site. It is classified as a collector in the current Stockton General Plan. Quail Lakes Drive provides access to the residential area in Quail Lakes.
- *Alexandria Place* is a two-lane residential street adjacent to and west of the project site that intersects with Quail Lakes Drive at the southwest corner of the project site.
- *Cedar Ridge Drive*, a two-lane residential street adjacent to and north of the project site, intersects with Alexandria Place at the northwest corner of the project site and connects to Quail Lakes Drive east of the project site.
- *Grouse Run Drive* is a two-lane north-south local roadway with a northern terminus at Quail Lakes Drive, near the southeast corner of the project site.

The intersection of Quail Lakes Drive and Grouse Run Drive is an all-way, stop-sign intersection, while the intersection of Quail Lakes Drive and Alexandria Place has a stop sign only on the Alexandria Place leg. Traffic currently associated with the project site consists of vehicles traveling to and from Oasis Church.

Policy TC-2.1 of the Circulation Element of the Stockton General Plan states that the City shall maintain a Level of Service (LOS) D or better for all City streets, with some exceptions that do not include the streets adjacent to the project site. LOS is a measure of traffic flow on roadways and traffic delays at intersections using a scale from A to F, with A representing the best traffic flow or shortest intersection delays and F representing the worst traffic flow or longest intersection delays. Under existing conditions, all traffic study intersections and roadway segments operate at a LOS of A except for the Quail Lakes Drive/Grouse Run Drive intersection, which operates at LOS B during the PM peak hour only.

Alternative Modes of Transportation

Public transit service is provided by the San Joaquin Regional Transit District (SJRTD). SJRTD runs Routes 545 and 745, which both travel along Quail Lakes Drive between Sherwood Mall and Country Club Boulevard west of Interstate 5. Also, Metro Hopper Route 1 provides weekday service along Quail Lakes Drive. There are designated stops at the Quail Lakes Drive/Grouse Run Drive intersection. The SUSD operates its own bus service for students, transporting more than 2,350 students daily on 18 transit routes and 43 special needs routes.

BaseCamp Environmental

Figure 3-1
TRAFFIC IMPACT STUDY INTERSECTIONS

Sidewalks are provided along project site frontage on all adjacent streets. Class II Bike Lanes have been designated along both sides of Quail Lakes Drive, while Class III Bike Routes have been designated along Alexandria Place and Grouse Run Drive (City of Stockton 2007b).

Traffic Impact Analysis

The City of Stockton has issued Transportation Impact Analysis Guidelines for traffic impact studies. The traffic impact study based its analysis of project impacts the City's Guidelines. As noted in these Guidelines:

- "The City of Stockton's General Plan has a LOS 'D' standard for its roadway system. Intersections and roadway segments operating at LOS 'A', 'B', 'C', or 'D' conditions are considered acceptable, while those operating at LOS 'E' or 'F' conditions are considered unacceptable.
- "For a City intersection, a transportation impact for a project is considered significant if the addition of project traffic would cause an intersection that would function at LOS 'D' or better without the Project to function at LOS 'E' or 'F'.
- "For City intersections with a LOS 'E' or 'F' conditions without the project, a transportation impact for a project is considered significant if the addition of project traffic causes an increase of greater than 5 seconds in the average delay for the intersection."

Portions of the City's guidelines do not specifically address significance thresholds for roadway segments. For this traffic impact study, the City's significance thresholds described above are also applied to roadway segments.

Environmental Impacts and Mitigation Measures

a) Conflict with Transportation Plans, Ordinances and Policies.

The project would lead to an increase in traffic on adjacent streets and more traffic passing through the Quail Lakes Drive/Alexandria Place and Quail Lakes Drive/Grouse Run Drive intersections. Traffic generally would peak in the morning when students are dropped off, and again around mid-afternoon when the school day ends, and students are picked up.

The traffic impact study analyzed potential impacts of the project on four intersections near the project site and six proposed driveways. Two of the driveways studied, the Cedar Ridge Drive/Cafetorium Driveway, and an access driveway to a now-eliminated parking lot south of the administration/library building, have since been eliminated by the SUSD architects. These changes have been reviewed by K D Anderson and Associates; K D Anderson indicated that the changes would result in small changes in the quantitative results of the study, but no change in the conclusions of the study; predicted levels of service with and without the project would remain as predicted in the study.

The traffic impacts were analyzed under Existing Plus Approved Projects (EPAP) conditions, which considers existing land uses plus projects approved for development by the City but not yet constructed that could have impacts on the study intersections. Table 3-7 shows the LOS at the study intersections and driveways with implementation of the project under EPAP conditions without and with the project during the morning and evening peak hours. Table 3-8 shows the LOS at the study roadway segments with implementation of the project under EPAP conditions without and with the project. The results of the traffic study indicate that, with the project, the LOS of operate under EPAP conditions that would be well above the City of Stockton's minimally acceptable LOS of D. The project would not conflict with the City's policies regarding traffic LOS, and as a result, project impacts would be less than significant.

TABLE 3-7
LOS AT INTERSECTIONS UNDER EPAP CONDITIONS

		EPAP No Project Conditions		**EPAP Plus Project Conditions**	
No.	**Intersection**	**AM Peak Hour**	**PM Peak Hour**	**AM Peak Hour**	**PM Peak Hour**
1	Alexandria Place/Cedar Ridge Drive	A	A	A	A
2	Quail Lakes Drive/Cedar Ridge Drive	A	A	A	A
3	Quail Lakes Drive/Alexandria Place	A	A	A	A
4	Quail Lakes Drive/Grouse Run Drive	B	B	B	B
5	Cedar Ridge Drive/Cafetorium Driveway*	-	-	A	A
6	Cedar Ridge Drive/North Inbound Driveway	-	-	A	A
7	Cedar Ridge Drive/North Outbound Driveway	-	-	A	A
8	Alexandria Place/West Outbound Driveway	-	-	A	A
9	Alexandria Place/West Inbound Driveway	-	-	A	A
10	Alexandria Place/Southwest Driveway	-	-	A	A

EPAP- Existing Plus Approved Projects. Numbers correspond to locations identified in Figure 3-1.
* Eliminated since traffic study was completed.
Source: KD Anderson and Associates 2018.

TABLE 3-8
LOS AT ROADWAY SEGMENTS UNDER EPAP CONDITIONS

Intersection	**EPAP No Project Conditions**	**EPAP Plus Project Conditions**
Quail Lakes Drive west of Alexandria Place	A	A
Quail Lakes Drive east of Grouse Run Drive	A	A

EPAP- Existing Plus Approved Projects
Source: KD Anderson and Associates 2018.

b) Conflict with Congestion Management Program.

SJCOG adopted the latest version of its Regional Congestion Management Plan in 2012. The Regional Congestion Management Plan is designed to coordinate land use, air quality and transportation planning to reduce potential congestion from traffic generated by development (SJCOG 2012). The Plan has designated a roadway and intersection network on which traffic congestion would be monitored and programs to reduce congestion would be targeted. None of the streets adjacent to the project site are part of this network. The project would have no impact on the applicable congestion management program.

c) Air Traffic Patterns.

As noted in Section 3.8, Hazards and Hazardous Materials, there are no public airports in the vicinity. The project, being a proposed elementary school, is not expected to generate any passenger air traffic. The project would have no impact on air traffic patterns.

d) Traffic Hazards.

Future site development could lead to traffic conditions that engender extended delays at adjacent intersections and potential queueing from vehicles picking up and dropping off students. The peak periods for vehicle circulation in the vicinity of school sites occur immediately before classes begin and class dismissal time. This includes vehicles using pick-up and drop-off facilities, and also parents parking vehicles to pick up and drop off students.

Drop-off activity will be divided between parents who use the designated drop-off zones to unload students without leaving their vehicle, and parents who park their vehicle and walk with the student into the school. The traffic impact study concluded that all the inbound vehicles could hypothetically be served in seven minutes. In reality, some parents would park and walk with the student into the school, reducing demand on the pick-up and drop-off areas. It is also expected some students would be dropped off along the west side of Alexandria Place and walk across the street to the main campus. Also, some parents would park along the north side of Cedar Ridge Drive, and parents and students would walk across the street to the kindergarten building.

Stockton Municipal Code Section 16.64.040 presents parking requirements. Table 3-9 of this section specifies that public and private elementary and secondary schools provide two parking spaces per classroom. Application of the requirements presented in Stockton Municipal Code Section 16.64.040 would result in 42 parking spaces being required. The would include 62 on-site parking spaces, which would exceed the required 42 parking spaces. However, the traffic impact study estimates peak parking demand at the new school would be 103 vehicles. As a result, it is expected that approximately 41 vehicles would park off-site during a relatively short period of time at the dismissal of classes. As no parking is allowed along Quail Lakes Drive in the vicinity of the project site, off-site would be concentrated along Alexandria Place and Cedar Ridge Drive.

Based on the assessment of pick-up and drop-off areas, and the peak parking generation estimates presented above, it is likely the project would result in students and parents walking along and across both Alexandria Place and Cedar Ridge Drive, although the number of such students and parents cannot be quantified. This is considered a potential safety concern and therefore a potentially significant impact.

The West Inbound Driveway and the Southwest Driveway are located along the east side of Alexandria Place, approximately 150 to 200 feet north of Quail Lakes Drive (see Figure 3-1). As northbound vehicles approach the project site from Quail Lakes Drive along Alexandria Place, vehicle queues may form at these two driveways, especially the West Inbound Driveway. Vehicles parked along the east side of Alexandria Place between Quail Lakes Drive and the West Inbound Driveway would exacerbate the potential queuing. Excessive queuing along northbound Alexandria Place at this location could result in vehicle queues extending into the Quail Lakes Drive/Alexandria Place intersection. Queues extending into this intersection would interfere with its operations, resulting in a potential safety concern with through traffic on Quail Lakes Drive. This safety concern is considered a potentially significant impact.

Mitigation recommended by the traffic impact study and described below would enhance the safety of students and parents crossing streets and would reduce potential queuing. With these measures, potential safety impacts would be reduced to a level that would be less than significant.

Level of Significance: Potentially significant

Mitigation Measures:

TRANS-1: The SUSD will, in consultation with City of Stockton staff, develop and implement a pedestrian safety crossing plan. The objective of the plan will be to provide pedestrians with safe access between the Quail Lakes School project site, and the west side of Alexandria Place and the north side of Cedar Ridge Drive. Various marking, signing, street surface treatments, including mid-block crosswalks may be considered. The number, location, and type of features shall be to the satisfaction of City of Stockton staff. Potential designs and features are presented in the *City of Stockton Traffic Calming Guidelines* (City of Stockton 2008).

TRANS-2: Parking shall be prohibited on the east side of Alexandria Place between Quail Lakes Drive and the West Inbound Driveway. The SUSD shall install signs notifying vehicles of this prohibition.

Significance After Mitigation: Less than significant

e) Emergency Access.

As indicated on Figure 2-1, the project site would be accessible from Alexandria Place and Cedar Ridge Drive. The project would provide adequate access for emergency vehicles. The project would have no impact on emergency access.

f) Conflict with Non-vehicular Transportation Plans.

The project would not significantly affect existing public transit access in the area. The SUSD operates its own bus system, so impacts on SJRTD bus use is expected to be minimal. It is expected that SJRTD can accommodate any additional passengers the project would generate without adding buses or requiring new or expanded facilities.

Existing sidewalks and bicycle routes would remain, although some may be temporarily affected by project site construction. Implementation of the project would result in an increase in demand for bicycle and pedestrian facilities. As noted, a Class II Bikeway is present along the project site frontage on Quail Lakes Drive, and sidewalks are present on the project site frontage. The Class II Bikeway and sidewalks would provide safe facilities for bicycle and pedestrian travel to and from the project site. No mitigation measures would be required. Impacts related to non-vehicular transportation plans and systems would be less than significant.

3.17 TRIBAL CULTURAL RESOURCES

Would the project cause a substantial adverse change in the significance of a tribal cultural resource, defined in Public Resources Code Section 21074 as either a site, feature, place, cultural landscape that is geographically defined in terms of the size and scope of the landscape, sacred place, or object with cultural value to a California Native American tribe, and that is:	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
a) Listed or eligible for listing in the California Register of Historical Resources, or in a local register of historical resources as defined in Public Resources Code Section 5020.1(k), or		√		
b) A resource determined by the lead agency, in its discretion and supported by substantial evidence, to be significant pursuant to criteria set forth in subdivision (c) of Public Resources Code Section 5024.1? In applying the criteria set forth in subdivision (c) of Public Resources Code Section 5024.1, the lead agency shall consider the significance of the resource to a California Native American tribe.		√		

NARRATIVE DISCUSSION

Environmental Setting

In 2015, the California Legislature enacted AB 52, which focuses on consultation with Native American tribes on land use issues potentially affecting the tribes. The intent of this consultation is to avoid or mitigate potential impacts on “tribal cultural resources,” which are defined as “sites, features, places, cultural landscapes, sacred places, and objects with cultural value to a California Native American tribe.” More specifically, Public Resources Code Section 21074 defines tribal cultural resources as:

- Sites, features, places, cultural landscapes, sacred places, and objects with cultural value to a California Native American tribe that are included or determined to be eligible for inclusion in the California Register of Historical Resources, or included in a local register of historical resources; or
- A resource determined by the lead agency, in its discretion and supported by substantial evidence, to be significant pursuant to criteria set forth in subdivision (c) of Public Resources Code Section 5024.1 [i.e., eligible for inclusion in the California Register of Historical Resources].

Under AB 52, when a tribe requests consultation with a CEQA lead agency on projects within its traditionally and culturally affiliated geographical area, the lead agency must provide the tribe with notice of a proposed project within 14 days of a project application being deemed complete or when the lead agency decides to undertake the project if it is the agency's own project. The tribe has up to 30 days to respond to the notice and request consultation; if consultation is requested, then the local agency has up to 30 days to initiate consultation.

As previously noted, the project site is located within lands claimed by the Yokuts at the time of initial contact with European Americans. Section 3.5, Cultural Resources, discusses the Yokuts in more detail.

Environmental Impacts and Mitigation Measures

a, b) Tribal Cultural Resources.

At this time, no representatives from tribes that have a traditional and cultural affiliation with the project site and vicinity have requested consultation on the project. As part of the CEQA process for the purchase of the project site, and in accordance with AB 52, SUSD sent a letter dated June 1, 2017 to the United Auburn Indian Community of the Auburn Rancheria inviting consultation. No response was received from the tribe.

As discussed in Section 3.5, Cultural Resources, it is unlikely that any intact cultural resources that may be of value to local tribes would be found on the project site due to past disturbance. It is conceivable that project development could involve activities that may disturb cultural resources, including tribal cultural resources. Mitigation Measure CULT-1 sets forth procedures for the treatment and disposition of any resources discovered inadvertently during construction. Should human burials be encountered, CEQA Guidelines Section 15064.5(e) describes the procedure to be followed, particularly if the remain are Native American in origin. Implementation of Mitigation Measure CULT-1 and CEQA Guidelines Section 15064.5(e), when necessary, would minimize impacts on tribal cultural resources to a level that would be less than significant.

3.18 UTILITIES AND SERVICE SYSTEMS

Would the project:	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
a) Exceed wastewater treatment requirements of the applicable Regional Water Quality Control Board?			√	
b) Require or result in the construction of new water or wastewater treatment facilities or expansion of existing facilities, the construction of which could cause significant environmental effects?			√	
c) Require or result in the construction of new stormwater drainage facilities or expansion of existing facilities, the construction of which could cause significant environmental effects?			√	
d) Are sufficient water supplies available to serve the project from existing entitlements and resources, or are new or expanded entitlements needed?			√	
e) Has the wastewater treatment provider which serves or may serve the project determined that it has adequate capacity to serve the project's projected demand in addition to the provider's existing commitments?			√	
f) Is the project served by a landfill with sufficient permitted capacity to accommodate the project's solid waste disposal needs?			√	
g) Comply with federal, state and local statutes and regulations related to solid waste?			√	

NARRATIVE DISCUSSION

Environmental Setting

The City of Stockton provides services for the collection and treatment of wastewater for the project site. The existing church on the site connects to an adjacent sewer line beneath Cedar Ridge Drive. Municipal wastewater treatment services are provided at the City of Stockton's Regional Wastewater Control Facility (RWCF) located on Navy Drive in southwest Stockton. The RWCF currently processes approximately 33 million gallons per day (mgd) of wastewater on average and has a treatment capacity of 55 mgd.

The City also provides water service to the project site. Existing water lines are located beneath adjacent sections of Quail Lakes Drive, Alexandria Place, and Cedar Ridge Drive. Surface water comprises approximately 75% of the water provided to customers by the City of Stockton, provided by the Stockton East Water District and from the City's Delta Water Supply Project. The other 25% is produced by 22 City-owned wells. Total water demand in 2015 was 24,843 acre-feet. The City has a total water right or safe yield capacity of 96,480 acre-feet (Brown and Caldwell 2016).

Storm drainage collection services are provided by the City of Stockton. The project site currently has existing stormwater lines connected to facilities beneath Quail Lakes Drive, Alexandria Place, and Cedar Ridge Drive.

Solid waste generated in the Quail Lakes area of Stockton is collected by Republic Services. There are three active sanitary landfills in San Joaquin County: the Forward Landfill on South Austin Road with available capacity to 2020, the North County Landfill on East Harney Lane with available capacity to 2048, and the Foothill Sanitary Landfill on North Waverly Road with available capacity to 2082 (CalRecycle 2016).

Environmental Impacts and Mitigation Measures

a, e) Wastewater Systems.

The project site is connected to the Stockton wastewater system; however, the project proposes to add onsite sewer lines that would connect to existing mains in the vicinity. As these lines would be added to an already-developed area, installation of these lines would not have a significant environmental impact. As indicated above, the RWCF has approximately 22 mgd of treatment capacity. Moreover, since the project would serve a student population that would be relocated from other schools, the wastewater demand generated by the project would not increase significantly over existing demand generated at the schools where the students are currently enrolled. Project impacts related to wastewater systems would be less than significant.

b, d) Water Systems and Supply.

The project site is connected to the Stockton water system; however, the project proposes to add onsite water lines, including a fire main, that would connect to existing mains in the vicinity. As these lines would be added to an already-developed area, installation of these lines would not have a significant environmental impact. As indicated above, the City of Stockton has an adequate water supply and would not need to obtain additional supply to serve the project. Moreover, since the project would serve a student population that would be relocated from other schools, the water demand generated by the project would not increase significantly over existing demand generated at the schools where the students are currently enrolled. Project impacts related to water systems would be less than significant.

c) Storm Water Systems.

The project site is connected to the Stockton storm water collection system; however, the project proposes to add onsite storm drainage lines that would connect to existing facilities in the vicinity. As these lines would be added to an already-developed area, installation of these lines would not have a significant environmental impact. As described in Section 3.9, Hydrology and Water Quality, the project site already is covered substantially with pavement and other impervious surfaces, and the project proposes a play field that would reduce the impervious surface area. Given this, it is expected that the project would at least generate no more runoff than under existing conditions, and possibly less. Therefore, the existing storm water system should accommodate storm drainage from the project site without the need for expanded facilities. Project impacts on storm water systems would be less than significant.

f, g) Solid Waste Services.

The project would likely generate a demand for solid waste services above current demand. However, the current solid waste collector, Republic Services, would be required to accommodate the additional demand. As indicated above, existing landfills in the County would have adequate capacity to accommodate the amount of solid waste that would be generated by the project. The project would comply with applicable state and local statutes and regulations related to solid waste. Project impacts on solid waste are considered less than significant.

3.19 MANDATORY FINDINGS OF SIGNIFICANCE

	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
a) Does the project have the potential to degrade the quality of the environment, substantially reduce the habitat of a fish or wildlife species, cause a fish or wildlife population to drop below self-sustaining levels, threaten to eliminate a plant or animal community, reduce the number or restrict the range of a rare or endangered plant or animal or eliminate important examples of the major periods of California history or prehistory?		√		
b) Does the project have impacts that are individually limited, but cumulatively considerable? ("Cumulatively considerable" means that the incremental effects of a project are considerable when viewed in connection with the effects of past projects, the effects of other current projects, and the effects of probable future projects)?			√	
c) Does the project have environmental effects which would cause substantial adverse effects on human beings, either directly or indirectly?		√		

NARRATIVE DISCUSSION

a) Findings on Biological and Cultural Resources.

The project's potential biological resource and cultural resource impacts were described in Sections 3.4 and 3.5, respectively. The project would have minimal impacts on biological resources. The project could have potentially significant impacts on cultural resources, but mitigation described in Section 3.5 would minimize impacts.

b) Findings on Cumulatively Considerable Impacts.

The potentially significant environmental effects of the project identified in this IS/MND would be reduced to a level that is less than significant with proposed mitigation measures. With mitigation, none of these impacts would be considered cumulatively considerable, either in combination with other impacts associated with the project, or when considered in conjunction with the environmental impacts of other urban development.

The cumulative impacts of development within the City of Stockton have been addressed in the Stockton General Plan EIR (City of Stockton 2006), which identified several potentially significant cumulative effects, including impacts on biological resources, cultural resources, traffic, air quality, utility and service systems, and others. The proposed project would contribute to some of these identified impacts, such as air quality and traffic.

The project site has been previously developed and used in the past as a church and private school. This past development was considered in successive General Plan EIRs including the current update, and the proposed development would not introduce new or more severe impacts that would be inconsistent with the analysis and conclusions regarding cumulative impacts. Mitigation measures described in this IS/MND would avoid or minimize many of the project impacts that may contribute to cumulative effects.

The traffic impact study analyzed potential impacts of the project on study intersections, driveways, and roadway segments under cumulative conditions, which accounts for projected development under the Stockton General Plan. Table 3-9 shows the LOS at the study intersections and driveways with implementation of the project under cumulative conditions without and with the project during the morning and evening peak hours. Table 3-10 shows the LOS at the study roadway segments with implementation of the project under cumulative conditions without and with the project. The results of the traffic study indicate that the intersections, driveways, and roadway segments would operate under cumulative conditions with the project at a LOS that would be above the City of Stockton's minimally acceptable LOS of D.

In summary, none of the environmental impacts described in this IS/MND would be considered significant at the project level or cumulatively considerable, either in combination with other impacts associated with the project, or when considered in conjunction with the environmental impacts of other ongoing urban development in the City of Stockton.

c) Findings on Adverse Effects on Human Beings.

Potential adverse effects on human beings were discussed in Section 3.6, Geology and Soils (seismic hazards); Section 3.8, Hazards and Hazardous Materials; Section 3.9, Hydrology and Water Quality (flooding); and Section 3.16, Transportation/Traffic (traffic hazards). The project would have no adverse impacts on human beings, except for potential safety impacts related to traffic. Section 3.16 discusses the potential safety hazards and describes mitigation that would reduce these potential hazards to a level that would be less than significant.

TABLE 3-9
LOS AT INTERSECTIONS UNDER CUMULATIVE CONDITIONS

No.	Intersection	Cumulative No Project Conditions		Cumulative Plus Project Conditions	
		AM Peak Hour	PM Peak Hour	AM Peak Hour	PM Peak Hour
1	Alexandria Place/Cedar Ridge Drive	A	A	A	A
2	Quail Lakes Drive/Cedar Ridge Drive	A	A	A	A
3	Quail Lakes Drive/Alexandria Place	A	A	A	A
4	Quail Lakes Drive/Grouse Run Drive	B	B	B	B
5	Cedar Ridge Drive/Cafetorium Driveway*	-	-	A	A
6	Cedar Ridge Drive/North Inbound Driveway	-	-	A	A
7	Cedar Ridge Drive/North Outbound Driveway	-	-	A	A
8	Alexandria Place/West Outbound Driveway	-	-	A	A
9	Alexandria Place/West Inbound Driveway	-	-	A	A
10	Alexandria Place/Southwest Driveway	-	-	A	A

Numbers correspond to locations identified in Figure 3-1.
* Eliminated since traffic study was completed.
Source: KD Anderson and Associates 2018.

TABLE 3-10
LOS AT ROADWAY SEGMENTS UNDER CUMULATIVE CONDITIONS

Intersection	Cumulative No Project Conditions	Cumulative Plus Project Conditions
Quail Lakes Drive west of Alexandria Place	A	A
Quail Lakes Drive east of Grouse Run Drive	A	A

Source: KD Anderson and Associates 2018.

4.0 REFERENCES

4.1 DOCUMENT PREPARERS

This IS/MND was prepared by BaseCamp Environmental, Inc. for use by and under the supervision of the SUSD. The following persons were involved in preparation of the IS/MND:

BaseCamp Environmental, Inc.

Charlie Simpson, Principal
Terry Farmer, AICP, Senior Environmental Planner
Krista Simpson, Environmental Planner/Graphics

KD Anderson and Associates

Wayne Shijo, Transportation Planner

4.2 SOURCES CITED

California Air Resources Board (ARB). 2008. Climate Change Scoping Plan: A Framework for Change. Adopted December 2008.

______. 2014. First Update to the Climate Change Scoping Plan: Building on the Framework. May 2014.

______. 2017. The 2017 Climate Change Scoping Plan Update: The Proposed Strategy for Achieving California's 2030 Greenhouse Gas Target (draft). January 20, 2017.

______. 2018. California Greenhouse Gas Emission Inventory: 2000-2016. 2018 Edition.

California Climate Action Team. 2010. Climate Action Team Biennial Report – Executive Summary. April 2010.

California Department of Conservation, Division of Land Resources Protection, Farmland Mapping and Monitoring Program (FMMP). 2016. San Joaquin County Important Farmland 2016 (map).

California Department of Conservation, Division of Oil, Gas and Geothermal Resources (DOGGR). 2001. Oil, Gas, and Geothermal Fields in California 2001. Map S-1.

California Department of Education. 2015. School Site Selection and Approval Guide. Available online at http://www.cde.ca.gov/ls/fa/sf/schoolsiteguide.asp#highvoltage. Accessed December 22, 2015.

California Department of Finance. 2012. Report E-8, Historical Population and Housing Estimates, 2000-2010 Report, by Year. Sacramento, California, November 2012.

______. 2018. Report E-5, Population and Housing Estimates for Cities, Counties, and the State, January 1, 2011-2018, with 2010 Benchmark. Sacramento, California, May 2018.

California Department of Resources Recovery and Recycling (CalRecycle). 2016. Facility/Site Summary Details, San Joaquin County. Available online at http://www.calrecycle.ca.gov/SWFacilities/Directory/Detail/. Accessed August 6, 2017.

California Department of Toxic Substances Control (DTSC). 2017. EnviroStor database, www.envirostor.dtsc.ca.gov. Accessed May 16, 2017.

California Department of Transportation (Caltrans). 2017. List of Eligible and Officially Designated State Scenic Highways. Available online at http://www.dot.ca.gov/design/lap/livability/scenic-highways/index.html. Accessed March 22, 2017.

California Department of Water Resources. 2016. Best Available Maps (BAM). http://gis.bam.water.ca.gov/bam/. Accessed October 18, 2016.

California Environmental Protection Agency (CalEPA). 2016a. Sites Identified with Waste Constituents Above Hazardous Waste Levels Outside the Waste Management Unit. Available online at http://www.calepa.ca.gov/SiteCleanup/CorteseList/CurrentList.pdf. Accessed August 2, 2017.

______. 2016b. List of "Active" CDO and CAO from Water Board. Available online at http://www.calepa.ca.gov/SiteCleanup/CorteseList/default.htm. Accessed August 1, 2017.

California Geological Survey (CGS). 2015. CGS Information Warehouse: Regulatory Maps. Available online at http://maps.conservation.ca.gov/cgs/informationwarehouse/index.html?map=regulatorymaps. Accessed July 29, 2017.

City of Stockton. 2007a. Stockton General Plan 2035 Goals and Policies Report. Prepared by Mintier and Associates. December 2007.

______. 2007b. City of Stockton Bicycle Master Plan. November 2007.

______. 2009a. City of Stockton National Pollutant Discharge Elimination System Municipal Stormwater Program Stormwater Management Plan. Prepared by Larry Walker Associates. April 2009.

______. 2009b. City of Stockton and County of San Joaquin Final Stormwater Quality Control Criteria Plan. Prepared by Larry Walker Associates. March 2009.

______. 2014. City of Stockton Climate Action Plan. Prepared by ICF International. August 2014.

______. 2016. Stockton 2040 General Plan Update, Existing Conditions Technical Memorandum: Hazards and Safety. June 28, 2016.

Condor Earth. 2018. Geologic Hazards and Geotechnical Engineering Study, Stockton Unified School District, Oasis Church Property, 2111 Quail Lakes Drive, Stockton, California. August 23, 2018.

Federal Emergency Management Agency (FEMA). 2009. Flood Insurance Rate Map (FEMA #06077C0135F). San Joaquin County, California. Effective Date October 16, 2009.

Federal Highway Administration (FHWA). 2006. Construction Noise Handbook. FHWA-HEP-06-015. Final Report August 2006.

Harris, C.M. 1991. Handbook of Acoustical Measurements and Noise Control. McGraw-Hill, Inc., New York.

Lund, Jay, Ellen Hanak, William Fleenor, Richard Howitt, Jeffrey Mount, and Peter Moyle. 2007. Envisioning Futures for the Sacramento-San Joaquin Delta. Public Policy Institute of California.

Regional Water Quality Control Board (RWQCB). 2015. The Water Quality Control Plan (Basin Plan) for the California Regional Water Quality Control Board Central Valley Region: The Sacramento River Basin and the San Joaquin River Basin. Fourth Edition, Revised June 2015 (with Approved Amendments).

San Joaquin County. 2016. San Joaquin County General Plan Background Report. Prepared by Mintier Harnish. December 2016.

San Joaquin Council of Governments (SJCOG). 2000. San Joaquin County Multi-Species Open Space and Habitat Conservation Plan (SJMSCP). November 14, 2000.

______. 2012. San Joaquin County Regional Congestion Management Program. November 15, 2012.

San Joaquin County Flood Control and Water Conservation District. 2016. Groundwater Report, Spring 2016.

San Joaquin County Office of Emergency Services (OES). 2003. Dam Failure Plan. December 2003.

San Joaquin Valley Air Pollution Control District (SJVAPCD). 2015. Guide for Assessing and Mitigating Air Quality Impacts (GAMAQI). March 19, 2015.

______. 2017. Small Project Analysis Level. March 1, 2017.

______. 2018. Ambient Air Quality Standards and Valley Attainment Status. http://www.valleyair.org/aqinfo/attainment.htm. Accessed May 17, 2018.

State Water Resources Control Board (SWRCB). 2017. GeoTracker website, www.geotracker.swrcb.ca.gov. Accessed May 16, 2017.

U.S. Department of Agriculture, Natural Resources Conservation Service (NRCS). 2017. Custom Soil Resource Report for San Joaquin County, California – Quail Lakes School. May 16, 2017.

U.S. Department of Agriculture, Soil Conservation Service (SCS). 1992. Soil Survey of San Joaquin County, California.

U.S. Environmental Protection Agency (EPA). 2009. Endangerment and Cause of Contribute Findings for Greenhouse Gases Under Section 202(a) of the Clean Air Act. Federal Register Vol. 74, No. 239, pp. 66496-66546. December 15, 2009.

Wagner, D. L., E. J. Bortugno, and R. D. McJunkin. 1991. Geologic Map of the San Francisco-San Jose Quadrangle, California, 1:250,000. California Division of Mines and Geology, Regional Geologic Map Series.

4.3 PERSONS CONSULTED

Beamon, Christopher. Facilities Planning Technician, Stockton Unified School District.

Spragg, Michelle. Facilities Planner, Stockton Unified School District.

5.0 NOTES RELATED TO EVALUATION OF ENVIRONMENTAL IMPACTS

1) A brief explanation is required for all answers, except "No Impact" answers that are adequately supported by the information sources a lead agency cites in the parentheses following each question. A "No Impact" answer is adequately supported if the referenced information sources show that the impact simply does not apply to projects like the one involved (e.g., the project falls outside a fault rupture zone). A "No Impact" answer should be explained where it is based on project-specific factors as well as general standards (e.g., the project will not expose sensitive receptors to pollutants, based on a project-specific screening analysis).

2) All answers must take account of the whole action involved, including off-site as well as on-site, cumulative as well as project-level, indirect as well as direct, and construction as well as operational impacts.

3) Once the lead agency has determined that a physical impact may occur, then the checklist answers must indicate whether the impact is potentially significant, less than significant with mitigation, or less than significant. "Potentially Significant Impact" is appropriate if there is substantial evidence that an effect may be significant. If there are one or more "Potentially Significant Impact" entries when the determination is made, an EIR is required.

4) "Negative Declaration: Less Than Significant with Mitigation Incorporated" applies where the incorporation of mitigation measures has reduced an effect from "Potentially Significant Impact" to a "Less Than Significant Impact." The lead agency must describe the mitigation measures, and briefly explain how they reduce the effect to a less than significant level (mitigation measures from "Earlier Analyses," as described in (5) below, may be cross-referenced).

5) Earlier analyses may be used where, pursuant to the tiering, program EIR, or other CEQA process, an effect has been adequately analyzed in an earlier EIR or negative declaration [CEQA Guidelines Section 15063(c)(3)(D)]. In this case, a brief discussion should identify the following:

    a) Earlier Analyses Used: Identify and state where they are available for review.

    b) Impacts Adequately Addressed: Identify which effects from the above checklist were within the scope of and adequately analyzed in an earlier document pursuant to applicable legal standards, and state whether such effects were addressed by mitigation measures based on the earlier analysis.

   c) Mitigation Measures: For effects that are “Less than Significant with Mitigation Incorporated,” describe the mitigation measures, which were incorporated or refined from the earlier document, and the extent to which they address site-specific conditions for the project.

6) Lead agencies are encouraged to incorporate into the checklist references to information sources for potential impacts (e.g., general plans, zoning ordinances). Reference to a previously prepared or outside document should, where appropriate, include a reference to the page or pages where the statement is substantiated.

7) Supporting Information Sources: A source list should be attached, and other sources used or individuals contacted should be cited in the discussion.

8) The checklist in CEQA Guidelines Appendix G is only a suggested form, and lead agencies are free to use different formats; however, lead agencies should normally address the questions from this checklist that are relevant to a project’s environmental effects in whatever format is selected.

9) The explanation of each issue should identify:

   a) the significance criteria or threshold, if any, used to evaluate each question; and

   b) the mitigation measure identified, if any, to reduce the impact to less than significance.

APPENDICES

APPENDIX A
AIR QUALITY MODELING RESULTS

Quail Lakes Elementary School

San Joaquin County, Annual

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Elementary School	430.00	Student	0.83	35,949.45	0
Junior High School	128.00	Student	0.35	15,047.90	0

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	2.7	**Precipitation Freq (Days)**	51
Climate Zone	2			**Operational Year**	2021
Utility Company	Pacific Gas & Electric Company				
CO2 Intensity (lb/MWhr)	641.35	**CH4 Intensity (lb/MWhr)**	0.029	**N2O Intensity (lb/MWhr)**	0.006

1.3 User Entered Comments & Non-Default Data

Project Characteristics -

Land Use -

Construction Phase -

Grading - Size of project site.

Architectural Coating - Per SJVAPCD Rule 4601.

Vehicle Trips - Trip rates from traffic study.

Area Coating - Per SJVAPCD Rule 4601.

Mobile Land Use Mitigation -

Water Mitigation -

Waste Mitigation -

Table Name	Column Name	Default Value	New Value
tblArchitecturalCoating	EF_Nonresidential_Exterior	150.00	50.00
tblArchitecturalCoating	EF_Nonresidential_Interior	150.00	50.00
tblAreaCoating	Area_EF_Nonresidential_Exterior	150	50
tblAreaCoating	Area_EF_Nonresidential_Interior	150	50
tblGrading	AcresOfGrading	1.50	6.00
tblTripsAndVMT	HaulingTripNumber	360.00	0.00
tblVehicleTrips	WD_TR	1.29	1.89
tblVehicleTrips	WD_TR	1.62	2.13

2.0 Emissions Summary

2.1 Overall Construction

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2020	0.1958	1.5062	1.2762	2.3500e-003	0.0762	0.0771	0.1533	0.0193	0.0740	0.0933	0.0000	198.2589	198.2589	0.0347	0.0000	199.1273
2021	0.1637	0.3520	0.3415	6.3000e-004	5.3000e-003	0.0170	0.0223	1.4300e-003	0.0163	0.0178	0.0000	53.3301	53.3301	9.1100e-003	0.0000	53.5580
Maximum	**0.1958**	**1.5062**	**1.2762**	**2.3500e-003**	**0.0762**	**0.0771**	**0.1533**	**0.0193**	**0.0740**	**0.0933**	**0.0000**	**198.2589**	**198.2589**	**0.0347**	**0.0000**	**199.1273**

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2020	0.1958	1.5062	1.2762	2.3500e-003	0.0445	0.0771	0.1216	0.0115	0.0740	0.0855	0.0000	198.2587	198.2587	0.0347	0.0000	199.1271
2021	0.1637	0.3520	0.3415	6.3000e-004	5.3000e-003	0.0170	0.0223	1.4300e-003	0.0163	0.0178	0.0000	53.3301	53.3301	9.1100e-003	0.0000	53.5579
Maximum	**0.1958**	**1.5062**	**1.2762**	**2.3500e-003**	**0.0445**	**0.0771**	**0.1216**	**0.0115**	**0.0740**	**0.0855**	**0.0000**	**198.2587**	**198.2587**	**0.0347**	**0.0000**	**199.1271**

	ROG	**NOx**	**CO**	**SO2**	**Fugitive PM10**	**Exhaust PM10**	**PM10 Total**	**Fugitive PM2.5**	**Exhaust PM2.5**	**PM2.5 Total**	**Bio- CO2**	**NBio-CO2**	**Total CO2**	**CH4**	**N20**	**CO2e**
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**38.85**	**0.00**	**18.03**	**37.79**	**0.00**	**7.05**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

Quarter	Start Date	End Date	Maximum Unmitigated ROG + NOX (tons/quarter)	Maximum Mitigated ROG + NOX (tons/quarter)
1	**4-20-2020**	**7-19-2020**	0.6312	0.6312
2	**7-20-2020**	**10-19-2020**	0.5893	0.5893
3	**10-20-2020**	**1-19-2021**	0.5799	0.5799
4	**1-20-2021**	**4-19-2021**	0.4113	0.4113
		Highest	0.6312	0.6312

2.2 Overall Operational

Unmitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Area	0.2115	5.0000e-005	5.1500e-003	0.0000		2.0000e-005	2.0000e-005		2.0000e-005	2.0000e-005	0.0000	9.9700e-003	9.9700e-003	3.0000e-005	0.0000	0.0106
Energy	2.6000e-003	0.0237	0.0199	1.4000e-004		1.8000e-003	1.8000e-003		1.8000e-003	1.8000e-003	0.0000	109.4452	109.4452	4.2800e-003	1.2600e-003	109.9262
Mobile	0.2372	1.6129	2.4318	8.9800e-003	0.6457	8.0400e-003	0.6537	0.1731	7.5600e-003	0.1807	0.0000	827.6662	827.6662	0.0442	0.0000	828.7710
Waste						0.0000	0.0000		0.0000	0.0000	20.6706	0.0000	20.6706	1.2216	0.0000	51.2105
Water						0.0000	0.0000		0.0000	0.0000	0.4292	5.6711	6.1002	0.0443	1.0900e-003	7.5346
Total	**0.4513**	**1.6366**	**2.4568**	**9.1200e-003**	**0.6457**	**9.8600e-003**	**0.6555**	**0.1731**	**9.3800e-003**	**0.1825**	**21.0997**	**942.7925**	**963.8922**	**1.3144**	**2.3500e-003**	**997.4529**

2.2 Overall Operational

Mitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Area	0.2115	5.0000e-005	5.1500e-003	0.0000		2.0000e-005	2.0000e-005		2.0000e-005	2.0000e-005	0.0000	9.9700e-003	9.9700e-003	3.0000e-005	0.0000	0.0106
Energy	2.6000e-003	0.0237	0.0199	1.4000e-004		1.8000e-003	1.8000e-003		1.8000e-003	1.8000e-003	0.0000	109.4452	109.4452	4.2800e-003	1.2600e-003	109.9262
Mobile	0.2124	1.3745	1.8659	6.4100e-003	0.4333	5.7800e-003	0.4391	0.1162	5.4400e-003	0.1216	0.0000	591.1862	591.1862	0.0377	0.0000	592.1276
Waste						0.0000	0.0000		0.0000	0.0000	5.1676	0.0000	5.1676	0.3054	0.0000	12.8026
Water						0.0000	0.0000		0.0000	0.0000	0.3433	4.5369	4.8802	0.0355	8.8000e-004	6.0277
Total	**0.4265**	**1.3982**	**1.8909**	**6.5500e-003**	**0.4333**	**7.6000e-003**	**0.4409**	**0.1162**	**7.2600e-003**	**0.1234**	**5.5110**	**705.1782**	**710.6892**	**0.3828**	**2.1400e-003**	**720.8947**

	ROG	**NOx**	**CO**	**SO2**	**Fugitive PM10**	**Exhaust PM10**	**PM10 Total**	**Fugitive PM2.5**	**Exhaust PM2.5**	**PM2.5 Total**	**Bio- CO2**	**NBio-CO2**	**Total CO2**	**CH4**	**N20**	**CO2e**
Percent Reduction	**5.50**	**14.57**	**23.03**	**28.18**	**32.89**	**22.92**	**32.75**	**32.90**	**22.60**	**32.37**	**73.88**	**25.20**	**26.27**	**70.87**	**8.94**	**27.73**

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Demolition	Demolition	4/20/2020	5/15/2020	5	20	
2	Site Preparation	Site Preparation	5/16/2020	5/19/2020	5	2	
3	Grading	Grading	5/20/2020	5/25/2020	5	4	
4	Building Construction	Building Construction	5/26/2020	3/1/2021	5	200	
5	Paving	Paving	3/2/2021	3/15/2021	5	10	
6	Architectural Coating	Architectural Coating	3/16/2021	3/29/2021	5	10	

Acres of Grading (Site Preparation Phase): 1

Acres of Grading (Grading Phase): 6

Acres of Paving: 0

Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 76,496; Non-Residential Outdoor: 25,499; Striped Parking Area: 0 (Architectural Coating – sqft)

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Architectural Coating	Air Compressors	1	6.00	78	0.48
Paving	Cement and Mortar Mixers	1	6.00	9	0.56
Demolition	Concrete/Industrial Saws	1	8.00	81	0.73
Building Construction	Generator Sets	1	8.00	84	0.74
Building Construction	Cranes	1	6.00	231	0.29
Building Construction	Forklifts	1	6.00	89	0.20
Site Preparation	Graders	1	8.00	187	0.41
Paving	Pavers	1	6.00	130	0.42
Paving	Rollers	1	7.00	80	0.38
Demolition	Rubber Tired Dozers	1	8.00	247	0.40
Grading	Rubber Tired Dozers	1	6.00	247	0.40
Building Construction	Tractors/Loaders/Backhoes	1	6.00	97	0.37
Demolition	Tractors/Loaders/Backhoes	3	8.00	97	0.37
Grading	Tractors/Loaders/Backhoes	1	7.00	97	0.37
Paving	Tractors/Loaders/Backhoes	1	8.00	97	0.37
Site Preparation	Tractors/Loaders/Backhoes	1	8.00	97	0.37
Grading	Graders	1	6.00	187	0.41
Paving	Paving Equipment	1	8.00	132	0.36
Site Preparation	Rubber Tired Dozers	1	7.00	247	0.40
Building Construction	Welders	3	8.00	46	0.45

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Architectural Coating	1	4.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Building Construction	7	21.00	8.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Demolition	5	13.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Grading	3	8.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Paving	5	13.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Site Preparation	3	8.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

Water Exposed Area

3.2 Demolition - 2020

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0395	0.0000	0.0395	5.9800e-003	0.0000	5.9800e-003	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0213	0.2095	0.1466	2.4000e-004		0.0115	0.0115		0.0108	0.0108	0.0000	21.0677	21.0677	5.4200e-003	0.0000	21.2031
Total	**0.0213**	**0.2095**	**0.1466**	**2.4000e-004**	**0.0395**	**0.0115**	**0.0510**	**5.9800e-003**	**0.0108**	**0.0167**	**0.0000**	**21.0677**	**21.0677**	**5.4200e-003**	**0.0000**	**21.2031**

3.2 Demolition - 2020

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	5.2000e-004	3.7000e-004	3.6700e-003	1.0000e-005	1.0400e-003	1.0000e-005	1.0400e-003	2.8000e-004	1.0000e-005	2.8000e-004	0.0000	0.9183	0.9183	3.0000e-005	0.0000	0.9189
Total	**5.2000e-004**	**3.7000e-004**	**3.6700e-003**	**1.0000e-005**	**1.0400e-003**	**1.0000e-005**	**1.0400e-003**	**2.8000e-004**	**1.0000e-005**	**2.8000e-004**	**0.0000**	**0.9183**	**0.9183**	**3.0000e-005**	**0.0000**	**0.9189**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0178	0.0000	0.0178	2.6900e-003	0.0000	2.6900e-003	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0213	0.2095	0.1466	2.4000e-004		0.0115	0.0115		0.0108	0.0108	0.0000	21.0676	21.0676	5.4200e-003	0.0000	21.2030
Total	**0.0213**	**0.2095**	**0.1466**	**2.4000e-004**	**0.0178**	**0.0115**	**0.0293**	**2.6900e-003**	**0.0108**	**0.0135**	**0.0000**	**21.0676**	**21.0676**	**5.4200e-003**	**0.0000**	**21.2030**

3.2 Demolition - 2020

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	5.2000e-004	3.7000e-004	3.6700e-003	1.0000e-005	1.0400e-003	1.0000e-005	1.0400e-003	2.8000e-004	1.0000e-005	2.8000e-004	0.0000	0.9183	0.9183	3.0000e-005	0.0000	0.9189
Total	**5.2000e-004**	**3.7000e-004**	**3.6700e-003**	**1.0000e-005**	**1.0400e-003**	**1.0000e-005**	**1.0400e-003**	**2.8000e-004**	**1.0000e-005**	**2.8000e-004**	**0.0000**	**0.9183**	**0.9183**	**3.0000e-005**	**0.0000**	**0.9189**

3.3 Site Preparation - 2020

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					5.8000e-003	0.0000	5.8000e-003	2.9500e-003	0.0000	2.9500e-003	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	1.6300e-003	0.0184	7.7100e-003	2.0000e-005		8.2000e-004	8.2000e-004		7.6000e-004	7.6000e-004	0.0000	1.5127	1.5127	4.9000e-004	0.0000	1.5249
Total	**1.6300e-003**	**0.0184**	**7.7100e-003**	**2.0000e-005**	**5.8000e-003**	**8.2000e-004**	**6.6200e-003**	**2.9500e-003**	**7.6000e-004**	**3.7100e-003**	**0.0000**	**1.5127**	**1.5127**	**4.9000e-004**	**0.0000**	**1.5249**

3.3 Site Preparation - 2020

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	3.0000e-005	2.0000e-005	2.3000e-004	0.0000	6.0000e-005	0.0000	6.0000e-005	2.0000e-005	0.0000	2.0000e-005	0.0000	0.0565	0.0565	0.0000	0.0000	0.0566
Total	**3.0000e-005**	**2.0000e-005**	**2.3000e-004**	**0.0000**	**6.0000e-005**	**0.0000**	**6.0000e-005**	**2.0000e-005**	**0.0000**	**2.0000e-005**	**0.0000**	**0.0565**	**0.0565**	**0.0000**	**0.0000**	**0.0566**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					2.6100e-003	0.0000	2.6100e-003	1.3300e-003	0.0000	1.3300e-003	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	1.6300e-003	0.0184	7.7100e-003	2.0000e-005		8.2000e-004	8.2000e-004		7.6000e-004	7.6000e-004	0.0000	1.5127	1.5127	4.9000e-004	0.0000	1.5249
Total	**1.6300e-003**	**0.0184**	**7.7100e-003**	**2.0000e-005**	**2.6100e-003**	**8.2000e-004**	**3.4300e-003**	**1.3300e-003**	**7.6000e-004**	**2.0900e-003**	**0.0000**	**1.5127**	**1.5127**	**4.9000e-004**	**0.0000**	**1.5249**

3.3 Site Preparation - 2020

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	3.0000e-005	2.0000e-005	2.3000e-004	0.0000	6.0000e-005	0.0000	6.0000e-005	2.0000e-005	0.0000	2.0000e-005	0.0000	0.0565	0.0565	0.0000	0.0000	0.0566
Total	**3.0000e-005**	**2.0000e-005**	**2.3000e-004**	**0.0000**	**6.0000e-005**	**0.0000**	**6.0000e-005**	**2.0000e-005**	**0.0000**	**2.0000e-005**	**0.0000**	**0.0565**	**0.0565**	**0.0000**	**0.0000**	**0.0566**

3.4 Grading - 2020

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0122	0.0000	0.0122	5.3100e-003	0.0000	5.3100e-003	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	2.7000e-003	0.0302	0.0129	3.0000e-005		1.3700e-003	1.3700e-003		1.2600e-003	1.2600e-003	0.0000	2.4779	2.4779	8.0000e-004	0.0000	2.4980
Total	**2.7000e-003**	**0.0302**	**0.0129**	**3.0000e-005**	**0.0122**	**1.3700e-003**	**0.0136**	**5.3100e-003**	**1.2600e-003**	**6.5700e-003**	**0.0000**	**2.4779**	**2.4779**	**8.0000e-004**	**0.0000**	**2.4980**

3.4 Grading - 2020

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	6.0000e-005	5.0000e-005	4.5000e-004	0.0000	1.3000e-004	0.0000	1.3000e-004	3.0000e-005	0.0000	3.0000e-005	0.0000	0.1130	0.1130	0.0000	0.0000	0.1131
Total	**6.0000e-005**	**5.0000e-005**	**4.5000e-004**	**0.0000**	**1.3000e-004**	**0.0000**	**1.3000e-004**	**3.0000e-005**	**0.0000**	**3.0000e-005**	**0.0000**	**0.1130**	**0.1130**	**0.0000**	**0.0000**	**0.1131**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					5.5000e-003	0.0000	5.5000e-003	2.3900e-003	0.0000	2.3900e-003	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	2.7000e-003	0.0302	0.0129	3.0000e-005		1.3700e-003	1.3700e-003		1.2600e-003	1.2600e-003	0.0000	2.4779	2.4779	8.0000e-004	0.0000	2.4980
Total	**2.7000e-003**	**0.0302**	**0.0129**	**3.0000e-005**	**5.5000e-003**	**1.3700e-003**	**6.8700e-003**	**2.3900e-003**	**1.2600e-003**	**3.6500e-003**	**0.0000**	**2.4779**	**2.4779**	**8.0000e-004**	**0.0000**	**2.4980**

3.4 Grading - 2020

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	6.0000e-005	5.0000e-005	4.5000e-004	0.0000	1.3000e-004	0.0000	1.3000e-004	3.0000e-005	0.0000	3.0000e-005	0.0000	0.1130	0.1130	0.0000	0.0000	0.1131
Total	**6.0000e-005**	**5.0000e-005**	**4.5000e-004**	**0.0000**	**1.3000e-004**	**0.0000**	**1.3000e-004**	**3.0000e-005**	**0.0000**	**3.0000e-005**	**0.0000**	**0.1130**	**0.1130**	**0.0000**	**0.0000**	**0.1131**

3.5 Building Construction - 2020

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.1604	1.1683	1.0419	1.7400e-003		0.0629	0.0629		0.0607	0.0607	0.0000	143.4183	143.4183	0.0266	0.0000	144.0839
Total	**0.1604**	**1.1683**	**1.0419**	**1.7400e-003**		**0.0629**	**0.0629**		**0.0607**	**0.0607**	**0.0000**	**143.4183**	**143.4183**	**0.0266**	**0.0000**	**144.0839**

3.5 Building Construction - 2020

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	2.5600e-003	0.0747	0.0159	1.8000e-004	4.1800e-003	4.1000e-004	4.5900e-003	1.2100e-003	3.9000e-004	1.6000e-003	0.0000	16.9755	16.9755	1.0500e-003	0.0000	17.0019
Worker	6.6200e-003	4.7500e-003	0.0469	1.3000e-004	0.0132	9.0000e-005	0.0133	3.5100e-003	8.0000e-005	3.6000e-003	0.0000	11.7190	11.7190	3.2000e-004	0.0000	11.7271
Total	**9.1800e-003**	**0.0795**	**0.0628**	**3.1000e-004**	**0.0174**	**5.0000e-004**	**0.0179**	**4.7200e-003**	**4.7000e-004**	**5.2000e-003**	**0.0000**	**28.6945**	**28.6945**	**1.3700e-003**	**0.0000**	**28.7290**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.1604	1.1683	1.0419	1.7400e-003		0.0629	0.0629		0.0607	0.0607	0.0000	143.4181	143.4181	0.0266	0.0000	144.0837
Total	**0.1604**	**1.1683**	**1.0419**	**1.7400e-003**		**0.0629**	**0.0629**		**0.0607**	**0.0607**	**0.0000**	**143.4181**	**143.4181**	**0.0266**	**0.0000**	**144.0837**

3.5 Building Construction - 2020

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	2.5600e-003	0.0747	0.0159	1.8000e-004	4.1800e-003	4.1000e-004	4.5900e-003	1.2100e-003	3.9000e-004	1.6000e-003	0.0000	16.9755	16.9755	1.0500e-003	0.0000	17.0019
Worker	6.6200e-003	4.7500e-003	0.0469	1.3000e-004	0.0132	9.0000e-005	0.0133	3.5100e-003	8.0000e-005	3.6000e-003	0.0000	11.7190	11.7190	3.2000e-004	0.0000	11.7271
Total	**9.1800e-003**	**0.0795**	**0.0628**	**3.1000e-004**	**0.0174**	**5.0000e-004**	**0.0179**	**4.7200e-003**	**4.7000e-004**	**5.2000e-003**	**0.0000**	**28.6945**	**28.6945**	**1.3700e-003**	**0.0000**	**28.7290**

3.5 Building Construction - 2021

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0381	0.2864	0.2709	4.6000e-004		0.0144	0.0144		0.0139	0.0139	0.0000	38.1250	38.1250	6.8100e-003	0.0000	38.2952
Total	**0.0381**	**0.2864**	**0.2709**	**4.6000e-004**		**0.0144**	**0.0144**		**0.0139**	**0.0139**	**0.0000**	**38.1250**	**38.1250**	**6.8100e-003**	**0.0000**	**38.2952**

3.5 Building Construction - 2021

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	5.6000e-004	0.0180	3.7100e-003	5.0000e-005	1.1100e-003	5.0000e-005	1.1600e-003	3.2000e-004	5.0000e-005	3.7000e-004	0.0000	4.4705	4.4705	2.6000e-004	0.0000	4.4771
Worker	1.6200e-003	1.1200e-003	0.0114	3.0000e-005	3.5100e-003	2.0000e-005	3.5400e-003	9.3000e-004	2.0000e-005	9.6000e-004	0.0000	2.9977	2.9977	8.0000e-005	0.0000	2.9996
Total	**2.1800e-003**	**0.0191**	**0.0151**	**8.0000e-005**	**4.6200e-003**	**7.0000e-005**	**4.7000e-003**	**1.2500e-003**	**7.0000e-005**	**1.3300e-003**	**0.0000**	**7.4682**	**7.4682**	**3.4000e-004**	**0.0000**	**7.4768**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0381	0.2864	0.2709	4.6000e-004		0.0144	0.0144		0.0139	0.0139	0.0000	38.1250	38.1250	6.8100e-003	0.0000	38.2951
Total	**0.0381**	**0.2864**	**0.2709**	**4.6000e-004**		**0.0144**	**0.0144**		**0.0139**	**0.0139**	**0.0000**	**38.1250**	**38.1250**	**6.8100e-003**	**0.0000**	**38.2951**

3.5 Building Construction - 2021

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	5.6000e-004	0.0180	3.7100e-003	5.0000e-005	1.1100e-003	5.0000e-005	1.1600e-003	3.2000e-004	5.0000e-005	3.7000e-004	0.0000	4.4705	4.4705	2.6000e-004	0.0000	4.4771
Worker	1.6200e-003	1.1200e-003	0.0114	3.0000e-005	3.5100e-003	2.0000e-005	3.5400e-003	9.3000e-004	2.0000e-005	9.6000e-004	0.0000	2.9977	2.9977	8.0000e-005	0.0000	2.9996
Total	**2.1800e-003**	**0.0191**	**0.0151**	**8.0000e-005**	**4.6200e-003**	**7.0000e-005**	**4.7000e-003**	**1.2500e-003**	**7.0000e-005**	**1.3300e-003**	**0.0000**	**7.4682**	**7.4682**	**3.4000e-004**	**0.0000**	**7.4768**

3.6 Paving - 2021

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	3.8700e-003	0.0387	0.0443	7.0000e-005		2.0800e-003	2.0800e-003		1.9100e-003	1.9100e-003	0.0000	5.8825	5.8825	1.8600e-003	0.0000	5.9291
Paving	0.0000					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**3.8700e-003**	**0.0387**	**0.0443**	**7.0000e-005**		**2.0800e-003**	**2.0800e-003**		**1.9100e-003**	**1.9100e-003**	**0.0000**	**5.8825**	**5.8825**	**1.8600e-003**	**0.0000**	**5.9291**

3.6 Paving - 2021

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	2.4000e-004	1.7000e-004	1.6700e-003	0.0000	5.2000e-004	0.0000	5.2000e-004	1.4000e-004	0.0000	1.4000e-004	0.0000	0.4418	0.4418	1.0000e-005	0.0000	0.4421
Total	**2.4000e-004**	**1.7000e-004**	**1.6700e-003**	**0.0000**	**5.2000e-004**	**0.0000**	**5.2000e-004**	**1.4000e-004**	**0.0000**	**1.4000e-004**	**0.0000**	**0.4418**	**0.4418**	**1.0000e-005**	**0.0000**	**0.4421**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	3.8700e-003	0.0387	0.0443	7.0000e-005		2.0800e-003	2.0800e-003		1.9100e-003	1.9100e-003	0.0000	5.8825	5.8825	1.8600e-003	0.0000	5.9291
Paving	0.0000					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**3.8700e-003**	**0.0387**	**0.0443**	**7.0000e-005**		**2.0800e-003**	**2.0800e-003**		**1.9100e-003**	**1.9100e-003**	**0.0000**	**5.8825**	**5.8825**	**1.8600e-003**	**0.0000**	**5.9291**

3.6 Paving - 2021

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	2.4000e-004	1.7000e-004	1.6700e-003	0.0000	5.2000e-004	0.0000	5.2000e-004	1.4000e-004	0.0000	1.4000e-004	0.0000	0.4418	0.4418	1.0000e-005	0.0000	0.4421
Total	**2.4000e-004**	**1.7000e-004**	**1.6700e-003**	**0.0000**	**5.2000e-004**	**0.0000**	**5.2000e-004**	**1.4000e-004**	**0.0000**	**1.4000e-004**	**0.0000**	**0.4418**	**0.4418**	**1.0000e-005**	**0.0000**	**0.4421**

3.7 Architectural Coating - 2021

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Archit. Coating	0.1182					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	1.0900e-003	7.6300e-003	9.0900e-003	1.0000e-005		4.7000e-004	4.7000e-004		4.7000e-004	4.7000e-004	0.0000	1.2766	1.2766	9.0000e-005	0.0000	1.2788
Total	**0.1193**	**7.6300e-003**	**9.0900e-003**	**1.0000e-005**		**4.7000e-004**	**4.7000e-004**		**4.7000e-004**	**4.7000e-004**	**0.0000**	**1.2766**	**1.2766**	**9.0000e-005**	**0.0000**	**1.2788**

3.7 Architectural Coating - 2021

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	7.0000e-005	5.0000e-005	5.1000e-004	0.0000	1.6000e-004	0.0000	1.6000e-004	4.0000e-005	0.0000	4.0000e-005	0.0000	0.1360	0.1360	0.0000	0.0000	0.1360
Total	**7.0000e-005**	**5.0000e-005**	**5.1000e-004**	**0.0000**	**1.6000e-004**	**0.0000**	**1.6000e-004**	**4.0000e-005**	**0.0000**	**4.0000e-005**	**0.0000**	**0.1360**	**0.1360**	**0.0000**	**0.0000**	**0.1360**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Archit. Coating	0.1182					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	1.0900e-003	7.6300e-003	9.0900e-003	1.0000e-005		4.7000e-004	4.7000e-004		4.7000e-004	4.7000e-004	0.0000	1.2766	1.2766	9.0000e-005	0.0000	1.2788
Total	**0.1193**	**7.6300e-003**	**9.0900e-003**	**1.0000e-005**		**4.7000e-004**	**4.7000e-004**		**4.7000e-004**	**4.7000e-004**	**0.0000**	**1.2766**	**1.2766**	**9.0000e-005**	**0.0000**	**1.2788**

3.7 Architectural Coating - 2021

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	7.0000e-005	5.0000e-005	5.1000e-004	0.0000	1.6000e-004	0.0000	1.6000e-004	4.0000e-005	0.0000	4.0000e-005	0.0000	0.1360	0.1360	0.0000	0.0000	0.1360
Total	**7.0000e-005**	**5.0000e-005**	**5.1000e-004**	**0.0000**	**1.6000e-004**	**0.0000**	**1.6000e-004**	**4.0000e-005**	**0.0000**	**4.0000e-005**	**0.0000**	**0.1360**	**0.1360**	**0.0000**	**0.0000**	**0.1360**

4.0 Operational Detail - Mobile

4.1 Mitigation Measures Mobile

Increase Diversity

Improve Destination Accessibility

Increase Transit Accessibility

Improve Pedestrian Network

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Mitigated	0.2124	1.3745	1.8659	6.4100e-003	0.4333	5.7800e-003	0.4391	0.1162	5.4400e-003	0.1216	0.0000	591.1862	591.1862	0.0377	0.0000	592.1276
Unmitigated	0.2372	1.6129	2.4318	8.9800e-003	0.6457	8.0400e-003	0.6537	0.1731	7.5600e-003	0.1807	0.0000	827.6662	827.6662	0.0442	0.0000	828.7710

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
Elementary School	812.70	0.00	0.00	1,279,967	858,927
Junior High School	272.64	0.00	0.00	437,820	293,801
Total	1,085.34	0.00	0.00	1,717,787	1,152,727

4.3 Trip Type Information

	Miles			Trip %			Trip Purpose %		
Land Use	H-W or C-W	H-S or C-C	H-O or C-NW	H-W or C-W	H-S or C-C	H-O or C-NW	Primary	Diverted	Pass-by
Elementary School	9.50	7.30	7.30	65.00	30.00	5.00	63	25	12
Junior High School	9.50	7.30	7.30	72.80	22.20	5.00	63	25	12

4.4 Fleet Mix

Land Use	LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
Elementary School	0.552050	0.036079	0.182449	0.124563	0.019215	0.004844	0.016098	0.055414	0.001187	0.001496	0.005121	0.000613	0.000871
Junior High School	0.552050	0.036079	0.182449	0.124563	0.019215	0.004844	0.016098	0.055414	0.001187	0.001496	0.005121	0.000613	0.000871

5.0 Energy Detail

Historical Energy Use: N

5.1 Mitigation Measures Energy

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Electricity Mitigated						0.0000	0.0000		0.0000	0.0000	0.0000	83.6734	83.6734	3.7800e-003	7.8000e-004	84.0013
Electricity Unmitigated						0.0000	0.0000		0.0000	0.0000	0.0000	83.6734	83.6734	3.7800e-003	7.8000e-004	84.0013
NaturalGas Mitigated	2.6000e-003	0.0237	0.0199	1.4000e-004		1.8000e-003	1.8000e-003		1.8000e-003	1.8000e-003	0.0000	25.7718	25.7718	4.9000e-004	4.7000e-004	25.9249
NaturalGas Unmitigated	2.6000e-003	0.0237	0.0199	1.4000e-004		1.8000e-003	1.8000e-003		1.8000e-003	1.8000e-003	0.0000	25.7718	25.7718	4.9000e-004	4.7000e-004	25.9249

5.2 Energy by Land Use - NaturalGas

Unmitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	tons/yr										MT/yr					
Elementary School	340441	1.8400e-003	0.0167	0.0140	1.0000e-004		1.2700e-003	1.2700e-003		1.2700e-003	1.2700e-003	0.0000	18.1672	18.1672	3.5000e-004	3.3000e-004	18.2752
Junior High School	142504	7.7000e-004	6.9900e-003	5.8700e-003	4.0000e-005		5.3000e-004	5.3000e-004		5.3000e-004	5.3000e-004	0.0000	7.6045	7.6045	1.5000e-004	1.4000e-004	7.6497
Total		**2.6100e-003**	**0.0237**	**0.0199**	**1.4000e-004**		**1.8000e-003**	**1.8000e-003**		**1.8000e-003**	**1.8000e-003**	**0.0000**	**25.7718**	**25.7718**	**5.0000e-004**	**4.7000e-004**	**25.9249**

Mitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	tons/yr										MT/yr					
Elementary School	340441	1.8400e-003	0.0167	0.0140	1.0000e-004		1.2700e-003	1.2700e-003		1.2700e-003	1.2700e-003	0.0000	18.1672	18.1672	3.5000e-004	3.3000e-004	18.2752
Junior High School	142504	7.7000e-004	6.9900e-003	5.8700e-003	4.0000e-005		5.3000e-004	5.3000e-004		5.3000e-004	5.3000e-004	0.0000	7.6045	7.6045	1.5000e-004	1.4000e-004	7.6497
Total		**2.6100e-003**	**0.0237**	**0.0199**	**1.4000e-004**		**1.8000e-003**	**1.8000e-003**		**1.8000e-003**	**1.8000e-003**	**0.0000**	**25.7718**	**25.7718**	**5.0000e-004**	**4.7000e-004**	**25.9249**

5.3 Energy by Land Use - Electricity

Unmitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
Elementary School	202755	58.9837	2.6700e-003	5.5000e-004	59.2148
Junior High School	84870.2	24.6897	1.1200e-003	2.3000e-004	24.7864
Total		**83.6734**	**3.7900e-003**	**7.8000e-004**	**84.0013**

Mitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
Elementary School	202755	58.9837	2.6700e-003	5.5000e-004	59.2148
Junior High School	84870.2	24.6897	1.1200e-003	2.3000e-004	24.7864
Total		**83.6734**	**3.7900e-003**	**7.8000e-004**	**84.0013**

6.0 Area Detail

6.1 Mitigation Measures Area

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Mitigated	0.2115	5.0000e-005	5.1500e-003	0.0000		2.0000e-005	2.0000e-005		2.0000e-005	2.0000e-005	0.0000	9.9700e-003	9.9700e-003	3.0000e-005	0.0000	0.0106
Unmitigated	0.2115	5.0000e-005	5.1500e-003	0.0000		2.0000e-005	2.0000e-005		2.0000e-005	2.0000e-005	0.0000	9.9700e-003	9.9700e-003	3.0000e-005	0.0000	0.0106

6.2 Area by SubCategory

Unmitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	tons/yr										MT/yr					
Architectural Coating	0.0118					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	0.1992					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Landscaping	4.8000e-004	5.0000e-005	5.1500e-003	0.0000		2.0000e-005	2.0000e-005		2.0000e-005	2.0000e-005	0.0000	9.9700e-003	9.9700e-003	3.0000e-005	0.0000	0.0106
Total	**0.2115**	**5.0000e-005**	**5.1500e-003**	**0.0000**		**2.0000e-005**	**2.0000e-005**		**2.0000e-005**	**2.0000e-005**	**0.0000**	**9.9700e-003**	**9.9700e-003**	**3.0000e-005**	**0.0000**	**0.0106**

6.2 Area by SubCategory

Mitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	tons/yr										MT/yr					
Architectural Coating	0.0118					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	0.1992					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Landscaping	4.8000e-004	5.0000e-005	5.1500e-003	0.0000		2.0000e-005	2.0000e-005		2.0000e-005	2.0000e-005	0.0000	9.9700e-003	9.9700e-003	3.0000e-005	0.0000	0.0106
Total	**0.2115**	**5.0000e-005**	**5.1500e-003**	**0.0000**		**2.0000e-005**	**2.0000e-005**		**2.0000e-005**	**2.0000e-005**	**0.0000**	**9.9700e-003**	**9.9700e-003**	**3.0000e-005**	**0.0000**	**0.0106**

7.0 Water Detail

7.1 Mitigation Measures Water

Apply Water Conservation Strategy

	Total CO2	CH4	N2O	CO2e
Category	MT/yr			
Mitigated	4.8802	0.0355	8.8000e-004	6.0277
Unmitigated	6.1002	0.0443	1.0900e-003	7.5346

7.2 Water by Land Use

Unmitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
Elementary School	1.04242 / 2.68052	4.7009	0.0342	8.4000e-004	5.8062
Junior High School	0.310303 / 0.797921	1.3993	0.0102	2.5000e-004	1.7284
Total		**6.1002**	**0.0443**	**1.0900e-003**	**7.5346**

7.2 Water by Land Use

Mitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
Elementary School	0.833939 / 2.14441	3.7607	0.0273	6.7000e-004	4.6450
Junior High School	0.248242 / 0.638337	1.1195	8.1400e-003	2.0000e-004	1.3827
Total		**4.8802**	**0.0355**	**8.7000e-004**	**6.0277**

8.0 Waste Detail

8.1 Mitigation Measures Waste

Institute Recycling and Composting Services

Category/Year

	Total CO2	CH4	N2O	CO2e
	MT/yr			
Mitigated	5.1676	0.3054	0.0000	12.8026
Unmitigated	20.6706	1.2216	0.0000	51.2105

8.2 Waste by Land Use

Unmitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
Elementary School	78.47	15.9287	0.9414	0.0000	39.4627
Junior High School	23.36	4.7419	0.2802	0.0000	11.7478
Total		**20.6706**	**1.2216**	**0.0000**	**51.2105**

8.2 Waste by Land Use

Mitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
Elementary School	19.6175	3.9822	0.2353	0.0000	9.8657
Junior High School	5.84	1.1855	0.0701	0.0000	2.9369
Total		**5.1677**	**0.3054**	**0.0000**	**12.8026**

9.0 Operational Offroad

Equipment Type	Number	Hours/Day	Days/Year	Horse Power	Load Factor	Fuel Type

10.0 Stationary Equipment

Fire Pumps and Emergency Generators

Equipment Type	Number	Hours/Day	Hours/Year	Horse Power	Load Factor	Fuel Type

Boilers

Equipment Type	Number	Heat Input/Day	Heat Input/Year	Boiler Rating	Fuel Type

User Defined Equipment

Equipment Type	Number

11.0 Vegetation

APPENDIX B
BIOLOGICAL RESOURCE REPORTS

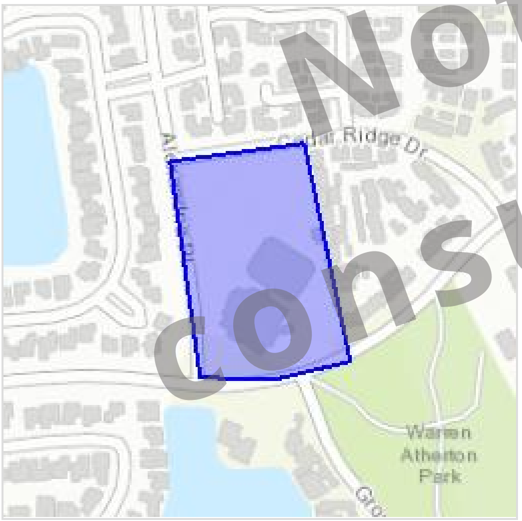
IPaC resource list

This report is an automatically generated list of species and other resources such as critical habitat (collectively referred to as *trust resources*) under the U.S. Fish and Wildlife Service's (USFWS) jurisdiction that are known or expected to be on or near the project area referenced below. The list may also include trust resources that occur outside of the project area, but that could potentially be directly or indirectly affected by activities in the project area. However, determining the likelihood and extent of effects a project may have on trust resources typically requires gathering additional site-specific (e.g., vegetation/species surveys) and project-specific (e.g., magnitude and timing of proposed activities) information.

Below is a summary of the project information you provided and contact information for the USFWS office(s) with jurisdiction in the defined project area. Please read the introduction to each section that follows (Endangered Species, Migratory Birds, USFWS Facilities, and NWI Wetlands) for additional information applicable to the trust resources addressed in that section.

Location

San Joaquin County, California



Local office

San Francisco Bay-delta Fish And Wildlife

☎ (916) 930-5603
📠 (916) 930-5654

650 Capitol Mall
Suite 8-300
Sacramento, CA 95814

http://kim_squires@fws.gov

Endangered species

This resource list is for informational purposes only and does not constitute an analysis of project level impacts.

The primary information used to generate this list is the known or expected range of each species. Additional areas of influence (AOI) for species are also considered. An AOI includes areas outside of the species range if the species could be indirectly affected by activities in that area (e.g., placing a dam upstream of a fish population, even if that fish does not occur at the dam site, may indirectly impact the species by reducing or eliminating water flow downstream). Because species can move, and site conditions can change, the species on this list are not guaranteed to be found on or near the project area. To fully determine any potential effects to species, additional site-specific and project-specific information is often required.

Section 7 of the Endangered Species Act **requires** Federal agencies to "request of the Secretary information whether any species which is listed or proposed to be listed may be present in the area of such proposed action" for any project that is conducted, permitted, funded, or licensed by any Federal agency. A letter from the local office and a species list which fulfills this requirement can **only** be obtained by requesting an official species list from either the Regulatory Review section in IPaC (see directions below) or from the local field office directly.

For project evaluations that require USFWS concurrence/review, please return to the IPaC website and request an official species list by doing the following:

1. Draw the project location and click CONTINUE.
2. Click DEFINE PROJECT.

3. Log in (if directed to do so).
4. Provide a name and description for your project.
5. Click REQUEST SPECIES LIST.

Listed species

[1] are managed by the Endangered Species Program of the U.S. Fish and Wildlife Service.

---

1. Species listed under the Endangered Species Act are threatened or endangered; IPaC also shows species that are candidates, or proposed, for listing. See the listing status page for more information.

The following species are potentially affected by activities in this location:

Amphibians

NAME	STATUS
California Red-legged Frog *Rana draytonii* There is a **final** critical habitat designated for this species. Your location is outside the designated critical habitat. https://ecos.fws.gov/ecp/species/2891	Threatened
California Tiger Salamander *Ambystoma californiense* There is a **final** critical habitat designated for this species. Your location is outside the designated critical habitat. https://ecos.fws.gov/ecp/species/2076	Threatened

Crustaceans

NAME	STATUS
Vernal Pool Fairy Shrimp *Branchinecta lynchi* There is a **final** critical habitat designated for this species. Your location is outside the designated critical habitat. https://ecos.fws.gov/ecp/species/498	Threatened
Vernal Pool Tadpole Shrimp *Lepidurus packardi* There is a **final** critical habitat designated for this species. Your location is outside the designated critical habitat. https://ecos.fws.gov/ecp/species/2246	Endangered

Fishes

NAME	STATUS
Delta Smelt *Hypomesus transpacificus* There is a **final** critical habitat designated for this species. Your location overlaps the designated critical habitat. https://ecos.fws.gov/ecp/species/321	Threatened

Flowering Plants

NAME	STATUS
Large-flowered Fiddleneck *Amsinckia grandiflora* There is a **final** critical habitat designated for this species. Your location is outside the designated critical habitat. https://ecos.fws.gov/ecp/species/5558	Endangered
Palmate-bracted Bird's Beak *Cordylanthus palmatus* No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/1616	Endangered

Insects

NAME	STATUS
Valley Elderberry Longhorn Beetle *Desmocerus californicus dimorphus* There is a **final** critical habitat designated for this species. Your location is outside the designated critical habitat. https://ecos.fws.gov/ecp/species/7850	Threatened

Mammals

NAME	STATUS
Riparian Brush Rabbit *Sylvilagus bachmani riparius* No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/6189	Endangered

Reptiles

NAME	STATUS
Giant Garter Snake *Thamnophis gigas* No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/4482	Threatened

Critical habitats

Potential effects to critical habitat(s) in this location must be analyzed along with the endangered species themselves.

This location overlaps the critical habitat for the following species:

NAME	TYPE
Delta Smelt *Hypomesus transpacificus* https://ecos.fws.gov/ecp/species/321#crithab	Final designated

Migratory birds

Certain birds are protected under the Migratory Bird Treaty Act

[1] and the Bald and Golden Eagle Protection Act[2].

Any activity that results in the take (to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct) of migratory birds or eagles is prohibited unless authorized by the U.S. Fish and Wildlife Service

[3]. There are no provisions for allowing the take of migratory birds that are unintentionally killed or injured.

Any person or organization who plans or conducts activities that may result in the take of migratory birds is responsible for complying with the appropriate regulations and implementing appropriate conservation measures.

---

1. The Migratory Birds Treaty Act of 1918.
2. The Bald and Golden Eagle Protection Act of 1940.
3. 50 C.F.R. Sec. 10.12 and 16 U.S.C. Sec. 668(a)

Additional information can be found using the following links:

- Birds of Conservation Concern
  http://www.fws.gov/birds/management/managed-species/birds-of-conservation-concern.php
- Conservation measures for birds
  http://www.fws.gov/birds/management/project-assessment-tools-and-guidance/conservation-measures.php
- Year-round bird occurrence data
  http://www.birdscanada.org/birdmon/default/datasummaries.jsp

The migratory birds species listed below are species of particular conservation concern (e.g. Birds of Conservation Concern) that may be potentially affected by activities in this location. It is not a list of every bird species you may find in this location, nor a guarantee that all of the bird species on this list will be found on or near this location. Although it is important to try to avoid and minimize impacts to all birds, special attention should be made to avoid and minimize impacts to birds of priority concern. To view available data on other bird species that may occur in your project area, please visit the AKN Histogram Tools and Other Bird Data Resources. To fully determine any potential effects to species, additional site-specific and project-specific information is often required.

NAME	SEASON(S)
Allen's Hummingbird Selasphorus sasin https://ecos.fws.gov/ecp/species/9637	Migrating
Bald Eagle Haliaeetus leucocephalus https://ecos.fws.gov/ecp/species/1626	Year-round
Black Rail Laterallus jamaicensis https://ecos.fws.gov/ecp/species/7717	Breeding
Burrowing Owl Athene cunicularia https://ecos.fws.gov/ecp/species/9737	Year-round
Costa's Hummingbird Calypte costae https://ecos.fws.gov/ecp/species/9470	Year-round
Fox Sparrow Passerella iliaca	Wintering

Least Bittern Ixobrychus exilis https://ecos.fws.gov/ecp/species/6175	Breeding
Lesser Yellowlegs Tringa flavipes https://ecos.fws.gov/ecp/species/9679	Wintering
Lewis's Woodpecker Melanerpes lewis https://ecos.fws.gov/ecp/species/9408	Wintering
Loggerhead Shrike Lanius ludovicianus https://ecos.fws.gov/ecp/species/8833	Year-round
Long-billed Curlew Numenius americanus https://ecos.fws.gov/ecp/species/5511	Wintering
Marbled Godwit Limosa fedoa https://ecos.fws.gov/ecp/species/9481	Wintering
Mountain Plover Charadrius montanus https://ecos.fws.gov/ecp/species/3638	Wintering
Nuttall's Woodpecker Picoides nuttallii https://ecos.fws.gov/ecp/species/9410	Year-round
Oak Titmouse Baeolophus inornatus https://ecos.fws.gov/ecp/species/9656	Year-round
Peregrine Falcon Falco peregrinus https://ecos.fws.gov/ecp/species/8831	Wintering
Rufous Hummingbird selasphorus rufus https://ecos.fws.gov/ecp/species/8002	Migrating
Short-eared Owl Asio flammeus https://ecos.fws.gov/ecp/species/9295	Wintering

Swainson's Hawk Buteo swainsoni https://ecos.fws.gov/ecp/species/1098	Breeding
Tricolored Blackbird Agelaius tricolor https://ecos.fws.gov/ecp/species/3910	Year-round
Western Grebe aechmophorus occidentalis https://ecos.fws.gov/ecp/species/6743	Wintering
Williamson's Sapsucker Sphyrapicus thyroideus https://ecos.fws.gov/ecp/species/8832	Year-round
Yellow-billed Magpie Pica nuttalli https://ecos.fws.gov/ecp/species/9726	Year-round

What does IPaC use to generate the list of migratory bird species potentially occurring in my specified location?

Landbirds:

Migratory birds that are displayed on the IPaC species list are based on ranges in the latest edition of the National Geographic Guide, Birds of North America (6th Edition, 2011 by Jon L. Dunn, and Jonathan Alderfer). Although these ranges are coarse in nature, a number of U.S. Fish and Wildlife Service migratory bird biologists agree that these maps are some of the best range maps to date. These ranges were clipped to a specific Bird Conservation Region (BCR) or USFWS Region/Regions, if it was indicated in the 2008 list of Birds of Conservation Concern (BCC) that a species was a BCC species only in a particular Region/Regions. Additional modifications have been made to some ranges based on more local or refined range information and/or information provided by U.S. Fish and Wildlife Service biologists with species expertise. All migratory birds that show in areas on land in IPaC are those that appear in the 2008 Birds of Conservation Concern report.

Atlantic Seabirds:

Ranges in IPaC for birds off the Atlantic coast are derived from species distribution models developed by the National Oceanic and Atmospheric Association (NOAA) National Centers for Coastal Ocean Science (NCCOS) using the best available seabird survey data for the offshore Atlantic Coastal region to date. NOAANCCOS assisted USFWS in developing seasonal species ranges from their models for specific use in IPaC. Some of these birds are not BCC species but were of interest for inclusion because they may occur in high abundance off the coast at different times throughout the year, which potentially makes them more susceptible to certain types of development and activities taking place in that area. For more refined details about the abundance and richness of bird species within your project area off the Atlantic Coast, see the Northeast Ocean Data Portal. The Portal also offers data and information about other types of taxa that may be helpful in your project review.

About the NOAANCCOS models: the models were developed as part of the NOAANCCOS project: Integrative Statistical Modeling and Predictive Mapping of Marine Bird Distributions and Abundance on the Atlantic Outer Continental Shelf. The models resulting from this project are being used in a number of decision-support/mapping products in order to help guide decision-making on activities off the Atlantic Coast with the goal of reducing impacts to migratory birds. One such product is the Northeast Ocean Data Portal, which can be used to explore details about the relative occurrence and abundance of bird species in a particular area off the Atlantic Coast.

All migratory bird range maps within IPaC are continuously being updated as new and better information becomes available.

Can I get additional information about the levels of occurrence in my project area of specific birds or groups of birds listed in IPaC?

Landbirds:

The Avian Knowledge Network (AKN) provides a tool currently called the "Histogram Tool", which draws from the data within the AKN (latest,survey, point count, citizen science datasets) to create a view of relative abundance of species within a particular location over the course of the year. The results of the tool depict the frequency of detection of a species in survey events, averaged between multiple datasets within AKN in a particular week of the year. You may access the histogram tools through the Migratory Bird Programs AKN Histogram Tools webpage.

The tool is currently available for 4 regions (California, Northeast U.S., Southeast U.S. and Midwest), which encompasses the following 32 states: Alabama, Arkansas, California, Connecticut, Delaware, Florida, Georgia, Illinois, Indiana, Iowa, Kentucky, Louisiana, Maine, Maryland, Massachusetts, Michigan, Minnesota, Mississippi, Missouri, New Hampshire, New Jersey, New York, North, Carolina, Ohio, Pennsylvania, Rhode Island, South Carolina, Tennessee, Vermont, Virginia, West Virginia, and Wisconsin.

In the near future, there are plans to expand this tool nationwide within the AKN, and allow the graphs produced to appear with the list of trust resources generated by IPaC, providing you with an additional level of detail about the level of occurrence of the species of particular concern potentially occurring in your project area throughout the course of the year.

Atlantic Seabirds:

For additional details about the relative occurrence and abundance of both individual bird species and groups of bird species within your project area off the Atlantic Coast, please visit the Northeast Ocean Data Portal. The Portal also offers data and information about other taxa besides birds that may be helpful to you in your project review. Alternately, you may download the bird model results files underlying the portal maps through the NOAANCCOS Integrative Statistical Modeling and Predictive Mapping of Marine Bird Distributions and Abundance on the Atlantic Outer Continental Shelf project webpage.

Facilities

Wildlife refuges

Any activity proposed on National Wildlife Refuge lands must undergo a 'Compatibility Determination' conducted by the Refuge. Please contact the individual Refuges to discuss any questions or concerns.

THERE ARE NO REFUGES AT THIS LOCATION.

Fish hatcheries

THERE ARE NO FISH HATCHERIES AT THIS LOCATION.

Wetlands in the National Wetlands Inventory

Impacts to NWI wetlands and other aquatic habitats may be subject to regulation under Section 404 of the Clean Water Act, or other State/Federal statutes.

For more information please contact the Regulatory Program of the local U.S. Army Corps of Engineers District.

THERE ARE NO KNOWN WETLANDS AT THIS LOCATION.

Data limitations

The Service's objective of mapping wetlands and deepwater habitats is to produce reconnaissance level information on the location, type and size of these resources. The maps are prepared from the analysis of high altitude imagery. Wetlands are identified based on vegetation, visible hydrology and geography. A margin of error is inherent in the use of imagery; thus, detailed on-the-ground inspection of any particular site may result in revision of the wetland boundaries or classification established through image analysis.

The accuracy of image interpretation depends on the quality of the imagery, the experience of the image analysts, the amount and quality of the collateral data and the amount of ground truth verification work conducted. Metadata should be consulted to determine the date of the source imagery used and any mapping problems.

Wetlands or other mapped features may have changed since the date of the imagery or field work. There may be occasional differences in polygon boundaries or classifications between the information depicted on the map and the actual conditions on site.

Data exclusions

Certain wetland habitats are excluded from the National mapping program because of the limitations of aerial imagery as the primary data source used to detect wetlands. These habitats include seagrasses or submerged aquatic vegetation that are found in the intertidal and subtidal zones of estuaries and nearshore coastal waters. Some deepwater reef communities (coral or tuberficid worm reefs) have also been excluded from the inventory. These habitats, because of their depth, go undetected by aerial imagery.

Data precautions

Federal, state, and local regulatory agencies with jurisdiction over wetlands may define and describe wetlands in a different manner than that used in this inventory. There is no attempt, in either the design or products of this inventory, to define the limits of proprietary jurisdiction of any Federal, state, or local government or to establish the geographical scope of the regulatory programs of government agencies. Persons intending to engage in activities involving modifications within or adjacent to wetland areas should seek the advice of appropriate federal, state, or local agencies concerning specified agency regulatory programs and proprietary jurisdictions that may affect such activities.

Element_Type	Scientific_Name	Common_Name	Element_C
Animals - Amphibians	Ambystoma californiense	California tiger salamander	AAAAA011
Animals - Birds	Accipiter cooperii	Cooper's hawk	ABNKC120
Animals - Birds	Buteo swainsoni	Swainson's hawk	ABNKC190
Animals - Birds	Elanus leucurus	white-tailed kite	ABNKC060
Animals - Birds	Ardea alba	great egret	ABNGA040
Animals - Birds	Ardea herodias	great blue heron	ABNGA040
Animals - Birds	Charadrius montanus	mountain plover	ABNNB031
Animals - Birds	Pica nuttalli	yellow-billed magpie	ABPAV090
Animals - Birds	Progne subis	purple martin	ABPAU010
Animals - Birds	Agelaius tricolor	tricolored blackbird	ABPBXB00
Animals - Birds	Icteria virens	yellow-breasted chat	ABPBX240
Animals - Birds	Setophaga petechia	yellow warbler	ABPBX030
Animals - Birds	Asio flammeus	short-eared owl	ABNSB130
Animals - Birds	Athene cunicularia	burrowing owl	ABNSB100
Animals - Birds	Vireo bellii pusillus	least Bell's vireo	ABPBW011
Animals - Fish	Acipenser transmontanus	white sturgeon	AFCAA010
Animals - Fish	Pogonichthys macrolepidotus	Sacramento splittail	AFCJB3402
Animals - Fish	Hypomesus transpacificus	Delta smelt	AFCHB010
Animals - Fish	Spirinchus thaleichthys	longfin smelt	AFCHB030
Animals - Fish	Entosphenus tridentatus	Pacific lamprey	AFBAA021
Animals - Fish	Lampetra ayresii	river lamprey	AFBAA020
Animals - Fish	Oncorhynchus mykiss irideus	steelhead - Central Valley DPS	AFCHA020
Animals - Fish	Oncorhynchus tshawytscha	chinook salmon - upper Klamath	AFCHA020
Animals - Fish	Oncorhynchus tshawytscha	chinook salmon - Central Valley s	AFCHA020
Animals - Fish	Oncorhynchus tshawytscha	chinook salmon - Central Valley f	AFCHA020
Animals - Mollusks	Anodonta californiensis	California floater	IMBIV0402
Animals - Mollusks	Gonidea angulata	western ridged mussel	IMBIV1901
Animals - Reptiles	Emys marmorata	western pond turtle	ARAAD020
Animals - Reptiles	Thamnophis gigas	giant gartersnake	ARADB361
Animals - Reptiles	Phrynosoma blainvillii	coast horned lizard	ARACF121
Plants - Vascular	Sagittaria sanfordii	Sanford's arrowhead	PMALI040
Plants - Vascular	Blepharizonia plumosa	big tarplant	PDAST1C01
Plants - Vascular	Symphyotrichum lentum	Suisun Marsh aster	PDASTE847
Plants - Vascular	Brasenia schreberi	watershield	PDCAB010
Plants - Vascular	Atriplex cordulata var. cordulat	heartscale	PDCHE040
Plants - Vascular	Extriplex joaquinana	San Joaquin spearscale	PDCHE041
Plants - Vascular	Astragalus tener var. tener	alkali milk-vetch	PDFAB0F8
Plants - Vascular	Lathyrus jepsonii var. jepsonii	Delta tule pea	PDFAB250
Plants - Vascular	Trifolium hydrophilum	saline clover	PDFAB400
Plants - Vascular	California macrophylla	round-leaved filaree	PDGER010
Plants - Vascular	Hibiscus lasiocarpos var. occide	woolly rose-mallow	PDMAL0H
Plants - Vascular	Chloropyron palmatum	palmate-bracted salty bird's-beak	PDSCR0J0J

Federal_Status	State_Status	CDFW_Stat	CA_Rare_Pl	Quad_Code	Quad_Nam	Data_Statu	Taxonomic_
Threatened	Threatened	WL	-	3712183	Stockton W	Mapped	Animals - Ar
None	None	WL	-	3712183	Stockton W	Unprocesse	Animals - Bi
None	Threatened	-	-	3712183	Stockton W	Mapped an	Animals - Bi
None	None	FP	-	3712183	Stockton W	Mapped	Animals - Bi
None	None	-	-	3712183	Stockton W	Unprocesse	Animals - Bi
None	None	-	-	3712183	Stockton W	Unprocesse	Animals - Bi
None	None	SSC	-	3712183	Stockton W	Unprocesse	Animals - Bi
None	None	-	-	3712183	Stockton W	Unprocesse	Animals - Bi
None	None	SSC	-	3712183	Stockton W	Unprocesse	Animals - Bi
None	Candidate Endange	SSC	-	3712183	Stockton W	Mapped	Animals - Bi
None	None	SSC	-	3712183	Stockton W	Unprocesse	Animals - Bi
None	None	SSC	-	3712183	Stockton W	Unprocesse	Animals - Bi
None	None	SSC	-	3712183	Stockton W	Unprocesse	Animals - Bi
None	None	SSC	-	3712183	Stockton W	Mapped an	Animals - Bi
Endangered	Endangered	-	-	3712183	Stockton W	Mapped	Animals - Bi
None	None	SSC	-	3712183	Stockton W	Unprocesse	Animals - Fi
None	None	SSC	-	3712183	Stockton W	Unprocesse	Animals - Fi
Threatened	Endangered	-	-	3712183	Stockton W	Mapped an	Animals - Fi
Candidate	Threatened	SSC	-	3712183	Stockton W	Mapped	Animals - Fi
None	None	SSC	-	3712183	Stockton W	Unprocesse	Animals - Fi
None	None	SSC	-	3712183	Stockton W	Unprocesse	Animals - Fi
Threatened	None	-	-	3712183	Stockton W	Mapped	Animals - Fi
None	None	SSC	-	3712183	Stockton W	Unprocesse	Animals - Fi
Threatened	Threatened	-	-	3712183	Stockton W	Unprocesse	Animals - Fi
None	None	SSC	-	3712183	Stockton W	Unprocesse	Animals - Fi
None	None	-	-	3712183	Stockton W	Unprocesse	Animals - M
None	None	-	-	3712183	Stockton W	Unprocesse	Animals - M
None	None	SSC	-	3712183	Stockton W	Unprocesse	Animals - Re
Threatened	Threatened	-	-	3712183	Stockton W	Mapped	Animals - Re
None	None	SSC	-	3712183	Stockton W	Unprocesse	Animals - Re
None	None	-	1B.2	3712183	Stockton W	Mapped	Plants - Vas
None	None	-	1B.1	3712183	Stockton W	Mapped	Plants - Vas
None	None	-	1B.2	3712183	Stockton W	Mapped	Plants - Vas
None	None	-	2B.3	3712183	Stockton W	Mapped	Plants - Vas
None	None	-	1B.2	3712183	Stockton W	Mapped	Plants - Vas
None	None	-	1B.2	3712183	Stockton W	Mapped	Plants - Vas
None	None	-	1B.2	3712183	Stockton W	Mapped	Plants - Vas
None	None	-	1B.2	3712183	Stockton W	Mapped	Plants - Vas
None	None	-	1B.2	3712183	Stockton W	Mapped	Plants - Vas
None	None	-	1B.2	3712183	Stockton W	Mapped	Plants - Vas
None	None	-	1B.2	3712183	Stockton W	Mapped	Plants - Vas
Endangered	Endangered	-	1B.1	3712183	Stockton W	Mapped	Plants - Vas

_Sort
mphibians - Ambystomatidae - Ambystoma californiense
rds - Accipitridae - Accipiter cooperii
rds - Accipitridae - Buteo swainsoni
rds - Accipitridae - Elanus leucurus
rds - Ardeidae - Ardea alba
rds - Ardeidae - Ardea herodias
rds - Charadriidae - Charadrius montanus
rds - Corvidae - Pica nuttalli
rds - Hirundinidae - Progne subis
rds - Icteridae - Agelaius tricolor
rds - Parulidae - Icteria virens
rds - Parulidae - Setophaga petechia
rds - Strigidae - Asio flammeus
rds - Strigidae - Athene cunicularia
rds - Vireonidae - Vireo bellii pusillus
sh - Acipenseridae - Acipenser transmontanus
sh - Cyprinidae - Pogonichthys macrolepidotus
sh - Osmeridae - Hypomesus transpacificus
sh - Osmeridae - Spirinchus thaleichthys
sh - Petromyzontidae - Entosphenus tridentatus
sh - Petromyzontidae - Lampetra ayresii
sh - Salmonidae - Oncorhynchus mykiss irideus
sh - Salmonidae - Oncorhynchus tshawytscha
sh - Salmonidae - Oncorhynchus tshawytscha
sh - Salmonidae - Oncorhynchus tshawytscha
ollusks - Unionidae - Anodonta californiensis
ollusks - Unionidae - Gonidea angulata
eptiles - Emydidae - Emys marmorata
eptiles - Natricidae - Thamnophis gigas
eptiles - Phrynosomatidae - Phrynosoma blainvillii
cular - Alismataceae - Sagittaria sanfordii
cular - Asteraceae - Blepharizonia plumosa
cular - Asteraceae - Symphyotrichum lentum
cular - Cabombaceae - Brasenia schreberi
cular - Chenopodiaceae - Atriplex cordulata var. cordulata
cular - Chenopodiaceae - Extriplex joaquinana
cular - Fabaceae - Astragalus tener var. tener
cular - Fabaceae - Lathyrus jepsonii var. jepsonii
cular - Fabaceae - Trifolium hydrophilum
cular - Geraniaceae - California macrophylla
cular - Malvaceae - Hibiscus lasiocarpos var. occidentalis
cular - Orobanchaceae - Chloropyron palmatum

APPENDIX C
GEOTECHNICAL ENGINEERING STUDY

GEOLOGIC HAZARDS AND GEOTECHNICAL ENGINEERING STUDY

STOCKTON UNIFIED SCHOOL DISTRICT
OASIS CHURCH PROPERTY
2111 QUAIL LAKES DRIVE
STOCKTON, CALIFORNIA

Prepared for
Christopher Beamon
Facilities Planning Technician
Stockton Unified School District
1944 N. El Pinal Drive
Stockton, CA 95205
209.933.7045, Ext. 2342

Prepared by
Condor Earth
188 Frank West Circle, Suite I
Stockton, California 95206
209.234.0518

August 23, 2018
Condor Project No. 7572D
SUSD Project No. FP2017-034

CONDOR

TABLE OF CONTENTS

APPENDICES

GEOLOGIC HAZARDS AND GEOTECHNICAL ENGINEERING STUDY

STOCKTON UNIFIED SCHOOL DISTRICT
OASIS CHURCH PROPERTY
2111 QUAIL LAKES DRIVE
STOCKTON, CALIFORNIA

1.0 INTRODUCTION

1.1 GENERAL

This report includes the results of our Geologic Hazards and Geotechnical Engineering Study (GHGES) for Stockton Unified School District's (SUSD) Quail Lakes Drive site (Site). The subject site comprises approximately 6.01 acres of Assessor's Parcel Number (APN) 108-020-04 (Site) located at 2111 Quail Lakes Drive in Stockton, California. The site is currently developed as a church facility operated by the Oasis Church (formerly Lakeview Assembly Church). The general location of the site is shown on the Figure 1 – Vicinity Map, and Figure 2 – Site Map with Boring Locations, Appendix A. Condor Earth (Condor) performed this study at the request of Facilities Planning Technician, Christopher Beamon of SUSD. This GHGES is intended to meet the requirements of DSA and CGS submission, and Title 24, California Building Code (CBC).

1.2 PROJECT DESCRIPTION

Condor understands that the proposed project will consist of five (5) new buildings on an existing site that is currently occupied by a church facility. Generally, the new structures will be located in the northern portion of the site, and physical education outdoor facilities will be located in the southern portion of the site. The proposed structures are shown in relation to the existing site in Figure 2. Structural loading for the proposed buildings is anticipated to be light to moderate, with one to two stories.

Condor previously prepared a geologic hazards assessment and liquefaction evaluation study dated July 14, 2017, for the site. At that time SUSD was evaluating the possibility of refurbishing the existing structures for school facilities. The current plans call for removal of all existing structures and replacement with the new structures as shown on Figure 2.

2.0 PURPOSE AND SCOPE

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

Condor completed the following work for this GHGES:

1. Reviewed available maps and documents relevant to the site geology, seismic setting, and geotechnical conditions, including previous work performed by Kleinfelder and Associates (Kleinfelder, September 29, 1983), and Condor Earth (Condor Earth, July 14, 2017).

2. Explored, sampled, and classified subsurface soils within the site by means of nineteen (19) exploratory soil borings drilled to a depth of 10 to 60 feet, and three (3) asphalt cores. The locations of these borings are shown on Figure 2 – Site Map with Boring Locations, Appendix A. Detailed soil boring logs are included in Appendix C.
3. Tested soils sampled during the subsurface exploration to measure their pertinent engineering and index properties. The tests included unit weight, moisture content, dry density, sieve analysis, plasticity index, corrosion, and a lime treated R-Value. Laboratory test results are presented in Appendix D.
4. Analyzed the findings from the document review, field exploration, and laboratory testing to develop conclusions regarding geologic hazards and geotechnical recommendations for:
    a. Geologic hazards that may impact the performance of the proposed structures, including liquefaction;
    b. 2016 CBC seismic design criteria;
    c. General earthwork including site stripping, subgrade preparation, temporary excavations, trench backfill, import fill, compaction criteria, and site surface drainage;
    d. Foundation design and construction, including foundation type, allowable bearing capacities, lateral resistance, settlement, and foundation depth;
    e. Concrete slabs and exterior flatwork; and
    f. Asphalt and concrete pavements.
5. Prepared this written report summarizing our findings, conclusions, and geotechnical recommendations.

3.0 SUBSURFACE EXPLORATION METHODS

Condor initially explored the site subsurface conditions during preparation of a previous report by drilling four (4) borings to a depth of 50 feet. The borings are identified in Figure 2, Appendix A, as B1 through B4 and were drilled on June 13, 14, and 15, 2017 by Woodward Drilling (License C57#710079). The borings were drilled using hollow stem auger methods to just below first groundwater then completed using mud rotary methods. Soil samples were collected at 2.5-foot intervals starting at 5 feet below grade using a 2-inch OD Standard Penetration Test (SPT) sampler. Samples were also periodically collected from B3 and B4 using a 3-inch OD California Modified (CM) sampler fitted with 2.5 OD brass and stainless-steel liners. The samples were collected using an auto-trip 140-pound hammer falling 30 inches to drive the sampler.

On March 2, 2018, an additional seven (7) borings were drilled to a depth of 10 to 20 feet, and are identified as B5 through B11 (Figure 2). The additional borings were drilled in the vicinity of the existing structures to supplement the data collected in B1 through B4. The second set of borings for the investigation were drilled by West Coast Exploration (License C57 #870761) with a truck-mounted drilling rig and a restricted access “Minute Man” drill rig using solid stem auger drilling methods. Soil samples were collected from each borehole at selected intervals using a 3-inch OD California Modified (CM) sampler fitted with 2.5 OD brass and stainless-steel liners, and a 2-inch OD Standard Penetration Test (SPT) sampler. The samples were collected using a 140-pound cathead-driven hammer falling 30 inches to drive the sampler with the exception of the “Minute Man” borings (B9 through B11).

Subsequent to the March 2018 drilling, the proposed new structures were relocated to the north portion of the project site. Borings B12 through B19 were drilled on July 23 and 24, 2018 to provide additional data for the new building locations. The borings include two deep borings (50 to 60 feet), shallow borings, and were drilled by V&W Drilling (License C57 #720904). Samples for B1 through B4 were collected using an auto-trip 140-pound hammer dropping a height of 30 inches to drive the sampler.

A Condor representative visually classified soil samples and cuttings at the time of drilling using the Unified Soil Classification System. All the boreholes were backfilled using bentonite under the observation of a San Joaquin County Environmental Health Department inspector. The boring locations are presented in Figure 2, Appendix A. Detailed soil boring logs and laboratory test results are shown in Appendix C and D, respectively.

Due to the presence of the existing structures and the location of existing site utilities, several of the borings are located outside the footprints of the proposed structures. However, the number of borings meets the guidelines for a minimum of one (1) boring for each 5,000 square feet of new building footprint. Additional discussion regarding the subsurface conditions and the adequacy of the completed boring is discussed in Section 6.0.

4.0 SITE DESCRIPTION

The Site is located in the northern portion of the San Joaquin Valley in the City of Stockton. The 6.01-acre site is bound by Quail Lakes Drive on the south, Alexandria Place on the west, and Cedar Ridge Drive on the north. The elevation is approximately 5 feet above mean sea level and the site is relatively flat and essentially rectangular in shape. The general topographic gradient slopes gently southwest.

The existing church buildings are oriented diagonally and located at the center to southwestern portion of the Site. A grassy landscape area is located in the southwest corner south of the church. The southeastern portion south of the church has a parking lot and a grassy area with benches near the building. North of the building has play structures and concrete play areas (basketball courts) with a parking lot surrounding the play area to the east, north, and west. Three outbuildings line the eastern boundary (two adjacent to play area with a trash enclosure south of the sheds and one cargo container north the two sheds) in the northern parking lot. Entrances to the parking lot are located to the south of the northern parking lot along Alexandria Place, to the north of the parking lot along Cedar Ridge Drive, and the south parking lot along Quail Lakes Drive. A chain-link fence surrounds the play structure area north of the building. A chain-link fence also separates the parking lot from the playground area on the eastern side of the building. A wooden fence borders the eastern Site boundary. Electrical transformers are located on the southwestern portion of the Site near the building in the grassy area. Electrical and sewer boxes are located in the ground near the sidewalk just north of the eastern parking lot Site entrance.

5.0 GEOLOGIC AND SEISMIC SETTING

5.1 REGIONAL GEOLOGY

The Site is located in the northern San Joaquin Valley. Together, the Sacramento and San Joaquin Valleys form the Great Valley Geomorphic Province of California. The Great Valley is a northwest-trending, west-dipping geosyncline in-filled with as much as six vertical miles of sediment. The geosyncline is sub-divided into three basins by the buried, transverse Stockton arch and the Bakersfield arch. The Stockton arch, a broad structure bounded on the north by the Stockton fault but with a poorly defined southern limit, separates the San Joaquin Valley to the south from the Sacramento Valley to the north. The Bakersfield arch separates the Maricopa-Tejon subbasin at the south end of the San Joaquin Valley from the remainder of the San Joaquin sedimentary basin. Neither arch has appreciable structural relief (Bartow, 1991). The

Great Valley lies between the Coast Ranges to the west and the Sierra Nevada Range to the east. Regionally, the lithology of the upper 3,000 feet is derived from the Sierra Nevada range to the east and the Coast Range Mountains to the west. Locally sediments are 1,000 to 2,000 feet thick.

The Coast Range Mountains generally consist of northwest trending ridges of Franciscan Assemblage and granitic basement rocks. The bedrock complex of the Sierra Nevada Mountains generally consists of metamorphosed sedimentary and volcanic rocks of Paleozoic and Mesozoic age (150 to 300 million years old) and plutonic rocks (chiefly granitic types) of Mesozoic age (80 to 150 million years old). Structurally, the Coast Range - Sierra Nevada Block Boundary Zone, a regional geological boundary separating Franciscan basement rocks of the Coast Range from granitic basement rocks of the Sierra Nevada Range, is present at depth near the western margin of the Great Valley Geomorphic Province.

5.2 LOCAL GEOLOGY

Based upon published geologic maps, near-surface geology underlying the Site consists of Modesto Formation Holocene alluvial fan deposits. These arkosic sediments consist of gravel, sand, silt and clay derived primarily from rocks of the Sierra Nevada Range. These materials would have eroded from nearby upland sources and likely deposited by the Calaveras River. The geologic distribution of near-surface deposits in the vicinity of the Site is shown on is shown on the Geologic Map, Figure 3, Appendix A.

5.3 FAULTING AND SEISMICITY

The Site is located in a moderately seismic region of California’s Central Valley. The locations of significant faults relative to the site are shown on Figure 4 – Regional Fault Map, Appendix A. Northern California Earthquake Data Center (NCEDC) files of historic earthquakes indicate 44 earthquakes of estimated magnitude M_w5.0 or greater and 7 earthquakes of M_w6.0 or greater have occurred within 161 km (100 miles) of the site since 1898. Among historic earthquakes, the 1906 earthquake on the San Andreas Fault located about 108 km (67 miles) west-southwest of the site is likely to have caused the strongest shaking. The more recent Loma Prieta earthquake (M_w 6.9 in 1989) occurred about 88 km (55 miles) to the southwest. The earthquake catalog files are in Appendix B. The closest mapped fault is the Vernalis Fault approximately 24 km (15 miles) southwest.

A number of major active strike-slip faults belonging to the San Andreas Fault system trend northwest through the San Francisco Bay Area to the west of the site. According to the segmentation model developed by the Working Group on Northern California Earthquake Potential (1996), the Great Valley thrust fault zone, a system of northwest-trending concealed (“blind”) thrust faults, lie at an estimated depth of 7 km beneath the east foothills of the Coast Range Mountains. The trace of the vertical projection of the Great Valley Fault (segment 05) is shown on Figure 4. Since faulting within the Great Valley thrust fault zone does not typically rupture the ground surface, this fault system has only recently been recognized as a potential source of earthquakes. The Great Valley thrust fault zone was responsible for the M_w6.7 Coalinga earthquake of 1983 and is considered the probable source of the twin Vacaville-Winters earthquakes of 1892 of similar magnitude.

No known active or potentially active faults cross the proposed school 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. Nevertheless, the site is near a number of mapped and major active faults capable of generating strong earthquakes. Active and potentially active faults considered capable of causing strong ground motion at the site are listed in the following table along with both respective distances to the site and estimated maximum earthquake magnitudes, $M_w$max.

REGIONAL SIGNIFICANT FAULTS

Fault		Distance to Site (km)	Maximum Earthquake- $M_w$max (Moment Magnitude)
Vernalis		24	6.6
Midland		26	6.3
Great Valley 05		38	6.5
Greenville (north)		44	6.6
Foothills Fault		50	6.5
Mount Diablo Thrust		51	6.6
Calaveras – Northern		61	6.8
6.2			
Concord		64	6.2
Green Valley (south)		68	6.2
Hayward (north)	7.1	74	6.4
West Napa		84	6.5
San Andreas (Peninsula)		104	7.1

Deaggregation of the site specific probabilistic seismic hazards using the United States Geologic Survey (USGS) web tools indicate the dominant seismic source has a modal distance of 11 km and a modal magnitude M_w 5.1 for a 975-year return period, which would best correlate to the Great Valley 7 Fault. The deaggregation results are included in Appendix B.

The San Andreas Fault also poses a seismic hazard to the site, especially in the longer periods of the site response spectrum. The San Andreas Fault is classified as a “Type A” seismic source based on its potential to generate a maximum earthquake of M_w8.0 and its estimated long-term slip rate of 24.0 mm/year.

6.0 SUBSURFACE CONDITIONS

Condor explored subsurface conditions by means of nineteen (19) borings. Boreholes B1, B3, B4, and B12 were drilled to 50 feet below existing grade, B2 was drilled to 55 feet, and B13 to 60 feet. The remaining borings were drilled to a depth of 10 to 20 feet. The borehole locations are shown on Figure 2, Appendix A. Additional information regarding the drilling methods and investigation dates is provided in Section 3.0.

The site is characterized well by the number and location of the borings. We therefore do not recommend additional exploration after demolition of the existing structures based on our findings However, the recommendations in Section 15.0, Additional Services, should be adhered to during construction to verify the anticipated ground conditions.

6.1 EARTH MATERIALS

The subsurface soils consisted of shallow fill from previous site development and alluvium to the maximum depth explored of 61.5 feet. The soils were generally stiff, low to moderately plastic fines Lean Clay (CL), Fat Clay (CH), Silty Clay with Sand (ML-CL), and Silty Clay (ML-CL) from just below the ground surface to depths ranging from 23 to 34 feet. These soils grade to a granular sequence of generally medium dense Silt (ML), Silty Sand (SM), Poorly Graded Sand (SP), and Well Graded Gravel (GW) present to depths ranging from 44 to 53 feet. Saturated conditions were generally present at about 20 feet. Detailed borehole logs are provided in Appendix C. A Geologic Cross-Section of the site soils and groundwater conditions is Shown on Figure 7, Appendix A.

6.2 LOCAL GROUNDWATER CONDITIONS

The depth to groundwater at the time of initial drilling ranged from approximately 14 feet in B4 on the west side of the property to 22 feet in B2 on the east. Groundwater was encountered at 14.0 feet in borings B6 and B7, which were drilled to 20 feet. Groundwater was encountered at 15 feet in B12 and B13 in July 2018. Groundwater was not encountered in the remaining borings which were generally drilled to a depth of 10 to 15 feet. The Department of Water Resources records from 1965 through 1975 for well number 02N06E28E003M approximately one-half mile to the southeast indicate groundwater has ranged from about 20 to 40 feet below existing grade. A soil-investigation performed by J. H. Kleinfelder & Associates in September 1983 reported groundwater at a depth of 14-1/2 feet. It should also be noted that fluctuations in the groundwater levels and soil moisture conditions do occur due to change in seasons, variations in rainfall, construction impacts, and other factors.

7.0 GEOLOGIC HAZARDS

7.1 FLOODING

The site is located at approximately sea level in a relatively flat area. Fourteen Mile Slough is approximately 700 feet north, the man-made Meadow Lake and Quail Lake is 420 feet west and 200 feet south, respectively. The Calaveras River is approximately 1 mile to the south and the confluence with the San Joaquin rivers approximately 3 miles to the southwest. The San Joaquin River joins the Sacramento River further to the northwest where they form the Sacramento-San Joaquin Delta.

The Federal Emergency Management Agency (FEMA) Flood Insurance Rate Map (FIRM) dated October 16, 2009 was used to evaluate site flooding potential. The map indicates the Site is protected by levees from a 1 percent annual chance of flooding, has an annual flood potential of 0.2 percent, and a 1 percent chance to an average depth of less than 1 foot or with drainage areas less than 1 square mile. The FEMA map is reproduced in part on Figure 5.

The potential damage to the Site from flooding by dam failure is minimal. The Site is not located near the ocean or a lakefront; therefore, secondary-flooding hazards from seismic activity such as tsunamis and seiches is negligible.

7.2 FAULTING

No known active or potentially active faults cross the proposed school site, and the site is not located in a Fault-Rupture Hazard Zone as established by the Alquist-Priolo Earthquake Fault Zoning Act (Hart, 2007). Therefore ground displacement from surface rupture is not considered a significant hazard at the site. Additional faulting discussion is provided in Section 5.3.

7.3 VOLCANIC ERUPTION

The Site is not within a region where volcanic eruptions of magma, ash, mud, or carbon dioxide are considered likely to occur. The closest active volcanic hazard zone is mapped approximately 130 miles southeast at Mammoth Lakes on the east side of the Sierra Nevada Mountains.

7.4 SLOPE STABILITY

The site is located in a flat area of the central Sacramento-San Joaquin Valley. The nearest slope to the site is along the north bank of the Calaveras River one mile south. Based on the proximity of these slopes to the site, there is no potential risk from a landslide or loss of lateral support at the site.

7.5 ASBESTOS BEARING ROCK

The nearest asbestos bearing rock outcrops to the site are approximately 30 miles to the west in the Coast Range Mountains near Mount Diablo and a similar distance to the northeast in the Sierra Nevada foothills near New Hogan Reservoir (Wagner, et al.1990 and Churchill, et al., 2000).

Asbestos has been shown to remain in soils and can be imported as aggregate. However, no imported rock was observed on the surface of the site and natural transport is unlikely. The potential hazard from encountering asbestos bearing rock in surface and subsurface excavations at the site is considered low. The site location relative to mapped locations of ultramafic rocks is shown on Figure 6, Ultramafic Rock Map, Appendix A.

7.6 RADON- BEARING SOIL

Radon-bearing soils are typically found near sites that overlie organic-rich marine black shale and certain igneous rocks. Increased amounts of radon may be generated in the subsurface at these locations. Though the site is not underlain by either of these rock types, we evaluated the potential exposure to radon-bearing soil during grading earthwork, and occupancy. The California Department of Health Services web page[1] *California Indoor Radon levels Sorted by Zip Code* indicates that 102 radon tests have been conducted in the 95207 zip code area and 23 were equal to or greater than the 4 picocuries per liter (pCi/L) advised action level. The maximum measured level was 13.5 pCi/L. Based on our review, we consider the risk of encountering radon bearing soils resulting in indoor radon levels exceeding the action level to be low. San Joaquin County is considered by the US Environmental Protection Agency to be within Zone 3, where indoor average radon levels are less than 2 pCi/L[2].

7.7 CORROSIVE AND REACTIVE SOILS

The United States Department of Agriculture (USDA) indicates that the site soils (Jacktone-Urban land complex) have a low potential to corrode concrete, and a high potential to corrode uncoated steel.

7.8 SOILS WITH EXPANSIVE, HYDRO-COMPACTION OR SEISMIC-COMPRESSIVE PROPERTIES

The near-surface site soils are generally alluvial clay deposits with fine sand and silt. Soils of these types commonly have expansive properties. Existing site concrete flatwork shows distress due to expansive soils, and replacement should include mitigation for expansive soils. Due to the past high groundwater, the soils are not susceptible to hydro-compaction or seismic-compression. Additional discussion of seismic settlement risk due to liquefaction is provided in latter sections. Recommendations provided in Sections 10.0 through 12.0 include mitigation for shallow expansive soils.

7.9 HAZARDOUS MATERIALS

The Site is not within a region where methane, hydrogen sulfide, or tar seeps are considered likely to occur. The closest oil or gas exploration wells are approximately 1.75 miles northwest and is plugged. See Appendix E for mapped well locations. The site is being evaluated for potential contamination caused by past site use under direction of the Department of Toxic Substance Control (DTSC). Based on the findings to date, we do not anticipate that significant grading adjustments will be required to meet DTSC requirements.

---

[1] https://www.cdph.ca.gov/Programs/CEH/DRSEM/Pages/EMB/Radon/Radon-Test-Results.aspx#

[2] https://www.epa.gov/radon/epa-map-radon-zones

8.0 SEISMIC CONSIDERATIONS

8.1 GROUND SHAKING

Probabilistic values of ground motion corresponding to various levels of seismic hazards are available on-line from the CGS and the USGS. Both agencies use a probabilistic model to estimate ground motions corresponding to various levels of seismic hazard. Site soils are classified using the procedures specified in the 2016 CBC, which utilizes the USGS Model (2012/2015 International Building Code).

Saturated conditions are present below approximately 15 to 20 feet and the site alluvial soils within 60 feet of the surface have an N-value ranging from 6 to 50+. Conditions were typically greater than 15 on the north, south, and west side of the property (Boreholes B1, B3, B4, B12, and B13) but less than 15 on the east (Borehole B2). We analyzed conditions for both Site Class D (Stiff Soil, 15<N<50) and Site Class E (Soft Clay Soil, N<15). The N-values that are below 15 are generally in sandy or silty ground, and clays are generally medium stiff to stiff based on results of pocket penetrometer and N-value results. Sandy and silty soils with N-values less than 15 were generally more susceptible to liquefaction, and they are therefore not representative of soft clay (Site Class E) soils. Therefore, it is more appropriate to perform seismic analysis of the structures using Site Class D soils.

A Site Specific Seismic Hazard Analysis is not required because no active or potentially active Holocene fault is located within 10 kilometers, Site Class F is not applicable, and the value of spectral acceleration at the one second wave length (S_1) was less than 0.75.

The results of the USGS seismic analysis are provided in Appendix B for Site Class D soils and are recommended for design of the proposed structures.

8.2 LIQUEFACTION, AND 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 below the groundwater table. 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 (CDMG Special Publication 117, 1997). Based on the subsurface conditions described in Section 6.1, the potential for liquefaction and liquefaction induced seismic settlement was deemed moderate, and a more detailed evaluation was performed. The evaluation was based on the following parameters.

Design Groundwater Depth:	5 feet	
Peak Ground Acceleration:	0.39 g	(975-year return period)
Moment Magnitude Earthquake:	6.6	(Vernalis Fault)

The analysis was performed using the program Liquefaction SPT Analysis 3.1. The results for B2, B4, B12, and B13 are provided in Appendix F. A summary of the results of the analysis is provided below.

Boring	Calculated Settlement Due to Liquefaction (Inches)	Depth Below Ground of "Settlement" Zones (feet)
1	0.3	36-44
2	2.05	30-50
3	0.25	42-50
4	2.33	30-47
12	3.98	34-50
13	4.28	30-52

8.2.1 Lateral Spreading and Seismic Densification

The site is located on a flat alluvial plain, with no free surface in the vicinity. Therefore, due to the absence of a free surface, the potential for lateral spreading is considered negligible in the event of a major earthquake. Seismic settlement due to densification is above the groundwater is also negligible.

9.0 CONCLUSIONS AND RECOMMENDATIONS FOR LIQUEFACTION MITIGATION

Based on the findings contained in Section 8.2, it is our professional opinion that the site should be suitable for use as a school facility provided that the recommendations contained herein are incorporated into the final project design.

In our opinion, this amount of predicted seismic settlement from liquefaction induced settlement is within an acceptable range because:

- The settlement generally occurs at a depth of 30 to 50 feet below the ground surface. Additionally, the majority of the settlement will occur after site shaking as pore pressure from liquefaction dissipates.
- The differential settlement (from one end of a building to the other) will be on the order of 1/2 to 2 inches, for conventional buildings, and 1/2 inch for shorter segments of modular structures (pre-manufactured). This is within the acceptable range of differential settlement for structures in seismic conditions.
- Shallow foundation bearing failure will not occur in spite of deep liquefaction due to the presences of a 25-30-foot thick cap of stiff clay overlying the layers that have a potential to settle (liquefy).

Based on the above conclusions, the effects of deep liquefaction do not pose a risk to structural integrity, and site-specific liquefaction mitigation is not required.

10.0 CONCLUSIONS AND RECOMMENDATIONS

10.1 GENERAL

Based on our findings, it is our professional opinion that the site should be suitable from a geotechnical standpoint for construction of the New Facilities Maintenance Building provided the geotechnical recommendations contained herein are incorporated into the project design. Given the site conditions encountered, we conclude that engineered fill supporting shallow foundations, slabs, or mats should provide adequate support for the anticipated structural loading. The primary geotechnical consideration from a development standpoint is:

- The presence of expansive soils requiring non-expansive engineered fill (import) below concrete slabs-on-grade and deepened foundations. Lime treated native soil may be used as an alternative to non-expansive fill.
- Grading considerations to provide uniform ground support.

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.

10.2 GRADING AND EARTHWORK RECOMMENDATIONS

All grading and site work should be performed in accordance with the 2016 CBC, Title 24, Chapter 33 (Safeguards During Construction), Appendix J (Grading), and Chapter 18A (Soils and Foundations), 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.

10.2.1 Site Preparation

At the time of our field exploration, the site was generally developed with existing buildings, hardscapes, and grass. Areas to support slabs, pavements, foundations, and new engineered fills should be stripped of all vegetation, debris, organic topsoil, or any existing non-engineered fill or other unsuitable material or soil. Stripping should extend at least 5 feet beyond the limits of the proposed building improvements, and 2 feet beyond exterior hardscape improvements. Soils containing more than 3 percent organic material by weight over baseline conditions should be considered organic. Organic topsoil is present in grass covered areas. Stripping depths should be determined at the time of grading by the Geotechnical Engineer of Record or a qualified representative. For planning, an average stripping depth of 2 to 4 inches may be used where grass is present. Any organic-laden material which is free from debris may be stockpiled for later use in landscape areas where approved by the owner, but such material should not be used for engineered fill.

10.2.2 Overexcavation

Overexcavation of existing soils and existing pavement should extend to a depth of at least 24 inches below final subgrade for slab-on-grade construction beneath building structures. Additional recommendation for support of building slabs-on-grade is provided in Section 12.0. In areas to support concrete flatwork, hardcourt areas, and any non-structural improvements susceptible to vertical movement, we recommend that the upper 12 inches, as measured from final subgrade, be removed and replaced with non-expansive engineered fill in accordance with Section 10.2.4, Engineered Fill Materials, and Section 10.2.5, Engineered Fill Placement. 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 overexcavations should be approved in the field by the Geotechnical Engineer of Record prior to placement of fill or improvements.

10.2.3 Subgrade Preparation

After overexcavation has been achieved, the exposed subgrade should be scarified to a depth of 12 inches, uniformly moisture conditioned to between 1 to 3 percent over optimum moisture, and compacted to achieve a minimum relative compaction of 90 percent of the ASTM D1557 maximum dry density. In lieu of scarification, additional excavation may be substituted and replaced with native soil that meets the compaction criteria for subgrade preparation. Field density tests should be taken to verify compaction of the prepared subgrade in these areas.

10.2.4 Engineered Fill Materials

Engineered fill used for the project should be either reprocessed native soil, select import engineered fill, or lime treated native soils. See Section 10.2.6 for lime treated soils.

Select import engineered fill should be inorganic, have an R-value of at least 50, and plastic index less than 4. 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.

10.2.5 Engineered Fill Placement

Engineered fill should be placed in a series of horizontal layers or lifts 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. For pavement subgrades, the upper 12 inches of soil should be compacted to at least 95 percent relative compaction of test method CAL-216. Non-expansive fill soils should be uniformly moisture conditioned to between 1 and 3 percentage points above the optimum moisture content. Fill soils composed of clays (including deep utility backfill) should be uniformly moisture conditioned to between 3 and 5 percentage points above the optimum moisture content. If a lift doesn’t meet the required relative compaction or shows signs of instability, such as “pumping”, additional lifts should not be placed until the issue is corrected. Discing, tilling, and/or blending may be required to uniformly moisture-condition soils used for engineered fill.

10.2.6 Lime Treatment

Lime treatment should be considered as an option to import of select engineered fill. When done properly, lime treating expansive soils, such as the clay materials existing at the project site, will mitigate the expansive properties of the material, thus making it a suitable material to build on. We recommend lime treating the site per the current edition of Caltrans Standard Specifications, Section 24-1, General (Stabilized Soils), and Section 24-2 Lime Stabilized Soils. Compaction of the lime treated material should follow the guidelines of Section 10.2.5.

Where lime treatment is selected as an option to import of select engineered fill, Sections 10.2.2, 10.2.3, and 10.2.5 should be adhered to prior to lime treating. The required relative compaction may be reduced to 85 percent in the depth to be lime treated when backfilling the native soil to pre-treatment subgrade.

10.2.7 Excavations

Excavations will typically encounter unconsolidated stiff to medium stiff clay soils. These materials can be excavated with conventional earthmoving equipment. We anticipate that temporary excavations less than 5 feet deep and above groundwater may be cut as steep as 1H:1V (horizontal to vertical). Deeper cuts should be considered on a case-by-case basis. 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.

10.3 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, whichever is more stringent.

Trench backfill above the pipe bedding zone should be placed in the same manner as required in Section 10.2.5, 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.

10.4 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 5 percent should be provided within 10 feet of all building foundations. Elsewhere, positive surface drainage of at least 2 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.

11.0 FOUNDATION RECOMMENDATIONS

11.1 GENERAL FOUNDATION RECOMMENDATIONS

All foundation improvements should be designed and constructed in accordance with the 2016 CBC, Title 24, Chapter 17A (Structural Tests and Special Inspections), Chapter 18A (Soils and Foundations), and Appendix J (Grading), and all other sections applicable to the proposed structural improvements. Note that all stated preliminary bearing pressures in Section 10.0 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 expansive soils. Specifically, the use of deepened foundations is recommended to cut off potential pathways for water mitigation from surface or subsurface sources to areas beneath building structures. In addition, deepened footings will provide extended foundations to soils that are less susceptible to moisture content changes due to seasonal and irrigation affects.

11.2 SHALLOW FOUNDATIONS

We recommend that shallow foundations (i.e., conventional spread foundations) supported on native soils or engineered fill should be designed to support dead loads plus normal duration live loads using allowable bearing capacity of 3,000 pounds per square foot for footings with a minimum embedment depth of 30 inches below soil subgrade for the exterior subgrade, or top of soil subgrade for interior subgrade, whichever is lower. Footing embedment depth may be reduced to 18 inches where the footing is a minimum of 5 feet interior of the exterior footing, and when the bearing capacity is reduced to 2,500 psf. Landscape fills cannot be included toward embedment depth. The allowable bearing capacities may be increased by one-third (1/3) when considering short-term wind and seismic loads. Static differential settlement is predicted to be less than 1/4 inches over 20 feet.

Exterior footing embedment depths for modular structures with crawl spaces may be reduced to 30 inches for the exterior (outside) footing depth, and 12 inches for the interior (inside) depth in the crawl space zone.

11.3 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 0.30. 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, 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. The values of friction and passive pressure may be combined.

Pole foundations may be designed using the above value for passive pressure over an area of two (2) times the footing diameter.

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 psi.

11.4 MODULUS OF SUBGRADE REACTION

For design of combined shallow foundations or floor slabs using an approximate flexible method, we recommend using the following equation to estimate the scaled subgrade reaction modulus (K_s):

$$K_s \text{ (pounds per cubic inch - pci)} = \frac{k_1 * (1 + \frac{B}{2L})}{1.5B}$$

Where: k_1= coefficient of subgrade reaction for 1-foot-square plate = 150 pci

B = width of deflected foundation/soil subgrade in feet (shorter dimension)

L = length of deflected foundation/soil subgrade in feet (longer dimension)

Note: the term $\frac{(1 + \frac{B}{2L})}{1.5B}$ is dimensionless

The values of B and L and the corresponding K_s value should be consistent with the calculated deflected shape of the combined shallow foundation or floor slab.

11.5 CONSTRUCTION CONSIDERATIONS

Where footing excavations loosen or disturb soils that have been compacted when graded per Section 10.2, excavations should be tamped using a gas powered wacker or similar equipment. We recommend that a representative of the Geotechnical Engineer of Record or Project Inspector 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.

12.0 SLABS-ON-GRADE

12.1 INTERIOR CONCRETE SLABS

Concrete floor slabs should be supported on 24 inches of engineered fill per Section 10.0 of this report. The of engineered fill should extend at least 5 feet outside the perimeter of the building. In addition, the upper 12 to 18 inches of engineered fill should be non-expansive per the table in this section.

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 pea gravel or permeable aggregate complying with Caltrans Standard Specifications, Section 68, Class 1, Type B. A 2-inch-thick protective cover (blotter) of clean sand should be placed over the vapor retarder. The vapor retarder should have a minimum thickness of 15 mils, a permeance as tested before and after mandatory conditioning (ASTM E 1745, Section 7.1.2 – 7.1.5) of less than 0.01 perms [grains/(ft^2 · hr · inHg)], and comply with the ASTM E 1745 Class A requirements. Vapor retarders having these properties are commonly referred to as "vapor barriers". The designer of record may omit the "blotter" (sand placed over the "vapor barrier") at their discretion when a concrete with a water-cement ratio of 0.45 or less is specified. The vapor retarder should be constructed in accordance with ASTM E 1643-09 using material which meets ASTM E 1745. A licensed copy of ASTM E 1643-09 is included in Appendix D.

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 Class A, ASTM E 154-93 resistance to puncture of not less than 3000 grams and ASTM E 154-93 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. 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 ration. 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 parameters. The final design of interior floor slab thickness and reinforcement should be provided by the Project Structural Engineer.

SLAB-ON-GRADE ALTERNATIVE

Building Pad Subgrade	**Minimum AB/Rock Thickness, Inches**	**Minimum Slab Thickness**	**Minimum Reinforcement**
18 inches of engineered non-expansive fill (PI <4) or lime treated native soil compacted to 90 percent	4	4 inches PCC	#4 at 24 inches O.C.E.W.
12 inches of engineered non-expansive fill (PI <4) or lime treated native soil compacted to 90 percent	6	6 inches PCC	Per Structural Engineer.

Notes:
a. PCC = Portland Cement Concrete with minimum compressive strength of 3,000 psi, and jointed and reinforced per structural design for shrinkage.
b. All grading recommendations per Section 10.0 are to be followed.

12.2 EXTERIOR CONCRETE SLABS

Exterior concrete slabs (i.e., sidewalks, building aprons, etc.) should be constructed over 4 inches of Class 2 Aggregate Base (AB) over 12 inches of lime treated native soil or non-expansive import compacted to the requirements of engineered fill, 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 Structural Engineer.

13.0 RETAINING WALLS

13.1 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 inverted equivalent fluid pressure of 10 pcf. The seismic increment should be a pressure that increases linearly from the base of the wall to the top of the wall as an inverted, triangular distribution. The resultant force of the seismic increment should act at a distance of 0.6H (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.

13.2 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.

14.0 PAVEMENTS

Based on our exploratory borings, the near-surface soils across the site are generally clay that have a poor support capacity when subgrade used as pavement subgrade. A sample of the near-surface fill soil was collected from within the proposed subgrade for R-value testing.

Pavement sections[3] for untreated 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 8.0). 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 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. Traffic lanes that carry occasional (few times per year) bus or fire vehicles, may be designed for a TI of 5. 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.

---

[3] *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.*

RECOMMENDED UNTREATED SUBGRADE PAVEMENT SECTIONS

Traffic Index	Asphalt-Concrete (inches)	Class 2 Aggregate Base (inches)	Class 2 Aggregate Subbase (inches)
4.0	2.5	8.0	-
5.0	2.5	11.0	-
	2.5	4.0	8.0
6.0	3.0	14.0	-
	3.0	4.0	10.5
8.0	4.0	19.5	-
	4.0	6.5	14.0

To reduce the thickness of aggregate base material required for pavement supported on untreated subgrade, we have provided the following pavement sections for lime treated subgrade.

RECOMMENDED LIME-TREATED BASE SUBGRADE PAVEMENT SECTIONS

Traffic Index (T.I.)	Asphalt Concrete Thickness (inches)	Class 2 Aggregate Base Thickness (inches)	LTB*
4.0	2.0	4.0	12
5.0	2.5	4.0	12
6.0	3.0	4.0	15
8.0	4.0	4.0	18

*LTB= Lime-Treated Base consisting of 4 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 assured 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 4 percent lime (quicklime or hi-calcium). For planning purposes, it can be assumed that a minimum spread rate for lime of 6.6 pounds per square foot for 18 inches of lime treatment will be required, and 4.5 pounds per square foot for 12 inches.

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 CAL 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 (CAL 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 12 inches recompacted lime treated native soils or Class 2 AB. 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.

15.0 CORROSION POTENTIAL

Chemical tests were performed on two discrete samples of the near-surface soils. Test results yielded a pH of 7.85 and 8.23, soil redox potential of 260 and 310 mv, water soluble sulfate of 29 and 59 ppm, and chloride of less than 15 ppm.

Resistivity tests performed on the same discrete soil samples indicated that the soils are corrosive to buried metal objects as indicated by result of 1,100 and 1,200 ohm-centimeters. 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. The results indicate that the sulfate ion concentration is insufficient to cause damage to reinforced concrete and coated steel. If warranted, a corrosion expert should be consulted to develop specific recommendations.

16.0 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 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 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.

17.0 LIMITATIONS

The conclusions and recommendations presented in this report are intended for planning, design, and construction of the proposed school site 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 components;
- the encountered soil or groundwater conditions are different than those anticipated in this report;
- the recommendations contained in this report are not followed;
- any other change is implemented that materially alters the project; or
- State agency review and acceptance of the report is not obtained.

This report was prepared in accordance with the generally accepted standards of environmental and geotechnical engineering practice existing in California at the time it was written. No other warranty, express 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 the data obtained from subsurface exploration and materials testing. 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 environmental and geotechnical engineering, changes in site conditions, 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

Marc R. Crum
NO. 2254

RONALD LEE SKAGGS
2295
Exp. 03/31/19

Marc R. Crum

Ronald L. Skaggs

Marc R. Crum
Certified Engineering Geologist (CA #2254)

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

X:\Project\7000_prj\7572 SUSD Quail Lakes\7572D GES\Reports\FR 20180823 GES.docx

18.0 REFERENCES

California Building Code, 2016, California Building Standards Commission, and International Conference of Building Officials, 2012.

California Department of Conservation, Division of Mines and Geology, 2008, Guidelines for Evaluating and Mitigating Seismic Hazards in California, Special Publication 117A.

California Geologic Survey – Note 48, checklist for Checklist for the Review of Engineering Geology and Seismology Reports for California Public Schools, Hospitals, and Essential Services Buildings October 2013

California Department of Health Services, California Indoor Radon Levels Sorted By Zip Code.

California Department of Water Resources, Water Data Library

Churchill, R.K. and Hill, R. L., A General Location Guide For Ultramafic Rocks in California – Areas More Likely to Contain Naturally Occurring Asbestos, August 2000, California Department of Conservation, Division of Mines and Geology, Open File Report 200-19

Condor Earth, Geologic Hazards Assessment and Liquefaction Evaluation, Lakeview Assembly Property, 2111 Quail Lakes Drive, Stockton, San Joaquin County, California, July 14, 2017 (CET #7572A)

Hart, E., 1994 (revised 2007), Fault-Rupture Hazard Zones in California, Alquist-Priolo Earthquake Fault Zoning Act with Index to Earthquake Fault Zones Maps, California Division of Mines and Geology Special Publication 42 pp.

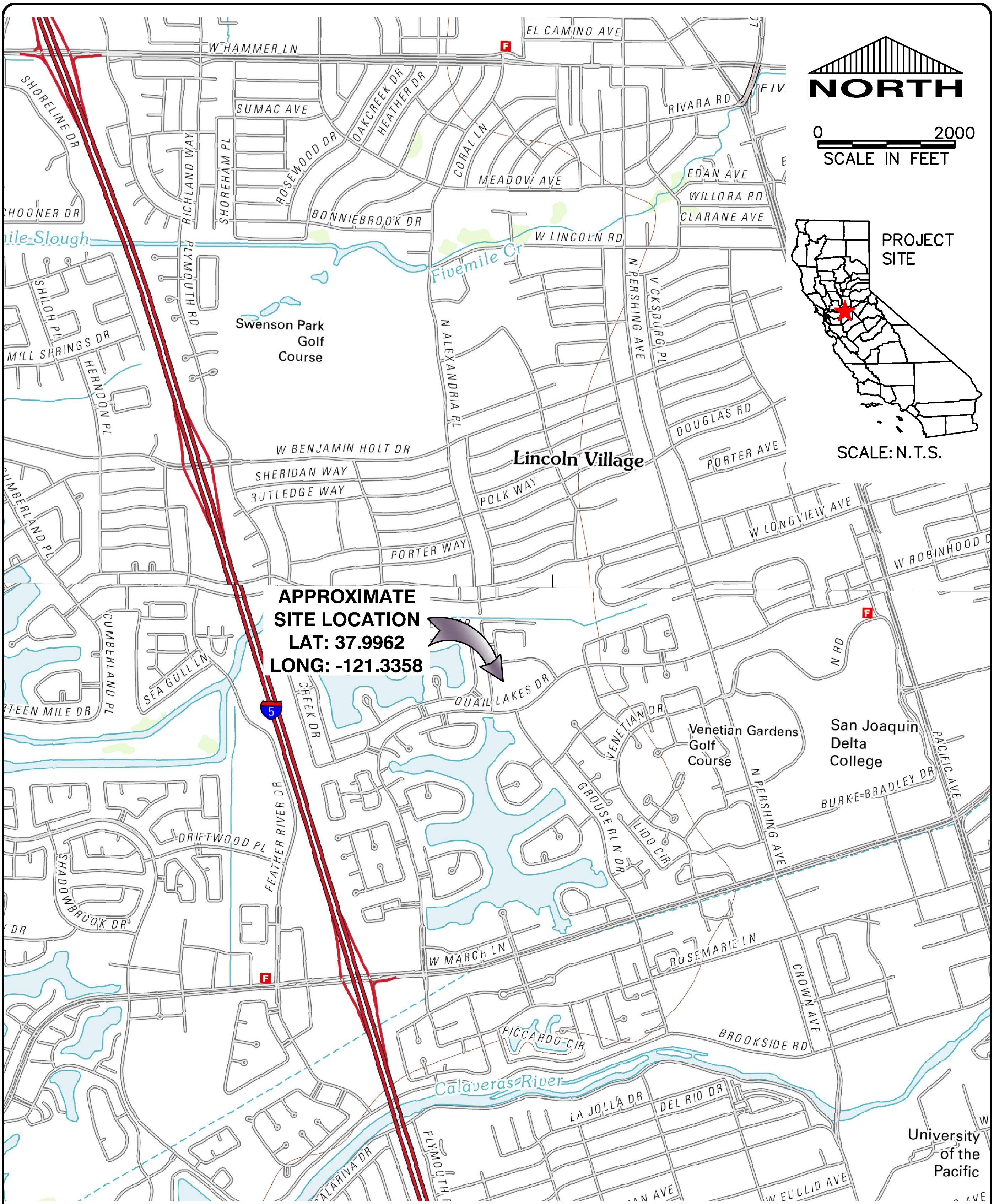
J. H. Kleinfelder & Associates, Soils Investigation, Lincoln Neighborhood Church, Stockton, California, September 29, 1983 (KA File No. S-2637-1)

Northern California Earthquake Data Center (2014), UC Berkeley Seismological Laboratory. Dataset. doi:10.7932/NCEDC.

United States Department of the Interior Geological Survey, Stockton West Quadrangle, California – San Joaquin County, 7.5 Minute Series (Topographic).

Wagner, D.L., E.J. Bortugno, and R.D. McJunkin, Geologic Map of the San Francisco-San Jose Quadrangle, California, 1:250,000, 1991.

APPENDIX A
FIGURES



APPROXIMATE SITE LOCATION
LAT: 37.9962
LONG: -121.3358

BACKGROUND IMAGE: USGS 7.5 MINUTE QUADRANGLE, STOCKTON WEST AND LODI SOUTH 2012

CONDOR EARTH
21663 Brian Lane
P.O. Box 3905
Sonora, CA 95370
(209) 532-0361
fax(209) 532-0773
www.condorearth.com
CONDOR®

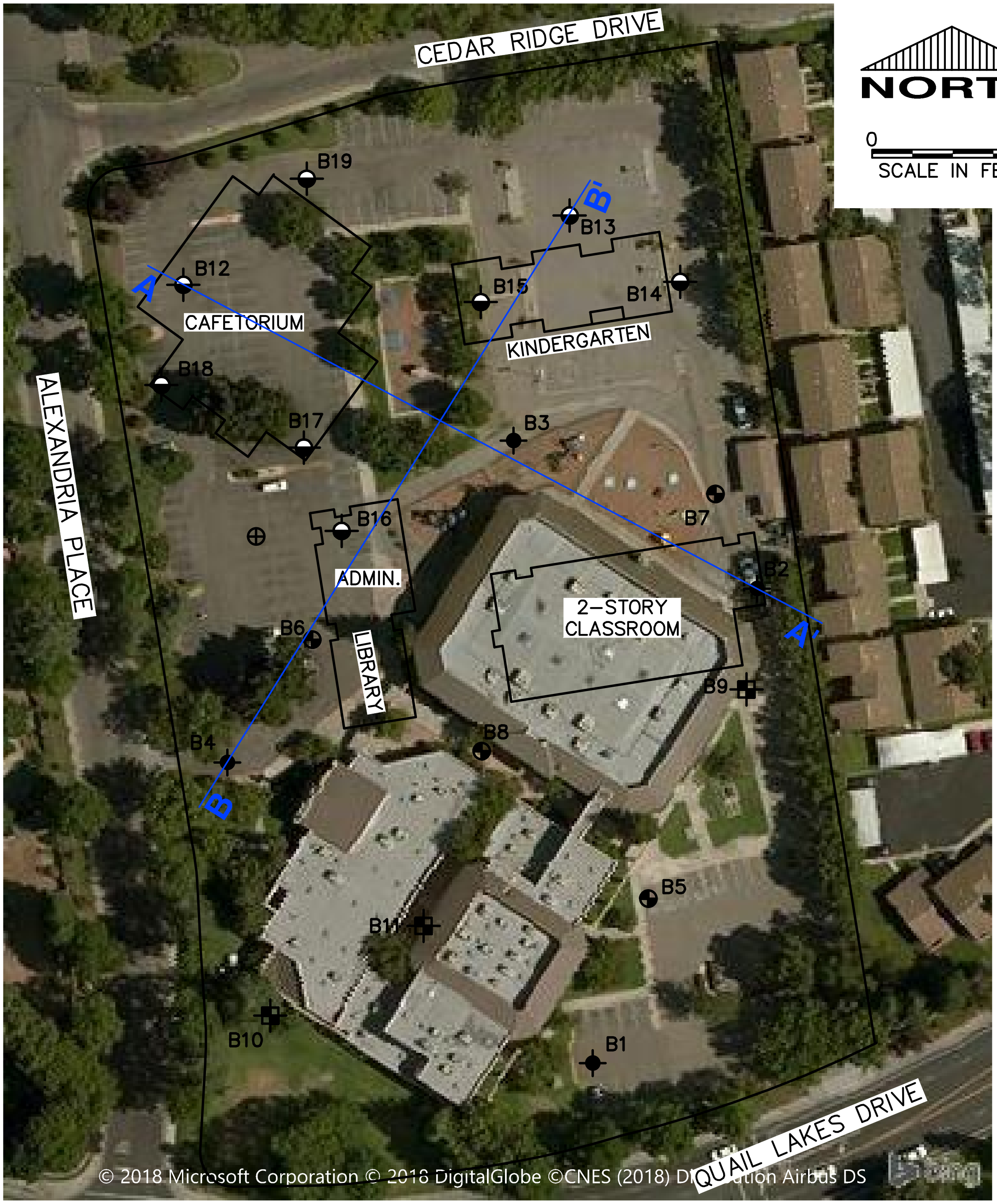
Job No.	7572D
Date	02 MAY 2018
Scale	AS SHOWN
Drawn KGM	Chk'd ABD

VICINITY MAP
GEOTECHNICAL ENGINEERING STUDY
STOCKTON UNIFIED SCHOOL DISTRICT
2111 QUAIL LAKES DRIVE
STOCKTON, CALIFORNIA

FIGURE
1

7572D_F1

X:\Project\7000_prj\7572 SUSD Quail Lakes\7572D GES\7572D_CAD\DWG\7572D_F1.dwg 5-02-18 03:56:51 PM kmckinley



© 2018 Microsoft Corporation © 2018 DigitalGlobe ©CNES (2018) D[illegible]tion Airbus DS

LEGEND

B1 ◆ = SOIL BORING LOCATIONS (PREVIOUSLY COMPLETED 06/13/2017)   ⊕ = ASPHALT CORES

B5 ◕ = SOIL BORING LOCATIONS (CONVENTIONAL RIG COMPLETED 03/02/2018)

B9 ▣ = SOIL BORING LOCATIONS (MINUTE MAN DRILL RIG COMPLETED 03/02/2018)

◓ = SOIL BORING LOCATIONS (COMPLETED JULY 23 AND 24, 2018)

BACKGROUND IMAGE: MICROSOFT BING

BORING B12 AND B13 FORMERLY ASPHALT CORES

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

CONDOR EARTH
21663 Brian Lane
P.O. Box 3905
Sonora, CA 95370
(209) 532-0361
fax(209) 532-0773
www.condorearth.com
CONDOR®

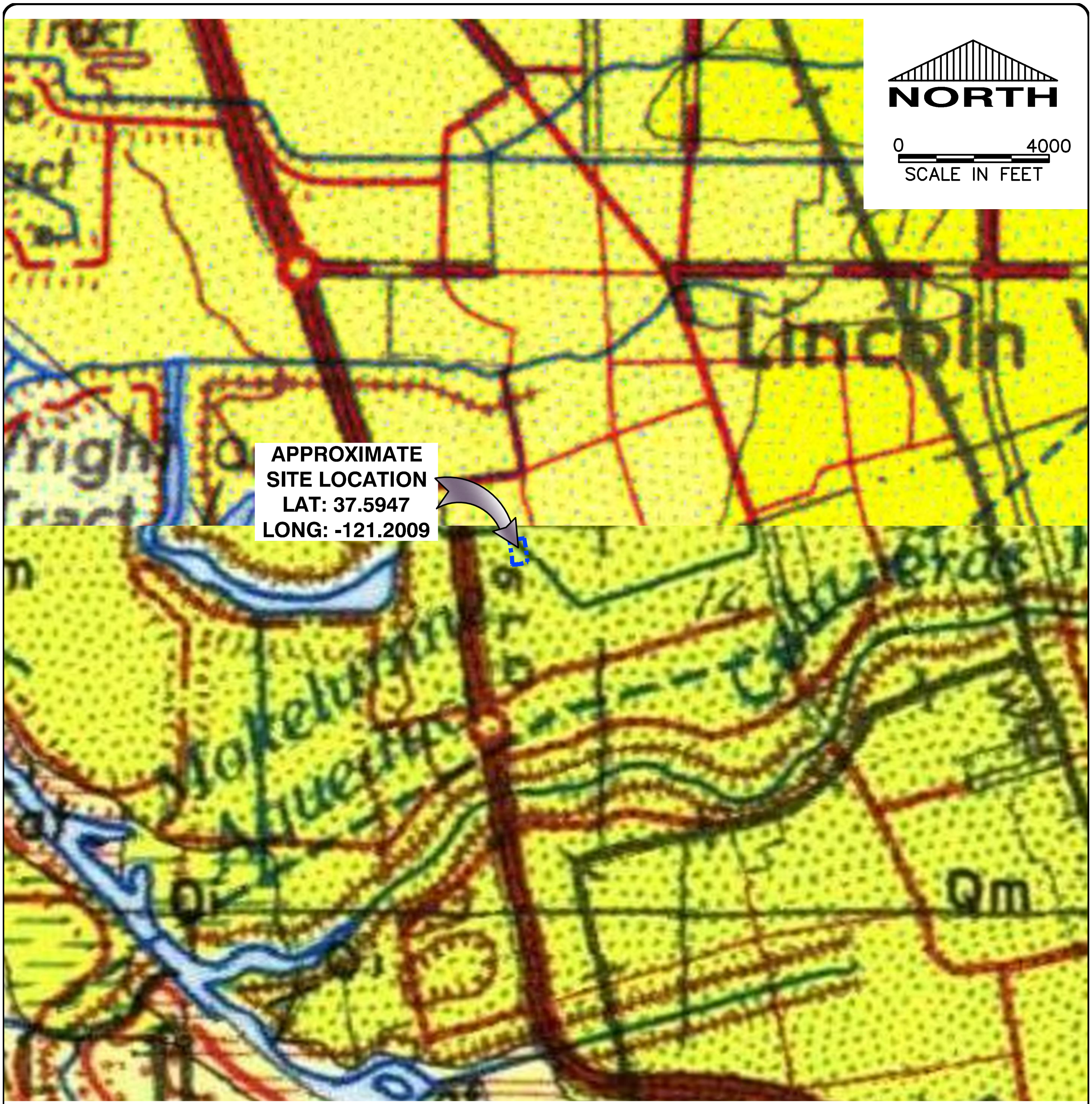
Job No. 7572D
Date 08 AUG 2018
Scale AS SHOWN
Drawn JW
Chk'd RLS

SITE MAP WITH SOIL BORING LOCATIONS
GEOTECHNICAL ENGINEERING STUDY
STOCKTON UNIFIED SCHOOL DISTRICT
2111 QUAIL LAKES DRIVE
STOCKTON, CALIFORNIA

FIGURE
2

7572D_F2

X:\Project\7000_prj\7572 SUSD Quail Lakes\7572D GES\7572D_CAD\DWG\Sections Aug2018\7572D_F2.dwg 8-08-18 10:19:23 AM jwilson



APPROXIMATE
SITE LOCATION
LAT: 37.5947
LONG: -121.2009

af	Artificial fill
Qdp	Dos Palos Alluvium
Qm	Modesto Formation

GEOLOGIC MAP OF SACRAMENTO QUADRANGLE, CALIFORNIA; D.L. WAGNER, 1981.
GEOLOGIC MAP OF SAN FRANCISCO–SAN JOSE QUADRANGLE, CALIFORNIA; D.L. WAGNER, 1981.

CONDOR EARTH
21663 Brian Lane
P.O. Box 3905
Sonora, CA 95370
(209) 532-0361
fax(209) 532-0773
www.condorearth.com

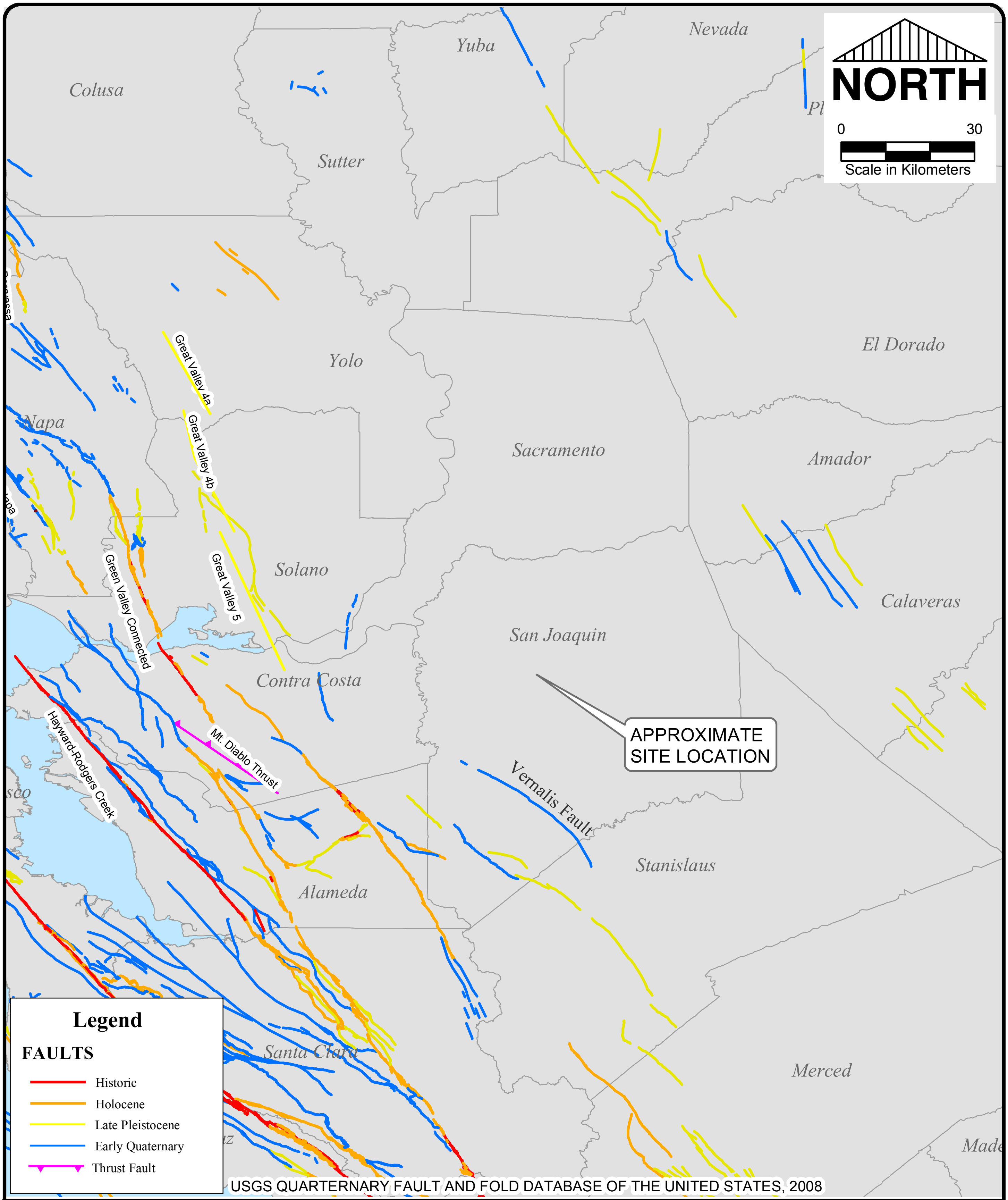
Job No. 7572A
Published Date 30 MAY 2017
Scale AS SHOWN
Drawn KGM
Chk'd ABD

GEOLOGIC MAP
GEOLOGIC HAZARDS ASSESSMENT
STOCKTON UNIFIED SCHOOL DISTRICT
2111 QUAIL LAKES DRIVE
STOCKTON, CALIFORNIA

FIGURE
3

File No. 7572A_F3

X:\Project\7000_prj\7572 SUSD Quail Lakes\7572A Geohazards\7572A_CAD\DWG\7572A_F3.dwg 6-23-17 01:25:19 PM jmontgomery



USGS QUATERNARY FAULT AND FOLD DATABASE OF THE UNITED STATES, 2008

CONDOR EARTH
21663 Brian Lane
P.O. Box 3905
Sonora, CA 95370
(209) 532-0361
fax (209) 532-0773
www.condorearth.com

CONDOR

Job No. 7572A

Published Data 30 MAY 2017

Scale AS SHOWN

Drawn KGM

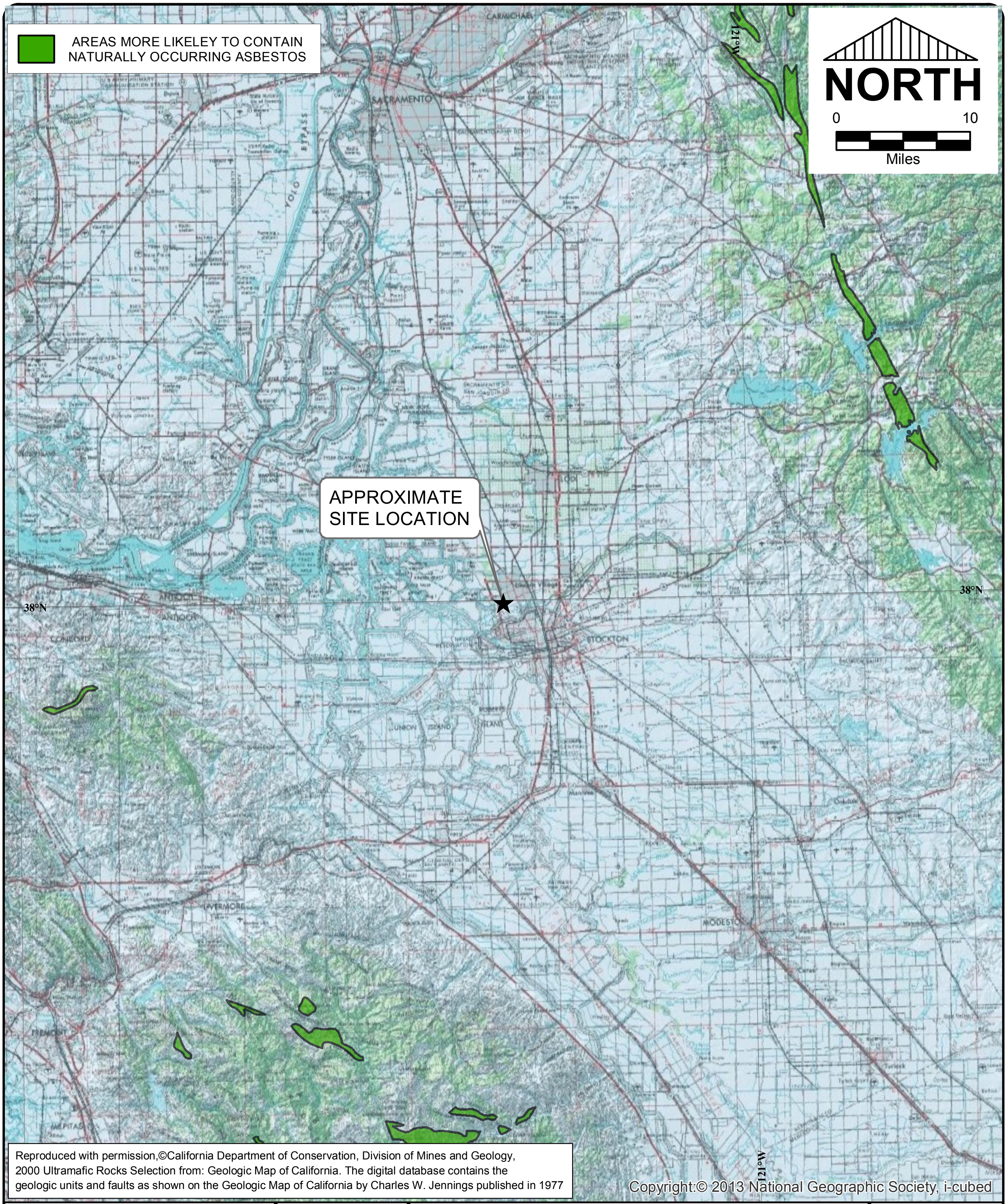
Chk'd ABD

REGIONAL FAULT MAP
GEOLOGIC HAZARD ASSESSMENT
STOCKTON UNIFIED SCHOOL DISTRICT
2111 QUAIL LAKES DRIVE
STOCKTON, CALIFORNIA

FIGURE
4

F4 20170530
7572A FAULT.MXD

X:\GIS\7000_PRJ\7572 SUSD Quail Lakes\7572A\MXD



Reproduced with permission,©California Department of Conservation, Division of Mines and Geology, 2000 Ultramafic Rocks Selection from: Geologic Map of California. The digital database contains the geologic units and faults as shown on the Geologic Map of California by Charles W. Jennings published in 1977

CONDOR EARTH
21663 Brian Lane
P.O. Box 3905
Sonora, CA 95370
(209) 532-0361
fax (209) 532-0773
www.condorearth.com

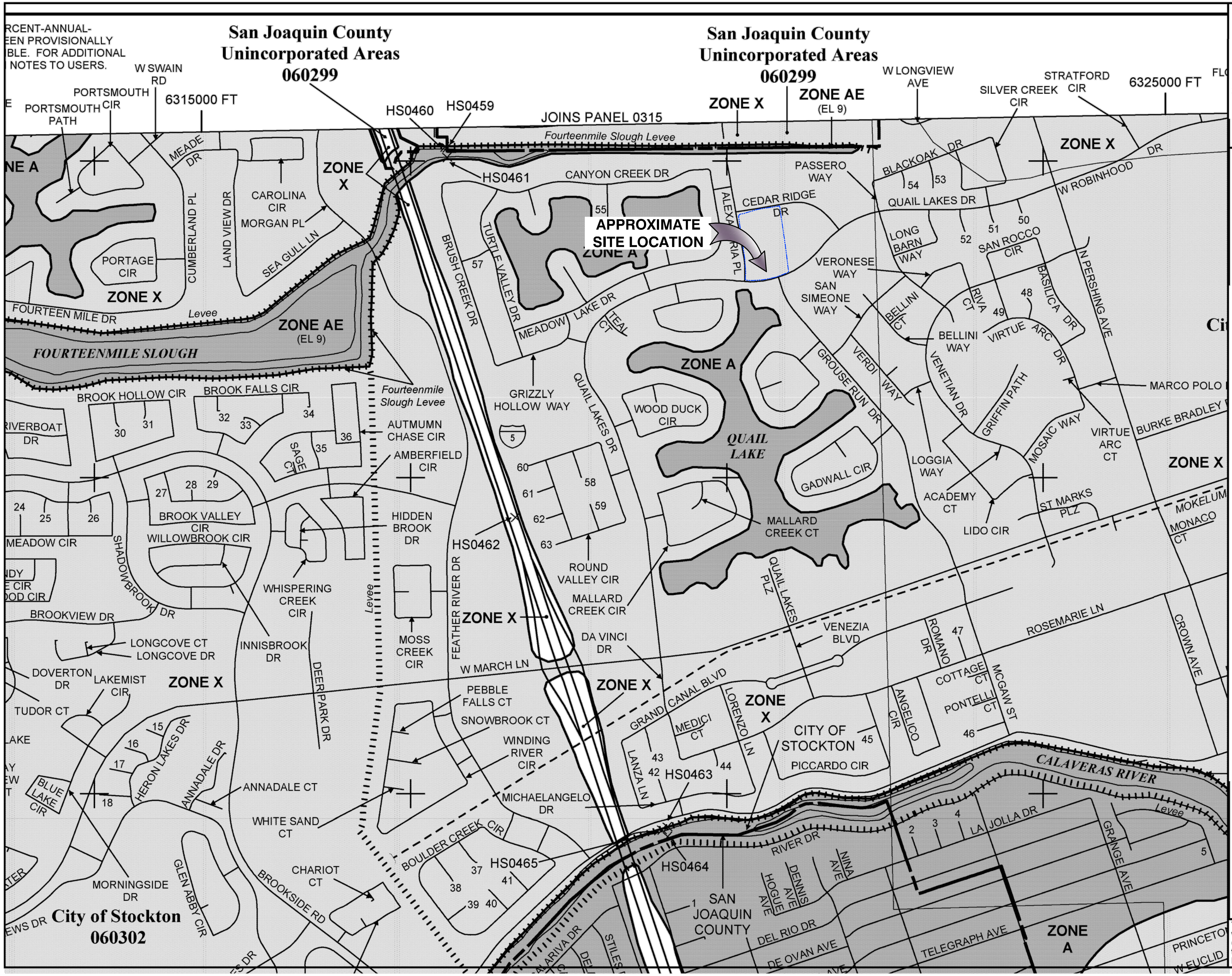
Job No. 7572A
Published Data 12 JUNE 2017
Scale AS SHOWN
Drawn KGM
Ch'd ABD

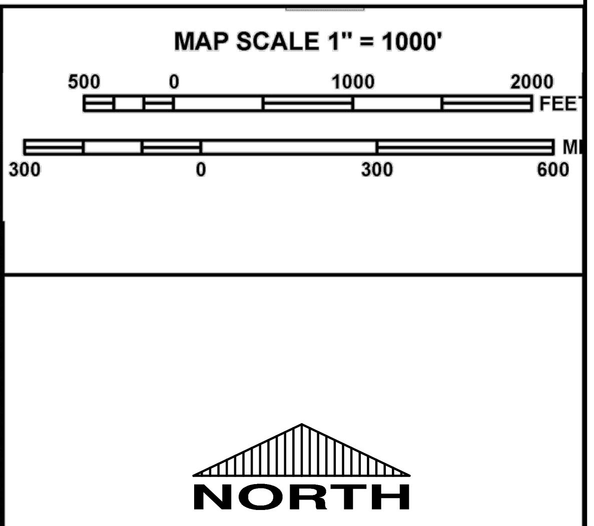
ULTRAMAFIC ROCK MAP
GEOLOGIC HAZARD ASSESSMENT
STOCKTON UNIFIED SCHOOL DISTRICT
211 QUAIL LAKES DRIVE
STOCKTON, CALIFORNIA

FIGURE
5

F5 20170612 7572A
ULTRAMAFIC.MXD

X:\GIS\7000_PRJ\7572 SUSD Quail Lakes\7572A\MXD





NFIP

NATIONAL FLOOD INSURANCE PROGRAM

PANEL 0455F

FIRM

FLOOD INSURANCE RATE MAP

SAN JOAQUIN COUNTY, CALIFORNIA

AND INCORPORATED AREAS

PANEL 455 OF 950

(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
SAN JOAQUIN COUNTY	060299	0455	F
STOCKTON, CITY OF	060302	0455	F

Notice to User: The **Map Number** shown below should be used when placing map orders; the **Community Number** shown above should be used on insurance applications for the subject community.

MAP NUMBER
06077C0455F

EFFECTIVE DATE
OCTOBER 16, 2009

Federal Emergency Management Agency

This is an official copy of a portion of the above referenced flood map. It was extracted using F-MIT On-Line. This map does not reflect changes or amendments which may have been made subsequent to the date on the title block. For the latest product information about National Flood Insurance Program flood maps check the FEMA Flood Map Store at www.msc.fema.gov

SITE LIES WITHIN ZONE X: "AREAS OF 0.2% ANNUAL CHANCE FLOOD; AREAS OF 1% CHANCE FLOOD WITH AVERAGE DEPTH OF LESS THAN 1 FOOT OR WITH DRAINAGE AREAS LESS THAN 1 SQUARE MILE; AND AREAS PROTECTED BY LEVEES FROM 1% ANNUAL CHANCE FLOOD.

FEMA FLOOD INSURANCE RATE MAP
GEOLOGIC HAZARDS ASSESSMENT
STOCKTON UNIFIED SCHOOL DISTRICT
2111 QUAIL LAKES DRIVE
STOCKTON, CALIFORNIA

CONDOR EARTH
21663 Brian Lane
P.O. Box 3905
Sonora, CA 95370
(209) 532-0361
fax(209) 532-0773
www.condorearth.com

Job No. 7572A
Date 12 JUNE 2017
Scale AS SHOWN
Drawn KGM / Chk'd ABD

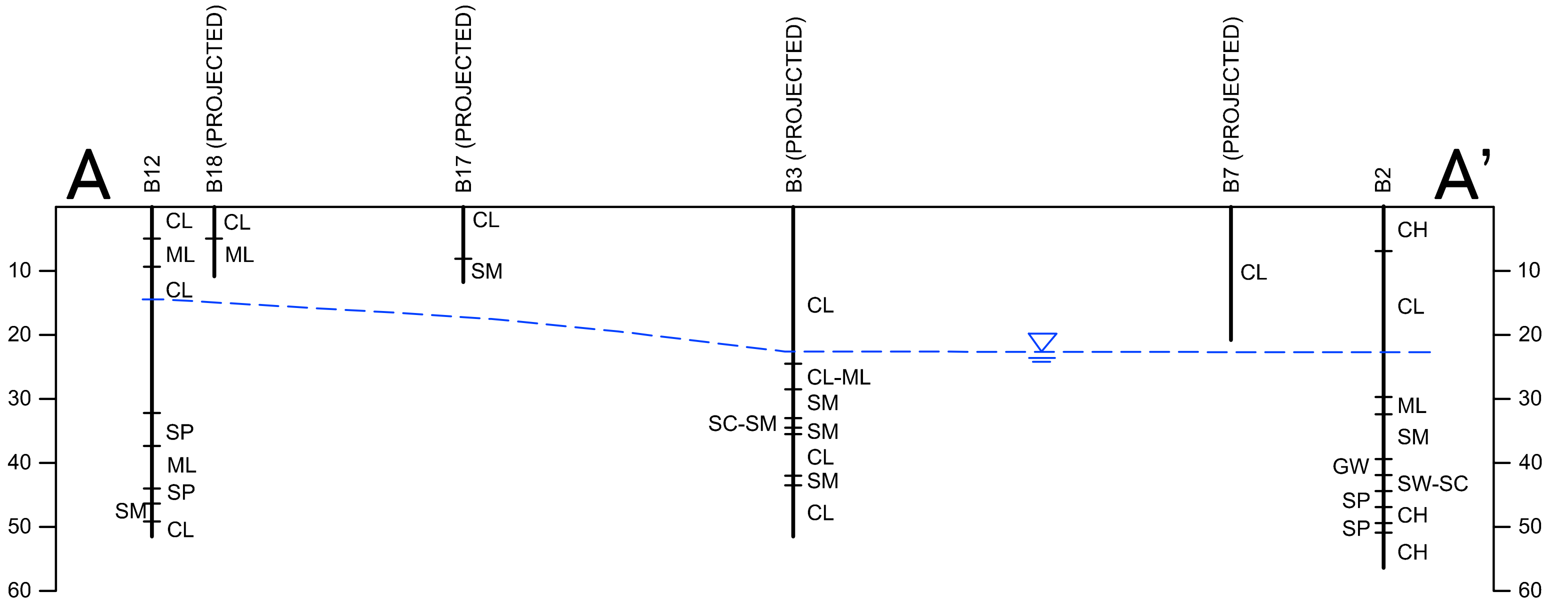
FIGURE 6

File No. 7572A_F6

X:\Project\7000_prj\7572 SUSD Quail Lakes\7572A Geohazards\7572A_CAD\DWG\7572A_F6.dwg 6-12-17 03:28:10 PM kmckinley

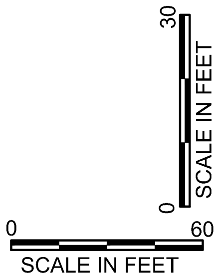
GENERALIZED CROSS SECTION A-A'

VIEW LOOKING NORTH NORTH-EAST



CL	LEAN CLAY
CH	FAT CLAY
GW	WELL GRADED GRAVEL
ML	SANDY SILT
SM	SILTY SAND
SP	POORLY GRADED SAND
SC-SM	SILTY CLAYEY SAND
SW-SC	WELL GRADED SAND WITH SILTY CLAY
CL-ML	SILTY CLAY WITH SAND
ML-SM	SANDY SILTY
GW-GM	WELL GRADED GRAVEL WITH SILT

▽ = GROUNDWATER AT TIME OF DRILLING



7572D_F3A

FIGURE 7A

CONDOR EARTH

21663 Brian Lane
P.O. Box 3905
Sonora, CA 95370
(209) 532-0361
fax(209) 532-0773
www.condorearth.com

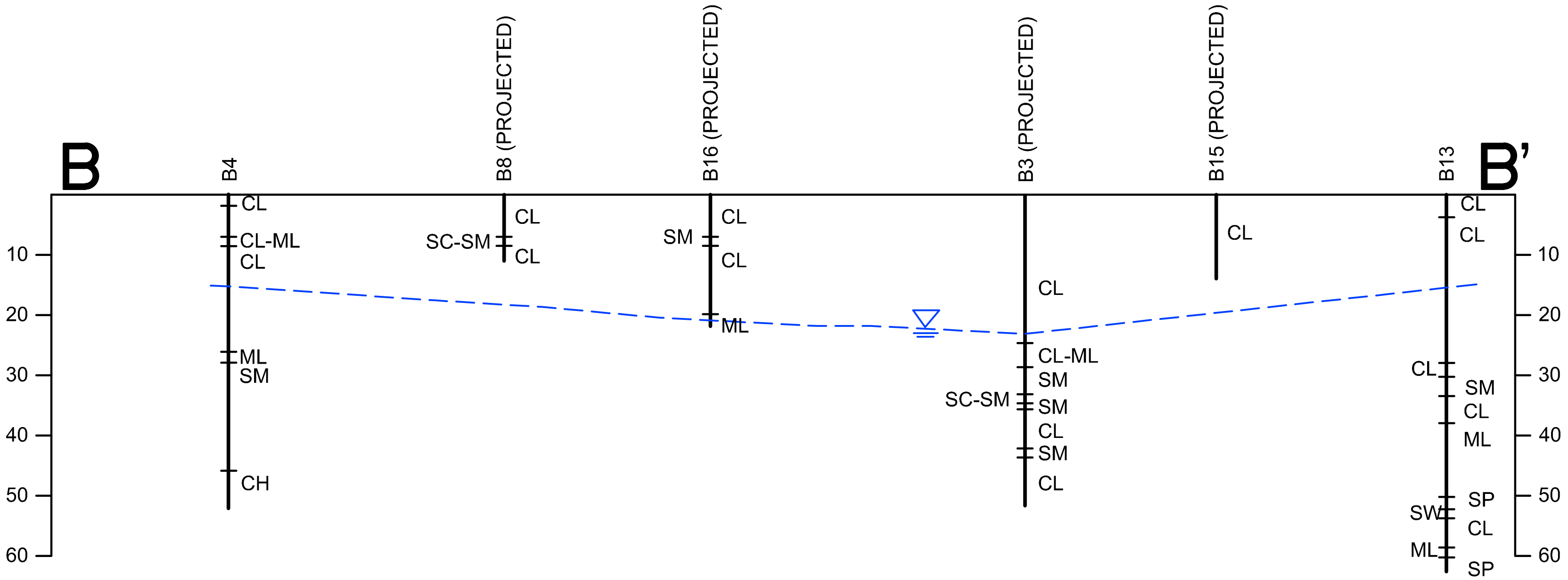
Job No.	7572D
Date	10 AUG 2018
Scale	AS SHOWN
Drawn	JW
Chk'd	RLS

GENERALIZED CROSS SECTION A-A'
GEOTECHNICAL ENGINEERING STUDY
STOCKTON UNIFIED SCHOOL DISTRICT
2111 QUAIL LAKES DRIVE
STOCKTON, CALIFORNIA

X:\Project\7000_prj\7572 SUSD Quail Lakes\7572D GES\7572D_CAD\DWG\Sections Aug2018\7572D_F3A.dwg 8-10-18 08:23:41 AM jwilson

GENERALIZED CROSS SECTION B-B'

VIEW LOOKING NORTH NORTH-WEST



= GROUNDWATER AT TIME OF DRILLING

CL	LEAN CLAY
CH	FAT CLAY
GW	WELL GRADED GRAVEL
ML	SANDY SILT
SM	SILTY SAND
SP	POORLY GRADED SAND
SC-SM	SILTY CLAYEY SAND
SW-SC	WELL GRADED SAND WITH SILTY CLAY
CL-ML	SILTY CLAY WITH SAND
ML-SM	SANDY SILTY
GW-GM	WELL GRADED GRAVEL WITH SILT

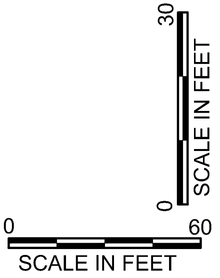


FIGURE 7B

7572D_F3B

CONDOR EARTH

21663 Brian Lane
P.O. Box 3905
Sonora, CA 95370
(209) 532-0361
fax(209) 532-0773
www.condorearth.com

Job No.	7572D
Date	10 AUG 2018
Scale	AS SHOWN
Drawn	JW
Chk'd	RLS

GENERALIZED CROSS SECTION B-B'
GEOTECHNICAL ENGINEERING STUDY
STOCKTON UNIFIED SCHOOL DISTRICT
2111 QUAIL LAKES DRIVE
STOCKTON, CALIFORNIA

APPENDIX B
USGS SEISMIC DESIGN PARAMETERS AND EARTHQUAKE CATALOG RESULTS

Design Maps Summary Report

User–Specified Input

Report Title Lakeview Assembly Property
Thu June 22, 2017 21:00:41 UTC

Building Code Reference Document 2012/2015 International Building Code
(which utilizes USGS hazard data available in 2008)

Site Coordinates 37.9966°N, 121.3359°W

Site Soil Classification Site Class D – "Stiff Soil"

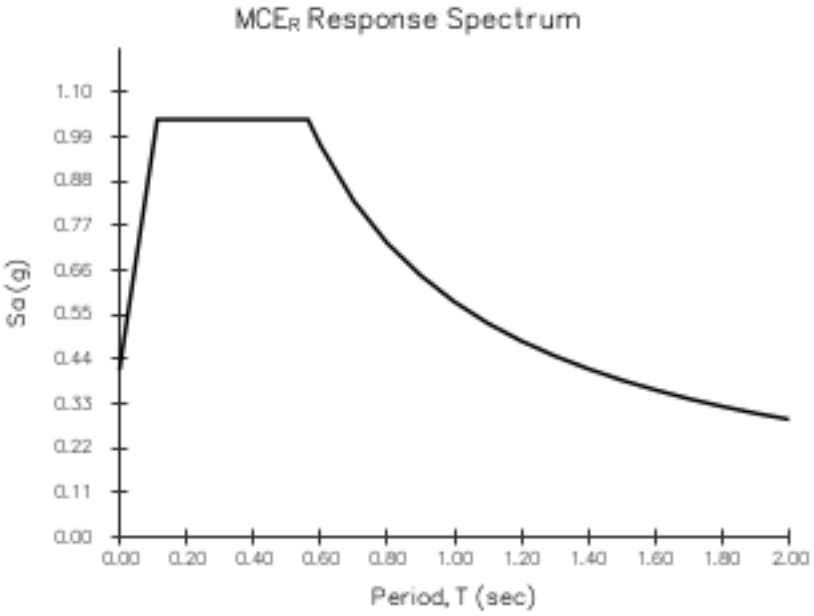
Risk Category I/II/III

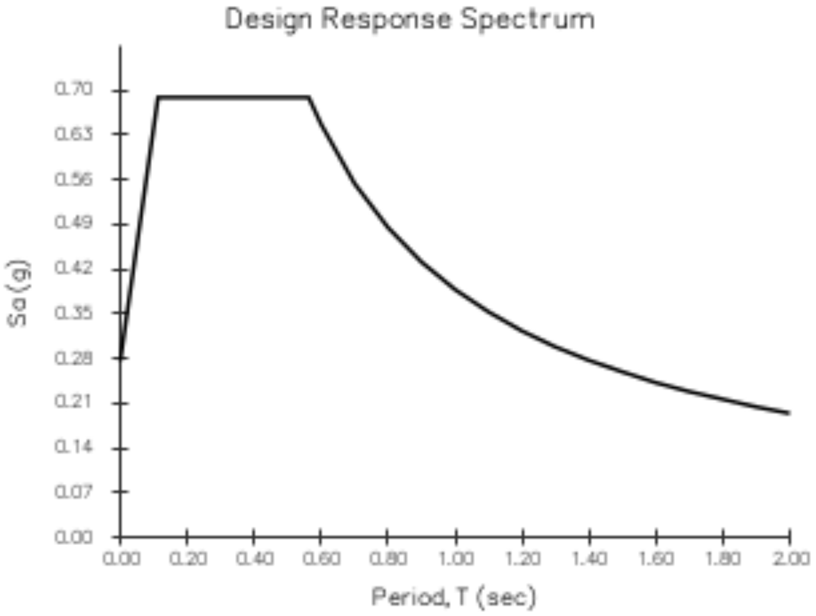
USGS–Provided Output

$S_S =$ 0.910 g $S_{MS} =$ 1.033 g $S_{DS} =$ 0.689 g

$S_1 =$ 0.337 g $S_{M1} =$ 0.582 g $S_{D1} =$ 0.388 g

For information on how the SS and S1 values above have been calculated from probabilistic (risk-targeted) and deterministic ground motions in the direction of maximum horizontal response, please return to the application and select the "2009 NEHRP" building code reference document.


MCE_R Response Spectrum


Design Response Spectrum

USGS Design Maps Detailed Report

2012/2015 International Building Code (37.9966°N, 121.3359°W)

Site Class D – “Stiff Soil”, Risk Category I/II/III

Section 1613.3.1 — Mapped acceleration parameters

Note: Ground motion values provided below are for the direction of maximum horizontal spectral response acceleration. They have been converted from corresponding geometric mean ground motions computed by the USGS by applying factors of 1.1 (to obtain S_S) and 1.3 (to obtain S_1). Maps in the 2012/2015 International Building Code are provided for Site Class B. Adjustments for other Site Classes are made, as needed, in Section 1613.3.3.

From Figure 1613.3.1(1) [1] [1]	$S_S = 0.910$ g
From Figure 1613.3.1(2) [2] [2]	$S_1 = 0.337$ g

Section 1613.3.2 — Site class definitions

The authority having jurisdiction (not the USGS), site-specific geotechnical data, and/or the default has classified the site as Site Class D, based on the site soil properties in accordance with Section 1613.

2010 ASCE-7 Standard – Table 20.3-1
SITE CLASS DEFINITIONS

Site Class	$\bar{v}_S$	$\bar{N}$ or $\bar{N}_{ch}$	$\bar{s}_u$
A. Hard Rock	>5,000 ft/s	N/A	N/A
B. Rock	2,500 to 5,000 ft/s	N/A	N/A
C. Very dense soil and soft rock	1,200 to 2,500 ft/s	>50	>2,000 psf
D. Stiff Soil	600 to 1,200 ft/s	15 to 50	1,000 to 2,000 psf
E. Soft clay soil	<600 ft/s	<15	<1,000 psf
	Any profile with more than 10 ft of soil having the characteristics: • Plasticity index *PI* > 20, • Moisture content *w* ≥ 40%, and • Undrained shear strength $\bar{s}_u$ < 500 psf		
F. Soils requiring site response analysis in accordance with Section 21.1	See Section 20.3.1		

For SI: 1ft/s = 0.3048 m/s 1lb/ft² = 0.0479 kN/m²

Section 1613.3.3 — Site coefficients and adjusted maximum considered earthquake spectral response acceleration parameters

TABLE 1613.3.3(1)
VALUES OF SITE COEFFICIENT F_a

Site Class	Mapped Spectral Response Acceleration at Short Period				
	$S_S \leq 0.25$	$S_S = 0.50$	$S_S = 0.75$	$S_S = 1.00$	$S_S \geq 1.25$
A	0.8	0.8	0.8	0.8	0.8
B	1.0	1.0	1.0	1.0	1.0
C	1.2	1.2	1.1	1.0	1.0
D	1.6	1.4	1.2	1.1	1.0
E	2.5	1.7	1.2	0.9	0.9
F	See Section 11.4.7 of ASCE 7				

Note: Use straight–line interpolation for intermediate values of S_S

For Site Class = D and S_s = 0.910 g, F_a = 1.136

TABLE 1613.3.3(2)
VALUES OF SITE COEFFICIENT F_v

Site Class	Mapped Spectral Response Acceleration at 1–s Period				
	$S_1 \leq 0.10$	$S_1 = 0.20$	$S_1 = 0.30$	$S_1 = 0.40$	$S_1 \geq 0.50$
A	0.8	0.8	0.8	0.8	0.8
B	1.0	1.0	1.0	1.0	1.0
C	1.7	1.6	1.5	1.4	1.3
D	2.4	2.0	1.8	1.6	1.5
E	3.5	3.2	2.8	2.4	2.4
F	See Section 11.4.7 of ASCE 7				

Note: Use straight–line interpolation for intermediate values of S_1

For Site Class = D and S_1 = 0.337 g, F_v = 1.726

Equation (16-37):	$S_{MS} = F_aS_S = 1.136 \text{ x } 0.910 = 1.033 \text{ g}$
Equation (16-38):	$S_{M1} = F_vS_1 = 1.726 \text{ x } 0.337 = 0.582 \text{ g}$

Section 1613.3.4 — Design spectral response acceleration parameters

Equation (16-39):	$S_{DS} = ⅔ \, S_{MS} = ⅔ \text{ x } 1.033 = 0.689 \text{ g}$
Equation (16-40):	$S_{D1} = ⅔ \, S_{M1} = ⅔ \text{ x } 0.582 = 0.388 \text{ g}$

Your search parameters are:

- start_time=1967/01/01
- end_time=2017/06/01
- minimum_latitude=36.5454
- maximum_latitude=39.4480
- minimum_longitude=-123.2013
- maximum_longitude=-119.5037
- minimum_magnitude=5
- maximum_magnitude=10
- etype=E
- rflag=A,F,H,I
- system=selected
- format=ncread

```
Date       Time              Lat        Lon   Depth   Mag Magt  Nst Gap  Clo  RMS  SRC   Event ID
-------------------------------------------------------------------------------------------------
1969/10/02 04:56:45.30  38.49783 -122.66400   0.153  5.60   ML   38 104   52 0.22 NCSN    1003129
1969/10/02 06:19:56.39  38.45000 -122.75350   5.037  5.70   ML   53 139   58 0.22 NCSN    1003132
1972/02/24 15:56:50.99  36.59033 -121.19050   3.872  5.10   ML   10 128    6 0.06 NCSN    1009257
1974/11/28 23:01:24.59  36.92017 -121.46733   5.336  5.20   ML   51  61    4 0.13 NCSN    1021949
1975/08/01 20:20:12.90  39.43217 -121.54583   4.970  5.70   ML    0   0    0 0.00 NCSN   71105799
1975/08/02 20:58:56.01  39.43783 -121.48483   1.506  5.20   ML    7 146    2 0.03 NCSN    1025150
1979/08/06 17:05:22.93  37.10383 -121.51234   8.315  5.80   ML   90  97    6 0.06 NCSN    1046962
1980/01/24 19:00:08.58  37.84000 -121.76783  14.488  5.80   ML   76  69    5 0.13 NCSN    1050040
1980/01/24 19:01:01.54  37.81100 -121.77500   6.523  5.10   ML   10 149    3 0.21 NCSN    1050041
1980/01/27 02:33:35.34  37.74900 -121.70634  14.166  5.40   ML   73 102    9 0.10 NCSN    1050437
1980/11/28 18:21:13.04  39.25150 -120.45383   5.921  5.10   ML  221  76   38 0.33 NCSN    1057587
1984/04/24 21:15:18.76  37.30967 -121.67883   8.193  6.20   ML   98  26    6 0.06 NCSN      17204
1986/01/26 19:20:50.95  36.80433 -121.28500   8.153  5.50   ML   81  27    7 0.05 NCSN      64626
1986/03/31 11:55:39.81  37.47917 -121.68667   8.502  5.70   ML   84  65    3 0.06 NCSN      68932
1988/02/20 08:39:57.26  36.79583 -121.31116   9.181  5.10   ML   81  26    3 0.07 NCSN   10086194
1988/06/13 01:45:36.53  37.39267 -121.74150   9.087  5.30   ML   94  29    4 0.06 NCSN   10087352
1988/06/27 18:43:22.33  37.12833 -121.89500  12.634  5.30   ML   87  45    5 0.09 NCSN   10139668
1989/08/08 08:13:27.39  37.14817 -121.92683  13.409  5.40   ML   86  51    2 0.09 NCSN   10089897
1989/10/18 00:04:15.19  37.03617 -121.87984  17.214  6.90   Mh   80  89    1 0.08 NCSN     216859
1989/10/18 00:41:23.77  37.19017 -122.05200  15.306  5.10   ML   50  57    3 0.09 NCSN   10090725
1990/04/18 13:53:51.30  36.93233 -121.65683   5.488  5.40   ML   95  36    0 0.11 NCSN   20091154
1990/04/18 15:46:03.45  36.95883 -121.68450   6.641  5.10   ML   82  28    1 0.09 NCSN   20091155
1994/09/12 12:23:43.03  38.80817 -119.69250  -1.258  5.90   Mw  290 162   86 0.33 NCSN   30057098
1994/09/12 23:57:09.75  38.77633 -119.70500  -0.942  5.10   Mw  327 164   85 0.46 NCSN   30057222
1998/08/12 14:10:25.14  36.75450 -121.46150   8.822  5.10   Mw   78  35    4 0.19 NCSN   30190473
2007/10/31 03:04:54.81  37.43350 -121.77433   9.741  5.45   Mw  164  50    3 0.11 NCSN   40204628
2014/08/24 10:20:44.07  38.21517 -122.31233  11.120  6.02   Mw  400  28    4 0.18 NCSN   72282711
2016/08/10 02:57:17.51  39.32933 -122.80183  14.450  5.09   Mw  121  32   17 0.15 NCSN   72672610
2016/12/14 16:41:05.53  38.82217 -122.84133   1.480  5.01   Mw   85  26    1 0.06 NCSN   72737985
```

Your search parameters are:

- catalog=UCB
- start_time=1910/01/01,00:00:00
- end_time=1966/12/31,00:00:00
- minimum_latitude=36.5454
- maximum_latitude=39.4480
- minimum_longitude=-123.2013
- maximum_longitude=-119.5037
- minimum_magnitude=5
- maximum_magnitude=10
- event_type=E

```
Date       Time             Lat       Lon   Depth   Mag Magt  Nst Gap  Clo  RMS  SRC   Event ID
----------------------------------------------------------------------------------------------
1911/07/01 22:00:00.00  37.2500 -121.7500   0.00  6.60   ML    0   0    0 0.00   BK          0
1926/10/22 12:35:07.00  36.6100 -122.3500   0.00  6.10   ML    4   0    0 0.00   BK          0
1926/10/22 13:35:22.00  36.5700 -122.1800   0.00  6.10   ML    4   0    0 0.00   BK          0
1939/06/24 13:02:00.00  36.8000 -121.4500   0.00  5.50   ML    0   0    0 0.00   BK          0
1942/12/17 15:07:43.00  38.8700 -119.9000   0.00  5.10   ML    0   0    0 0.00   BK          0
1943/03/30 21:07:28.00  39.4300 -120.4000   0.00  5.30   ML    0   0    0 0.00   BK          0
1949/03/09 12:28:39.00  37.0200 -121.4800   0.00  5.20   ML    0   0    0 0.00   BK          0
1951/07/29 10:53:45.00  36.5800 -121.1800   0.00  5.00   ML    0   0    0 0.00   BK          0
1952/05/09 15:31:32.00  39.4200 -119.7800   0.00  5.10   ML    0   0    0 0.00   BK          0
1953/03/22 05:19:00.00  38.8200 -119.9800   0.00  5.00   ML    0   0    0 0.00   BK          0
1954/04/25 20:33:28.00  36.9300 -121.6800   0.00  5.30   ML    0   0    0 0.00   BK          0
1955/09/05 02:01:18.00  37.3700 -121.7800   0.00  5.50   ML    0   0    0 0.00   BK          0
1955/10/24 04:10:44.00  37.9700 -122.0500   0.00  5.40   ML    0   0    0 0.00   BK          0
1957/03/22 19:44:21.00  37.6700 -122.4800   0.00  5.30   ML    0   0    0 0.00   BK          0
1959/03/02 23:27:17.00  36.9800 -121.6000   0.00  5.30   ML    0   0    0 0.00   BK          0
1960/01/20 03:25:53.00  36.7800 -121.4300   0.00  5.00   ML    0   0    0 0.00   BK          0
1961/04/09 07:23:16.00  36.6800 -121.3000   0.00  5.60   ML    0   0    0 0.00   BK          0
1961/04/09 07:25:41.00  36.7000 -121.3000   0.00  5.50   ML    0   0    0 0.00   BK          0
1963/09/14 19:46:17.00  36.8700 -121.6300   0.00  5.40   ML   19   0    0 0.00   BK          0
1964/11/16 02:46:41.70  37.0600 -121.6900   0.00  5.00   ML   17   0    0 0.00   BK          0
1966/09/12 16:41:01.90  39.4200 -120.1500   0.00  6.00   ML   10   0    0 0.00   BK          0
1966/09/12 17:20:11.00  39.4200 -120.1500   0.00  5.30   ML    0   0    0 0.00   BK          0
```

Your search parameters are:

- catalog=ANSS
- start_time=1989/01/01,00:00:00
- end_time=1909/12/31,00:00:00
- minimum_latitude=36.5454
- maximum_latitude=39.4480
- minimum_longitude=-123.2013
- maximum_longitude=-119.5037
- minimum_magnitude=6.0
- maximum_magnitude=10
- event_type=E

```
/usr/dc/bin/eqselect: minimum time value greater than maximum
```

No matches to your search criteria

U.S. Geological Survey - Earthquake Hazards Program

Unified Hazard Tool

Please do not use this tool to obtain ground motion parameter values for the design code reference documents covered by the U.S. Seismic Design Maps web tools (e.g., the International Building Code and the ASCE 7 or 41 Standard). The values returned by the two applications are not identical.

Input

Edition

Dynamic: Conterminous U.S. 2014 (v4.

Spectral Period

Peak ground acceleration

Latitude

Decimal degrees

Time Horizon

Return period in years

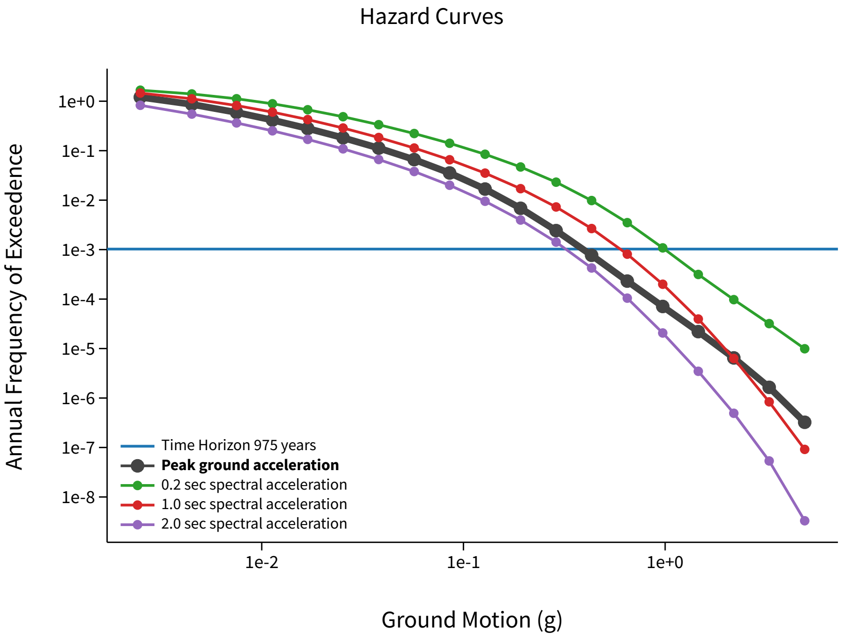
Longitude

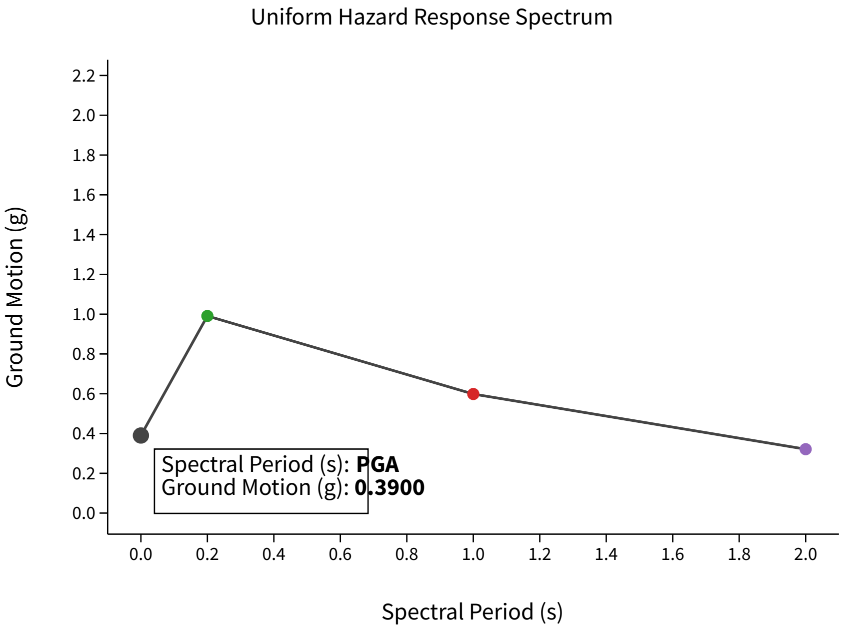
Decimal degrees, negative values for western longitudes

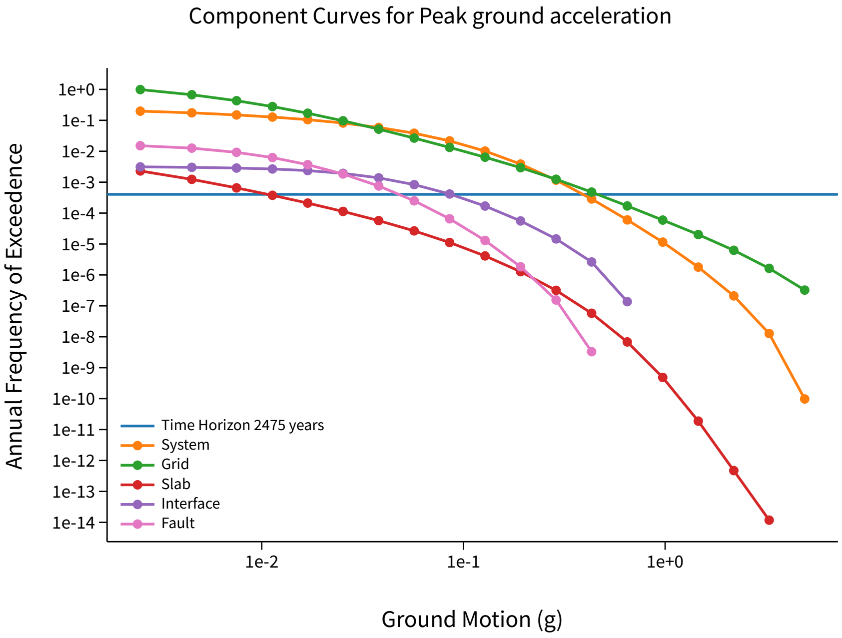
Site Class

180 m/s (D/E boundary)

Hazard Curve


Hazard Curves


Uniform Hazard Response Spectrum

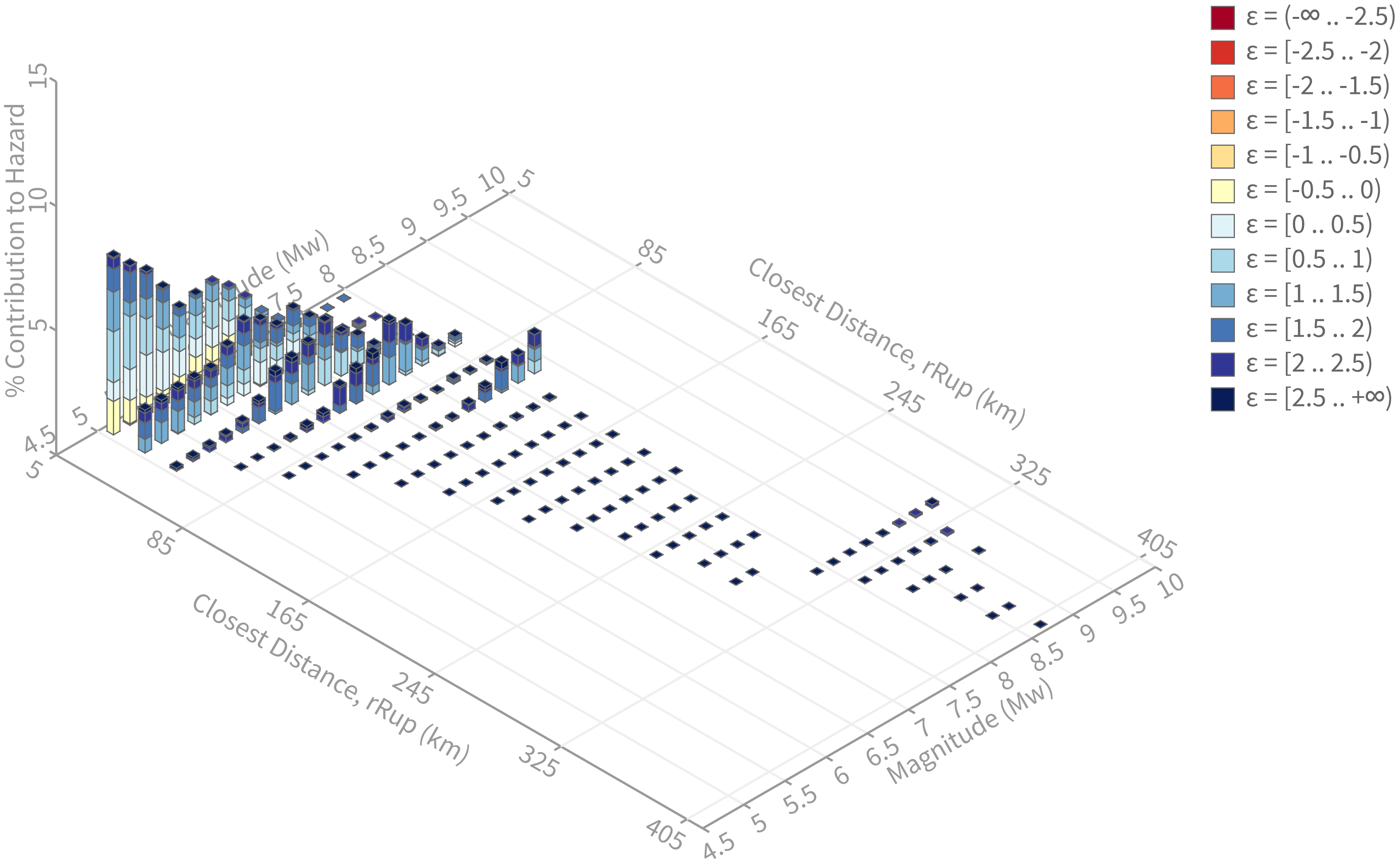

Component Curves for Peak ground acceleration

View Raw Data

^ Deaggregation

Component

Total ⌄



Summary statistics for, Deaggregation: Total

Deaggregation targets

Return period: 975 yrs
Exceedance rate: 0.001025641 yr^{-1}
PGA ground motion: 0.38999207 g

Recovered targets

Return period: 1078.3562 yrs
Exceedance rate: 0.00092733735 yr^{-1}

Totals

Binned: 100 %
Residual: 0 %
Trace: 0.28 %

Mean (for all sources)

r: 34.27 km
m: 6.34
ε_0: 1.09 σ

Mode (largest r-m bin)

r: 11.24 km
m: 5.1
ε_0: 0.86 σ
Contribution: 7.12 %

Mode (largest ε_0 bin)

r: 11.57 km
m: 5.3
ε_0: 0.79 σ
Contribution: 2.13 %

Discretization

r: min = 0.0, max = 1000.0, Δ = 20.0 km
m: min = 4.4, max = 9.4, Δ = 0.2
ε: min = -3.0, max = 3.0, Δ = 0.5 σ

Epsilon keys

ε0: [-∞ .. -2.5)
ε1: [-2.5 .. -2.0)
ε2: [-2.0 .. -1.5)
ε3: [-1.5 .. -1.0)
ε4: [-1.0 .. -0.5)
ε5: [-0.5 .. 0.0)
ε6: [0.0 .. 0.5)
ε7: [0.5 .. 1.0)
ε8: [1.0 .. 1.5)
ε9: [1.5 .. 2.0)
ε10: [2.0 .. 2.5)
ε11: [2.5 .. +∞]

Deaggregation Contributors

Source Set ↳ Source	Type	r	m	ε_0	lon	lat	az	%
UC33brAvg_FM32 (opt)	Grid							31.30
PointSourceFinite: -121.336, 38.100		11.74	5.76	0.62	121.336°W	38.100°N	0.00	2.08
PointSourceFinite: -121.336, 38.100		11.74	5.76	0.62	121.336°W	38.100°N	0.00	2.08
PointSourceFinite: -121.336, 38.046		7.35	5.66	0.31	121.336°W	38.046°N	0.00	1.86
PointSourceFinite: -121.336, 38.046		7.35	5.66	0.31	121.336°W	38.046°N	0.00	1.86
PointSourceFinite: -121.336, 38.028		6.14	5.63	0.20	121.336°W	38.028°N	0.00	1.75
PointSourceFinite: -121.336, 38.028		6.14	5.63	0.20	121.336°W	38.028°N	0.00	1.75
PointSourceFinite: -121.336, 38.109		12.54	5.78	0.67	121.336°W	38.109°N	0.00	1.73
PointSourceFinite: -121.336, 38.109		12.54	5.78	0.67	121.336°W	38.109°N	0.00	1.73
UC33brAvg_FM31 (opt)	Grid							31.13
PointSourceFinite: -121.336, 38.100		11.74	5.76	0.62	121.336°W	38.100°N	0.00	2.08
PointSourceFinite: -121.336, 38.100		11.74	5.76	0.62	121.336°W	38.100°N	0.00	2.08
PointSourceFinite: -121.336, 38.046		7.35	5.66	0.31	121.336°W	38.046°N	0.00	1.86
PointSourceFinite: -121.336, 38.046		7.35	5.66	0.31	121.336°W	38.046°N	0.00	1.86
PointSourceFinite: -121.336, 38.028		6.14	5.63	0.20	121.336°W	38.028°N	0.00	1.75
PointSourceFinite: -121.336, 38.028		6.14	5.63	0.20	121.336°W	38.028°N	0.00	1.75
PointSourceFinite: -121.336, 38.109		12.54	5.78	0.67	121.336°W	38.109°N	0.00	1.73
PointSourceFinite: -121.336, 38.109		12.54	5.78	0.67	121.336°W	38.109°N	0.00	1.73
UC33brAvg_FM31	System							19.16
Mount Diablo Thrust South [0]		39.68	6.91	1.19	121.778°W	37.736°N	233.44	2.36
Hayward (So) [4]		71.72	7.29	1.82	122.001°W	37.604°N	233.44	1.93
San Andreas (Peninsula) [5]		103.73	8.06	1.66	122.268°W	37.425°N	232.51	1.73
Calaveras (No) [1]		62.33	7.29	1.62	121.969°W	37.748°N	243.72	1.64
Great Valley 06 (Midland) alt1 [6]		26.03	6.81	0.69	121.632°W	37.995°N	269.77	1.55
Mount Diablo Thrust North CFM [0]		44.01	7.23	1.14	121.896°W	37.782°N	244.25	1.43
UC33brAvg_FM32	System							17.94
Greenville (No) [4]		44.41	7.08	1.29	121.741°W	37.762°N	233.87	3.07
Hayward (So) [4]		71.72	7.30	1.82	122.001°W	37.604°N	233.44	1.94
San Andreas (Peninsula) [5]		103.73	8.06	1.66	122.268°W	37.425°N	232.51	1.75
Calaveras (No) [1]		62.33	7.29	1.62	121.969°W	37.748°N	243.72	1.66
Great Valley 06 Midland alt2 [1]		29.82	7.22	0.59	121.673°W	37.981°N	266.81	1.21

APPENDIX C
LOGS OF BORINGS

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

LOG OF BORING No. B-1

PROJECT: SUSD Geologic Hazard Preliminary Liquefaction Assessment **PROJECT NO.:** 7572A
CLIENT: Stockton Unified School District
PROJECT LOCATION: 2111 Quail Lakes Drive [APN 108-020-04], Stockton, California
LOCATION: 2111 Quail Lakes Drive, Stockton, California **ELEVATION:** 0'
DRILLER: Woodward, C-57-710079 **LOGGED BY:** M. Crum
DRILLING METHOD: 8" HSA/MR-BK81 with Auto Trip Hammer **DATE:** 06/13/2017
DEPTH TO - WATER> INITIAL: ∇ 17.8' **AFTER DRILLING:** ▼ - **CAVING>** None

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
0		CL	0-0.2' Asphalt 0.2'-0.8' Road base, 3/8" gravel	1.0									9:30am start drill HSA
			Lean Clay										
5			Lean clay, slight moist, low plasticity, stiff to stiff, moderately yellow brown to black		1	4 4 10	14						9:36am 2-3.5 TSF
			Hard, moderately yellow brown		2	3 21 26	47						12" recovery
10			Moderately stiff, trace caliche		3	5 3 5	8						6" recovery
			Moist Hard, slightly moist, trace caliche		4	9 15 26	41						9:50am
15			Very stiff		5	10 10 11	21						10.04am 4.5 TSF
		CL	Stiff, moist		6	3 6 6	12						10:13am
20			Stiff to very stiff, wet		7	6 7 9	16						
		ML	Silt, moderately wet, non-low plastic fines, moderately yellow brown, slight dilatent	22.5	8	3 5 9	14						10:31am
25					9	4 8 12	20						10:44am; break; then drill mud rotary at 12:05pm
			Dark yellow brown, moderately yellow brown		10	8 13 14	27			NP			
30		ML	Sandy silt, dense 25-35% fine sand, 65-75% non-low plastic fines, wet		11	8 12 20	40			NP		81	PL = 25 12:14pm 12" recovery lost; 250 gal. bentonite added to mud
			Silt with sand, 15-25% fine sand, 75-85% non-low plastic fines, medium dense		12	64 8 13	21					63	
35			Sandy silt, moderately dense, 45% fine sand, 50%		13	4 6	16						12:44pm

Hand auger to 5'. Drill out; start sampling at 5'. HSA to 25.0; MR with drag bit 25 to TD.

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

LOG OF BORING No. B-1

PROJECT: SUSD Geologic Hazard Preliminary Liquefaction Assessment **PROJECT NO.:** 7572A
CLIENT: Stockton Unified School District
PROJECT LOCATION: 2111 Quail Lakes Drive [APN 108-020-04], Stockton, California
LOCATION: 2111 Quail Lakes Drive, Stockton, California **ELEVATION:** 0'
DRILLER: Woodward, C-57-710079 **LOGGED BY:** M. Crum
DRILLING METHOD: 8" HSA/MR-BK81 with Auto Trip Hammer **DATE:** 06/13/2017
DEPTH TO - WATER> INITIAL: ∇ 17.8' **AFTER DRILLING:** ▼ - **CAVING>** None

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
		ML SM	non-plastic fines, trace clay Sandy silty			10							
			36.5 Silty Sand, dense wet, dark yellow brown, 20% silt, 30% fine-medium sand, trace coarse sand		14	8 9 9	17					21	12:57pm
40			Trace silt		15	8 9 14	23						1:10pm
		GW- GM	42.0 Well graded gravel with silt, fine sand to 3/4" gravel, general fine gravel, medium dense		16	15 11 11	22						1:23pm 12" recovery 3.5 TSF
45		CH	44.0 Fat clay, very stiff to hard, high plastic fines, medium dark gray		17	4 6 7	13						No recovery
		CL	46.5 Lean clay with sand, stiff, 30% fine sand, 70% low plastic fines, medium dark gray		18	8 10 12	22						1:50pm
50		CH	49.5 Fat clay		19	9 14 15	29						2:15pm
			Boring Terminated at 51.5 ft.										
55													
60													
65													
70													

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

Hand auger to 5'. Drill out; start sampling at 5'. HSA to 25.0; MR with drag bit 25 to TD.

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

LOG OF BORING No. B-2

PROJECT: SUSD Geologic Hazard Preliminary Liquefaction Assessment **PROJECT NO.:** 7572A
CLIENT: Stockton Unified School District
PROJECT LOCATION: 2111 Quail Lakes Drive [APN 108-020-04], Stockton, California
LOCATION: 2111 Quail Lakes Drive, Stockton, California **ELEVATION:** 0'
DRILLER: Woodward, C-57-710079 **LOGGED BY:** M. Crum
DRILLING METHOD: 8" HSA/MR-BK81 with Auto Trip Hammer **DATE:** 06/15/2017
DEPTH TO - WATER> INITIAL: ∇ 22' **AFTER DRILLING:** ▼ - **CAVING>** None

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
0		CH	0-0.2' Asphalt 0.2'-0.8' Road base, 3/8" gravel										10:15am 8" HSA
1.0			Fat clay, high plastic fines, olive black, stiff										
5					1	2 3 5	8						10:18am
7.0		CL	Lean clay, low plastic fines, moderately yellow brown, medium stiff										10:23am
10					2	4 4 4	8						
15			Stiff		3	3 4 7	11						10:30am
		CL	Lean clay, low plastic fines, moderately yellow brown, stiff										
20					4	3 4 5	9						10:38am
	∇												
25			Wet		5	3 5 8	13						10:55am End HSA Start MR
			Moderately stiff		6	2 3 3	6						11:29am
29.5		ML	Sandy silt, moderately yellow brown, wet, loose, 60% non-plastic fines, 40% fine sand										
30					7	3 3 5	8						11:38am
32.5		SM	Silty sand with gravel,20% fine gravel, 15% non-plastic fines, 65% fine-coarse sand, medium dense, wet		8	9 12 15	27					11	11.57am
35		SM	Well graded gravel, rounded, medium dense		9	9 13	29						12:12pm

Hand auger to 5'. Drill out; start sampling at 5'. HSA to 25.0; MR with drag bit 25 to TD.

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

LOG OF BORING No. B-2

PROJECT: SUSD Geologic Hazard Preliminary Liquefaction Assessment **PROJECT NO.:** 7572A
CLIENT: Stockton Unified School District
PROJECT LOCATION: 2111 Quail Lakes Drive [APN 108-020-04], Stockton, California
LOCATION: 2111 Quail Lakes Drive, Stockton, California **ELEVATION:** 0'
DRILLER: Woodward, C-57-710079 **LOGGED BY:** M. Crum
DRILLING METHOD: 8" HSA/MR-BK81 with Auto Trip Hammer **DATE:** 06/15/2017
DEPTH TO - WATER> INITIAL: ▽ 22' **AFTER DRILLING:** ▼ - **CAVING>** ☾ None

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
						16							
		SM SM	36.5' Silty sand with gravel 40% fine gravel, ≤10% fines, 50% fine-coarse sand, medium dense, rounded clasts		10	5 10 14	24					3	12:29pm Add hole plug
40		GW	39.5 Well graded gravel, 65% fine gravel, 30% fine-coarse sand, minor fines, loose, rounded clasts		11	4 5 5	9						12:54pm
		SW-SC	42.0 Well graded sand with silty clay, ≤10% non-plasticity fines, 90% fine-coarse sand, loose		12	3 3 6	9					21	1:13pm 12" recovery gravel in hole, poor circ.
45		SP	44.5 Poorly graded sand, <5% fines, 95% fine-medium sand, medium dense		13	10 13 14	27					8	
		CH	47.0 Fat clay with sand, dark greenish gray, 15-30% fine sand, 70-85% high plastic fines, moderately stiff		14	2 2 4	8						1:55pm
50		SP	49.5 Poorly graded sand, gray, medium dense, fine to medium sand		15	8 10 12	22						2:10pm
		CH	51.0 Fat Clay, grayish green, trace caliche, 100% high plastic fines, stiff										
55					16	5 6 10	16						2:33pm
			Boring Terminated at 56.5 ft.										
60													
65													
70													

Hand auger to 5'. Drill out; start sampling at 5'. HSA to 25.0; MR with drag bit 25 to TD.

CONDOR EARTH TECHNOLOGIES, INC.

209-234-0518

FAX 209-234-0538

LOG OF BORING
No. B-3

PROJECT: SUSD Geologic Hazard Preliminary Liquefaction Assessment **PROJECT NO.:** 7572A

CLIENT: Stockton Unified School District

PROJECT LOCATION: 2111 Quail Lakes Drive [APN 108-020-04], Stockton, California

LOCATION: 2111 Quail Lakes Drive, Stockton, California **ELEVATION:** 0'

DRILLER: Woodward, C-57-710079 **LOGGED BY:** M. Crum

DRILLING METHOD: 8" HSA/MR-BK81 with Auto Trip Hammer **DATE:** 06/13-14/2017

DEPTH TO - WATER> INITIAL: 22' **AFTER DRILLING:** - **CAVING>** None

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	0-0.2' Asphalt 0.2'-0.5' Base rock gravel 0.5										3:40pm Mud rotary
			Lean clay, black										
5			Lean clay, stiff, low plastic fines. slightly moist, pale yellow orange, trace caliche		1	3 4 7	11						4:07pm
			Very stiff, dark yellow orange, trace caliche		2	6 9 17	26						4:19pm
10					3	7 8 11	29						4:40pm
			Hard, trace caliche		4	7 13 27	40						4:52pm End 06/13/17
15			Very stiff, slightly moist		5	4 7 12	19						06/14/17 7:17am
		CL	Lean clay, very stiff, low plastic fines, dark yellow orange		6	4 8 11	19						7:34am 1.0-3.5 TSF
20			Very stiff to hard, trace caliche		7	8 13 14	27	19	106				7:47am 1.0-4.5 TSF
	▽		Lean clay with sand, 15% fine sand, stiff		8	4 5 7	12						8:06pm
25		CL-ML	24.5 Silty clay with sand, 15% fine sand, very stiff, dark yellow orange, moist		9	9 11 14	25						8:21am
					10	7 10 15	25						8:42am
30		SM	28.5 Silty sand, fine to medium sand, generally fine, medium dense, dark yellow brown, wet Dense		11	12 14 17	31					15	8:59am
		SC-SM	33.0 Silty clayey sand, 30% low plastic fines, 70% fine medium sand, trace fine gravel, very dense, wet		12	19 28 34	62					19	9:21am
35		SM CL	34.5 Silty sand with gravel, 20% fine gravel, generally		13	9 9	29						9:35am

Hand auger to 5'. Drill out; start sampling at 5'. HSA to 25.0; MR with drag bit 25 to TD.

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-3

PROJECT: SUSD Geologic Hazard Preliminary Liquefaction Assessment **PROJECT NO.:** 7572A
CLIENT: Stockton Unified School District
PROJECT LOCATION: 2111 Quail Lakes Drive [APN 108-020-04], Stockton, California
LOCATION: 2111 Quail Lakes Drive, Stockton, California **ELEVATION:** 0'
DRILLER: Woodward, C-57-710079 **LOGGED BY:** M. Crum
DRILLING METHOD: 8" HSA/MR-BK81 with Auto Trip Hammer **DATE:** 06/13-14/2017
DEPTH TO - WATER> INITIAL: ▽ 22' **AFTER DRILLING:** ▼ - **CAVING>** None

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
			fine-medium sand, medium dense			11							
			35.5 Lean clay with sand, 85% low plastic fines, 15% fine sand, olive gray, wet, very stiff Grayish olive	▨	14	9 11 14	28	21.4	102				
40			Dark greenish gray	▨	15	11 11 14	25						
		SM SM	Grayish olive 42.0 Silty sand, ≤15% non-low plastic fines, 85% fine-medium sand, saturated, dilatent	░	16	9 9 9	18					22	10:30am
45		CL	43.5 Lean clay with sand, 30% fine sand, 70% low plastic fines, stiff, dark yellowish brown	▨	17	10 12 12	24						10:52am
		SM	45.5 Silty sand, dark greenish gray, wet, >12% fines, generally fine to medium sand, medium dense	░	18	9 10 14	24					14	11:05am
50		CL	49.5 Lean clay with sand, 20% fine sand, tracle fine gravel, 80% low plastic fines, dark grayish gray, wet, very stiff	▨	19	11 14 16	30						11:26am
			Boring Terminated at 51.5 ft.										
55													
60													
65													
70													

Hand auger to 5'. Drill out; start sampling at 5'. HSA to 25.0; MR with drag bit 25 to TD.

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-4

PROJECT: SUSD Geologic Hazard Preliminary Liquefaction Assessment **PROJECT NO.:** 7572A
CLIENT: Stockton Unified School District
PROJECT LOCATION: 2111 Quail Lakes Drive [APN 108-020-04], Stockton, California
LOCATION: 2111 Quail Lakes Drive, Stockton, California **ELEVATION:** 0'
DRILLER: Woodward, C-57-710079 **LOGGED BY:** M. Crum
DRILLING METHOD: 8" HSA/MR-BK81 with Auto Trip Hammer **DATE:** 06/14/2017
DEPTH TO - WATER> INITIAL: 14.4' **AFTER DRILLING:** - **CAVING>** None

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
0		CL	0-0.2' Asphalt 0.2'-0.5' Road base gravel										3:40pm Mud rotary
0.5			Lean clay, black moderate plastic fines, slightly moist										
5			Very stiff		1	4 7 13	20						
6.0		CL-ML	Silty clay, moderately brown low-plastic fines, very stiff										
7.5		CL	Lean clay, low-plastic fines, minor sitl, moderately yellow brown, trace caliche, moist, stiff		2	4 7 8	15						
10					3	3 4 5	9						
			Moderately stiff		4	3 3 5	8						1:26pm
15			Stiff		5	3 4 6	10						1:28pm
		CL	Lean clay, low-plastic fines, moderately yellow brown, moist, stiff		6	4 6 8	14						
20			Very stiff		7	6 8 9	17						1:45pm End HSA Start MR
					8	4 7 10	17						2:24pm Slow drilling 2.5 TSF
25					9	5 6 8	14						2:45pm End 06/14/17
27.0		ML	Sandy silt, medium dense, wet, 30% fine to medium sand, 70% non-plastic fines, medium yellowish brown		10	8 11 13	24			NP			6:55am Start 06/15/17
29.5		SM	Silty sand, 65% fine-medium sand, 35% non-plastic fines, medium dense, wet, moderately yellow brown		11	6 8 11	19					12	7:08am
					12	7 10 10	20					13	7:29am
35		SM	Silty sand, fine to medium sand, non-plastic fines,		13	9 11	26					15	7:43am

Hand auger to 5'. Drill out with HSA to 20'; mud rotary with drag bit 20'-50'; no additives

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

LOG OF BORING
No. B-4

PROJECT: SUSD Geologic Hazard Preliminary Liquefaction Assessment **PROJECT NO.:** 7572A
CLIENT: Stockton Unified School District
PROJECT LOCATION: 2111 Quail Lakes Drive [APN 108-020-04], Stockton, California
LOCATION: 2111 Quail Lakes Drive, Stockton, California **ELEVATION:** 0'
DRILLER: Woodward, C-57-710079 **LOGGED BY:** M. Crum
DRILLING METHOD: 8" HSA/MR-BK81 with Auto Trip Hammer **DATE:** 06/14/2017
DEPTH TO - WATER> INITIAL: ▽ 14.4' **AFTER DRILLING:** ▼ - **CAVING>** None

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
			medium dense, moderate yellow brown, wet			15							
					14	6 8 9	17					10	8:02am
40					15	8 8 9	17					8	8:15am
			Fine to coarse, generally fine to medium, 15% fines		16	8 7 9	17					6	8:33am
45					17	8 11 14	25					3	8:45am
		CH	47.0 Fat clay, 100% high plastic fines, stiff, dark greenish gray									10	
					18	3 4 6	10						9:07am
50			Very stiff		19	7 9 12	21						9:21am
			Boring Terminated at 51.5 ft.										
55													
60													
65													
70													

Hand auger to 5'. Drill out with HSA to 20'; mud rotary with drag bit 20'-50'; no additives

KEY TO SYMBOLS

Symbol	Description
Strata symbols	
▨	Lean clay, Lean clay with sand, Sandy lean clay
▥	Silt, Silt with sand, Sandy silt
▥	Silty sand, Clayey sand
▩	Well graded gravel with silt
▨	Fat clay, Fat clay with sand, Sandy fat clay
▩	Well graded gravel
░	Well graded sand with clay
░	Poorly graded sand, Poorly graded sand with gravel, Poorly graded sand with gravel and silt
▧	Silty clay, Silty clay with sand, Sandy silty clay
▧	Sandy silty clay
Misc. Symbols	
▽	Water table during drilling
Soil Samplers	
◩	Standard penetration test
■	California modified sampler

Notes:

1. These logs are subject to limitations, conclusions, and recommendations in this report.
2. Stated percent fines in Description based on field estimation. Actual values based on laboratory test results may differ.

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

LOG OF BORING
No. B-5

PROJECT: SUSD 2111 Quail Lakes Drive Project **PROJECT NO.:** 7572D
CLIENT: Stockton Unified School District
PROJECT LOCATION: 2111 Quail Lakes Drive, Stockton, CA 95207
LOCATION: Parking Lot on Southeast Quadrant of Property **ELEVATION:**
DRILLER: West Coast Exploration **LOGGED BY:** N. Garnica
DRILLING METHOD: 4.5-Inch Solid-Stem Auger **DATE:** 03/02/2018
DEPTH TO - WATER> INITIAL: ▽ **AFTER DRILLING:** ▼ **CAVING>** ℂ

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		AC	2" AC; 7" AB 1.0	▩									
	■	CL	Dark gray to black lean clay, moist, hard	▨	1	10 15 20	23						
	◩		Dark brown, sandy lean clay to black lean clay, moist, very stiff	▨	2	10 12 15	27						
5	■		Black lean clay, moist, very stiff	▨	3	13 22 25	31	17.1	104.1				
10	■		Yellowish green, lean clay, moist, hard	▨	4	12 15 20	35	20.1	98.3				
15	◩		Light brown, lean clay, moist, stiff	▨	5	4 5 6	11						
			Boring Terminated at 16.5 ft. No water										
20													
25													
30													
35													

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-6

PROJECT: SUSD 2111 Quail Lakes Drive Project **PROJECT NO.:** 7572D
CLIENT: Stockton Unified School District
PROJECT LOCATION: 2111 Quail Lakes Drive, Stockton, CA 95207
LOCATION: Southeast Corner of Parking Lot; Northwest of Property **ELEVATION:**
DRILLER: West Coast Exploration **LOGGED BY:** N. Garnica
DRILLING METHOD: 4.5-Inch Solid-Stem Auger **DATE:** 03/02/2018
DEPTH TO - WATER> INITIAL: ▽ 14.5' **AFTER DRILLING:** ▼ **CAVING>** ℂ

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		AC	2" AC; 7" AB										
	■	CL	Yellowish orange, sandy lean clay, moist, hard	1.0 ▨	1	20 28 30	39						
	◩	CL	Yellowish orange, sandy lean clay, moist, very stiff	▨	2	10 12 15	27						
5	■			▨	3	15 25 30	43	11.4	116.6				
10	■		Greenish gray, moist, lean clay, stiff	▨	4	7 7 10	17	19.4	98.8				
15 ▽	◩		Light brown, wet, lean clay, very stiff	▨	5	8 10 15	25						
20	■			▨	6	12 15 22	25						
			Boring Terminated at 21.5 ft.										
25													
30													
35													

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-7

PROJECT: SUSD 2111 Quail Lakes Drive Project **PROJECT NO.:** 7572D
CLIENT: Stockton Unified School District
PROJECT LOCATION: 2111 Quail Lakes Drive, Stockton, CA 95207
LOCATION: Center of West Side; Northwest of Existing Buildings **ELEVATION:**
DRILLER: West Coast Exploration **LOGGED BY:** N. Garnica
DRILLING METHOD: 4.5-Inch Solid-Stem Auger **DATE:** 03/02/2018
DEPTH TO - WATER> INITIAL: ▽ 14.0' **AFTER DRILLING:** ▼ **CAVING>** C

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		AC	2" AC; 7" AB										
1.0	◪	CL	Dark gray to black lean clay, moist, very stiff	▨	1	6 8 8	16						
	■		Dark gray to black lean clay, moist, very stiff	▨	2	10 18 20	25						
5	◪	CL	Brown lean clay, moist, hard	▨	3	10 12 18	30			21	39		
10	■		Light brown, lean clay, moist, hard	▨	4	20 25 25	33	15.6	102.2				
▽				▨									
15	◪		Yellowish orange, lean silty clay, wet, medium, stiff	▨	5	4 4 4	8						
20	◪			▨	6	10 12 18	30						
			Boring Terminated at 21.5 ft.										
25													
30													
35													

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-8

PROJECT: SUSD 2111 Quail Lakes Drive Project **PROJECT NO.:** 7572D

CLIENT: Stockton Unified School District

PROJECT LOCATION: 2111 Quail Lakes Drive, Stockton, CA 95207

LOCATION: Breezeway in Front of Main Building **ELEVATION:**

DRILLER: West Coast Exploration **LOGGED BY:** N. Garnica

DRILLING METHOD: 4.5-Inch Solid-Stem Auger **DATE:** 03/15/2018

DEPTH TO - WATER> INITIAL: **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
0		AC	4-5" Concrete 0.5										
		CL	Dark brown lean clay, moist, very stiff		1	10 9 9	18						
			Dark brown lean clay, moist, very stiff		2	6 10 15	17						
5					3	11 9 12	21						
		SC-SM	7.0 Yellowish orange, silty clayey sand 8.5										
10		CL	Yellowish lean clay, moist, hard		4	24 55/6	55	18.3	98.3				
			Boring Terminated at 11 ft.										
15													
20													
25													
30													
35													

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

LOG OF BORING
No. B-9

PROJECT: SUSD 2111 Quail Lakes Drive Project **PROJECT NO.:** 7572D
CLIENT: Stockton Unified School District
PROJECT LOCATION: 2111 Quail Lakes Drive, Stockton, CA 95207
LOCATION: Northwest corner of Parking Lot of Quail Lakes Drive **ELEVATION:**
DRILLER: West Coast Exploration **LOGGED BY:** N. Garnica
DRILLING METHOD: 4.5-Inch Solid-Stem Auger **DATE:** 03/02/2018
DEPTH TO - WATER> INITIAL: ▽ **AFTER DRILLING:** ▼ **CAVING>** ℂ

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		AC	2" AC; 7" AB										
	■	CL	Gray to dark gray, lean clay, moist	1.0	1	12 18 22	25						
	■	CL			2	10 10 15	25			15	33		
5	■		Dark gray lean clay, moist, stiff Note: Sample lost		3	12 25/12	25						
		ML	Yellowish orange, clayey silt, moist	7.5									
10	■	CL	Yellowish orange, lean clay, moist, hard	9.0	4	15 18 18	36	18.0	112.4				
15	■		Light brown, lean clay, moist, very stiff		5	10 12 15	27						
			Boring Terminated at 16.5 ft.										
20													
25													
30													
35													

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-10

PROJECT: SUSD 2111 Quail Lakes Drive Project **PROJECT NO.:** 7572D
CLIENT: Stockton Unified School District
PROJECT LOCATION: 2111 Quail Lakes Drive, Stockton, CA 95207
LOCATION: Grass Area; 100' Northwest of Quail Lakes Drive and Alexandria **ELEVATION:**
DRILLER: West Coast Exploration **LOGGED BY:** N. Garnica
DRILLING METHOD: 4.5-Inch Solid-Stem Auger **DATE:** 03/15/2018
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	4-6" Grass and roots (grown, wet due to recent storm) 1.0	▨	1	5 5 9	10						
	◤	CL	Dark brown sandy lean clay, moist, stiff	▨	2	3 4 5	9			26	41		
5	■		Dark brown to drak gray, lean clay, moist, very stiff	▨	3	8 13 19	21	15.4	114.6				
10	◤		Yellowish orange lean clay, moist, very stiff	▨	4	4 7 11	18						
			Boring Terminated at 11.5 ft.										
15													
20													
25													
30													
35													

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-11

PROJECT: SUSD 2111 Quail Lakes Drive Project **PROJECT NO.:** 7572D
CLIENT: Stockton Unified School District
PROJECT LOCATION: 2111 Quail Lakes Drive, Stockton, CA 95207
LOCATION: Breezeway 120' South of Main Building **ELEVATION:**
DRILLER: West Coast Exploration **LOGGED BY:** N. Garnica
DRILLING METHOD: 4.5-Inch Solid-Stem Auger **DATE:** 03/13/2018
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		AC	3.5" Concrete										
1.0	■	CL	Dark brown lean clay, moist, medium stiff	▨	1	6 10 10		16.5	104.7				
	◩		Dark brown lean clay, moist, stiff	▨	2	3 5 10							
5	■		Tan sandy lean clay, moist, very stiff	▨	3	10 12 20							
10	◩		Light brown lean clay, moist, very stiff	▨	4	7 11 17							
			Boring Terminated at 11.5 ft.										
15													
20													
25													
30													
35													

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-12

PROJECT: SUSD 2111 Quail Lakes Drive Project **PROJECT NO.:** 7572D

CLIENT: Stockton Unified School District

PROJECT LOCATION: 2111 Quail Lakes Drive, Stockton, CA 95207

LOCATION: Northwest Corner of Site **ELEVATION:**

DRILLER: V & W Drilling **LOGGED BY:** N. Garnica

DRILLING METHOD: Solid-Stem / MR-BK75 **DATE:** 07/24/18

DEPTH TO - WATER> INITIAL: ▽ 15' **AFTER DRILLING:** ▼ **CAVING>** C

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		AC	2.5" AC / 7" AB										
		CL	Dark brown lean clay, moist, stiff	1.0									7:30am started
5		ML	Yellowish orange sandy silt, moist, very dense	4.5	1	6 20 25	30	12.2	102.8				7:30am started
10		CL	Yellowish orange lean clay, moist, very stiff	7.0	2	7 9 10	19						
15 ▽			Light brown sandy lean clay, wet, medium stiff		3	2 3 4	5						
			Light brown lean clay, moist, very stiff		4	4 7 10	17						
20			Light brown lean clay, moist, stiff		5	4 6 8	14						
			Light brown lean clay, moist, medium stiff, trace of sand		6	2 3 4	7						
25			Light brown lean clay, moist, stiff		7	1 4 5	9						
			Brown lean clay, moist, stiff		8	2 6 7	13						
30			Grayish brown lean clay, moist, medium stiff		9	1 3 2	5						
			Lean clay to lean clay with sand, moist, stiff		10	1 4 7	11						
35		SP	Poorly graded sand with silt, wet, medium dense	34.0	11	5 5	12						

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-12

PROJECT: SUSD 2111 Quail Lakes Drive Project **PROJECT NO.:** 7572D
CLIENT: Stockton Unified School District
PROJECT LOCATION: 2111 Quail Lakes Drive, Stockton, CA 95207
LOCATION: Northwest Corner of Site **ELEVATION:**
DRILLER: V & W Drilling **LOGGED BY:** N. Garnica
DRILLING METHOD: Solid-Stem / MR-BK75 **DATE:** 07/24/18
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
						7							
37.0		ML	Sandy silt, moist, low-non plastic fines, medium dense		12	4 6 10	16					54	
40		ML	Sandy Silt, moist, low to non plastic fines		13	4 6 8	14						
		ML	Sandy Silt, low-plastic fines, slightly dilatant		14	2 2 4	6					59	
45.0		SP	Dark gray poorly graded sand (fine), moist, medium dense		15	5 8 11	19						
47.5		SM	Silty sand/silt with sand, moist, medium dense		16	9 6 7	13						
50.0		CL	Greenish blue lean clay, moist, stiff		17	3 5 7	12						
			Boring Terminated at 51.5 ft.										11:00am finished
55													
60													
65													
70													

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-13

PROJECT: SUSD 2111 Quail Lakes Drive Project **PROJECT NO.:** 7572D
CLIENT: Stockton Unified School District
PROJECT LOCATION: 2111 Quail Lakes Drive, Stockton, CA 95207
LOCATION: Northeast Corner of Site **ELEVATION:**
DRILLER: V & W Drilling **LOGGED BY:** N. Garnica
DRILLING METHOD: Solid-Stem Auger/MR-BK81 **DATE:** 07/23/18
DEPTH TO - WATER> INITIAL: ▽ 15' **AFTER DRILLING:** ▼ **CAVING>** C

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		AC	2.5" AC / 7" AB	▩									7:45am started drilling
1.0		CL	Dark brown lean clay, moist, stiff	▨									
5	■		Brown lean clay, moist, very stiff	▨	1	6 10 15	17	12.0	107.9	12	30		4.5 TSF
10	■		Tan lean clay, moist, stiff	▨	2	2 8 11	13						2.0, 2.0, 4.0 TSF
15 ▽	■		Tan lean clay, moist, stiff	▨	3	4 6 14	13						1.0, 1.5, 1.0 TSF
20	◩		Tan lean clay, moist, stiff	▨	4	3 8 5	13						
	◩		Lean clay, wet, stiff	▨	5	3 4 5	9						
25	◩		Light brown lean clay, moist, stiff	▨	6	3 3 5	8						
	◩		Lean clay, low-plastic fines, wet	▨	7	3 3 7	10			10	30	82.7	
30 / 30.0	◩	SM	Silty sand, loose, wet, dilatant	░	8	2 3 4	7					36	
32.5	◩	CL	Greenish gray lean clay, moist, very stiff	▨	9	4 11 12	26						
35	◩		Sandy lean clay, moist stiff	▨	10	5 5	11						

Switched to rotary @ 15'

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-13

PROJECT: SUSD 2111 Quail Lakes Drive Project **PROJECT NO.:** 7572D
CLIENT: Stockton Unified School District
PROJECT LOCATION: 2111 Quail Lakes Drive, Stockton, CA 95207
LOCATION: Northeast Corner of Site **ELEVATION:**
DRILLER: V & W Drilling **LOGGED BY:** N. Garnica
DRILLING METHOD: Solid-Stem Auger/MR-BK81 **DATE:** 07/23/18
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
	◤			▨		6							
	◣	ML	37.5 Greenish blue, wet, sandy lean clay to silt with sand	▥	11	4 5 10	15						
40	◣	ML	Greenish blue silt, with sand, wet, medium dense, dilatant	▥	12	5 7 9	16						
	◣		Greenish blue sandy silt, wet, dilatant, low-plastic fines	▥	13	3 3 4	7					54	
45	◣		Olive gray silt, with fine sand, wet, very soft	▥	14	1 2 2	4						
	◣		Olive gray, silt with fine sand, trace organic fines, wet, very soft	▥	15	1 1 2	3					62	
50	◣	SP	50.0 Poorly graded fine to medium sand, wet, medium dense	⁘	16	5 10 13	23						
	◣	SW CL	52.0 Poorly graded sand, medium to coarse, sharp contact with greenish blue lean clay	⁘	17	7 8 7	15						
55	◣		53.5 Greenish blue lean clay, moist, very stiff	▨	18	4 7 13	20						
	◣	CL	Greenish blue lean clay to silt, with fine sand	▨	19	4 7 13	20						
60		ML	59.0	▥									
	◣	SP	60.0 Poorly graded sand, wet, medium dense	⁘	20	7 8 13	21						
			Boring Terminated at 61.5 ft.										7:00pm finished
65													
70													

Switched to rotary @ 15'

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-14

PROJECT: SUSD 2111 Quail Lakes Drive Project **PROJECT NO.:** 7572D
CLIENT: Stockton Unified School District
PROJECT LOCATION: 2111 Quail Lakes Drive, Stockton, CA 95207
LOCATION: Northeast Quadrant of Site **ELEVATION:**
DRILLER: V & W Drilling **LOGGED BY:** N. Garnica
DRILLING METHOD: Solid-Stem Auger **DATE:** 07/23/18
DEPTH TO - WATER> INITIAL: ▽ **AFTER DRILLING:** ▼ **CAVING>** ℂ

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
0		AC	3" AC / 7" AB	■									
1.0		CL		▨									
	■		Light brown lean clay, moist, stiff	▨	1	4 6 11	11	22.1	95.9				3.0, 3.5 TSF
5	◣		Light brown lean clay, moist, stiff	▨	2	3 5 6	11						3,024 PSF
10	■		Light brown lean clay, moist, stiff	▨	3	3 6 7	9						
			Boring Terminated at 11.5 ft.										
15													
20													
25													
30													
35													

CONDOR EARTH TECHNOLOGIES, INC.

209-234-0518

FAX 209-234-0538

LOG OF BORING
No. B-15

PROJECT: SUSD 2111 Quail Lakes Drive Project **PROJECT NO.:** 7572D

CLIENT: Stockton Unified School District

PROJECT LOCATION: 2111 Quail Lakes Drive, Stockton, CA 95207

LOCATION: Northeast Quadrant of Site **ELEVATION:**

DRILLER: V & W Drilling **LOGGED BY:** N. Garnica

DRILLING METHOD: Solid-Stem Auger **DATE:** 07/23/18

DEPTH TO - WATER> INITIAL: ⊽ **AFTER DRILLING:** ▼ **CAVING>** C

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		AC	2.5" AC / 7" AB	■									
		CL	1.0	▨									
	◩		Brown lean clay, moist, stiff	▨	1	4 6 6	12						
5	■		Brown lean clay, moist, stiff	▨	2	5 7 12	13	17.9	94.6				
10	◩		Light brown lean clay, moist, stiff	▨	3	3 4 5	9						
			Boring Terminated at 11.5 ft.										
15													
20													
25													
30													
35													

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-16

PROJECT: SUSD 2111 Quail Lakes Drive Project **PROJECT NO.:** 7572D
CLIENT: Stockton Unified School District
PROJECT LOCATION: 2111 Quail Lakes Drive, Stockton, CA 95207
LOCATION: Parking Lot - Southwest of Playground **ELEVATION:**
DRILLER: V & W Drilling **LOGGED BY:** N. Garnica
DRILLING METHOD: Solid-Stem Auger **DATE:** 07/24/18
DEPTH TO - WATER> INITIAL: ▽ 20' **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
0		AC	2" AC / 7" AB										
	◤	CL	1.0 Dark brown to black lean clay, moist, stiff		1	3 5 6	11						
5	■		Dark brown sandy lean clay, moist, very stiff		2	4 10 21	21	17.6	106.6				
10	◤	SM	10.0 Yellowish brown silty sand, moist, loose		3	3 4 4	8					22	
	◤	CL	11.5 Light brown lean clay, moist, medium stiff		4	3 3 7	10						
15	■		Yellowish orange lean clay, moist, very stiff		5	3 10 13	23						
20 ▽	◤	ML	19.5 Light brown sandy silt, moist		6	2 7 11	18						
			Boring Terminated at 21.5 ft.										
25													
30													
35													

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

LOG OF BORING
No. B-17

PROJECT: SUSD 2111 Quail Lakes Drive Project **PROJECT NO.:** 7572D
CLIENT: Stockton Unified School District
PROJECT LOCATION: 2111 Quail Lakes Drive, Stockton, CA 95207
LOCATION: Parking Lot - Northwest Quadrant of Site **ELEVATION:**
DRILLER: V & W Drilling **LOGGED BY:** N. Garnica
DRILLING METHOD: 6-Inch Solid-Stem Auger **DATE:** 07/24/18
DEPTH TO - WATER> INITIAL: ▽ **AFTER DRILLING:** ▼ **CAVING>** C

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		AC	2.5" AC / 7" AB										
1.0		CL	Light brown sandy lean clay, moist, very stiff	▨									
	■			▨	1	8 10 17	18	15.8	78.0				
5	◩		Light brown lean gray, moist, very stiff	▨	2	5 9 13	21						
10.0	■	SM	Yellowish orange silty sand, moist, medium dense	░	3	7 9 10	15						
			Boring Terminated at 11.5 ft.										
15													
20													
25													
30													
35													

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-18

PROJECT: SUSD 2111 Quail Lakes Drive Project **PROJECT NO.:** 7572D
CLIENT: Stockton Unified School District
PROJECT LOCATION: 2111 Quail Lakes Drive, Stockton, CA 95207
LOCATION: Northwest Corner of Site **ELEVATION:**
DRILLER: V & W Drilling **LOGGED BY:** N. Garnica
DRILLING METHOD: 6-Inch Solid-Stem Auger **DATE:** 07/24/18
DEPTH TO - WATER> INITIAL: ∇ **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
0		AC	2.5" AC / 6" AB										
1.0	■	CL	Dark brown lean clay, moist, stiff	▨	1	3 6 8	10		80.2	14.1			5,088 PSF
5.0	◤	ML	Yellowish brown, silt with sand, moist, low to non-plastic fines	▥	2	6 9 12	17						
10.0	■	CL	Light brown lean clay, moist, stiff	▨	3	4 5 6	11						
			Boring Terminated at 11.5 ft.										
15													
20													
25													
30													
35													

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

LOG OF BORING
No. B-19

PROJECT: SUSD 2111 Quail Lakes Drive Project **PROJECT NO.:** 7572D
CLIENT: Stockton Unified School District
PROJECT LOCATION: 2111 Quail Lakes Drive, Stockton, CA 95207
LOCATION: Northwest Corner of Site **ELEVATION:**
DRILLER: V & W Drilling **LOGGED BY:** N. Garnica
DRILLING METHOD: 6-Inch Solid-Stem Auger **DATE:** 07/23/18
DEPTH TO - WATER> INITIAL: ▽ **AFTER DRILLING:** ▼ **CAVING>** C

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		AC	2.5" AC / 6" AB	1.0									
	■	CL	Light brown lean clay, moist, stiff	▨	1	10 11 14	17	14.4	105.6				2,372 PSF
5	◣		Brown lean clay, moist, stiff	▨	2	6 9 13	22						
10	■	SP	Yellowish orange silty sand, moist, medium dense	10.0	3	4 3 4	5					2.6	
	◣		Yellowish orange silty sand, moist, loose	13.0	4	3 5 6	11						
15	◣	CL	Yellowish orange lean clay, moist, stiff	▨	5	3 5 8	13						
			Boring Terminated at 16.5 ft.										
20													
25													
30													
35													

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

KEY TO SYMBOLS

Symbol	Description
Strata symbols	
▩	Asphalt
▨	Lean clay, Lean clay with sand, Sandy lean clay
▥	Silt, Silt with sand, Sandy silt
░	Poorly graded sand, Poorly graded sand with gravel, Poorly graded sand with gravel and silt
⁞	Silty sand, Clayey sand
▒	Well graded sand
Misc. Symbols	
▽	Water table during drilling
TSF	Pocket Pentrometer Test (tons/ft^2)
PSF	Unconfined Compressive Test Shear Strength
Soil Samplers	
■	California modified sampler
◩	Standard penetration test

Notes:

1. These logs are subject to limitations, conclusions, and recommendations in this report.

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 #: 7572D
Client: SUSD
Project: Quail Lakes
Test Date: 8/6/2018
Tested by: E. Gamez

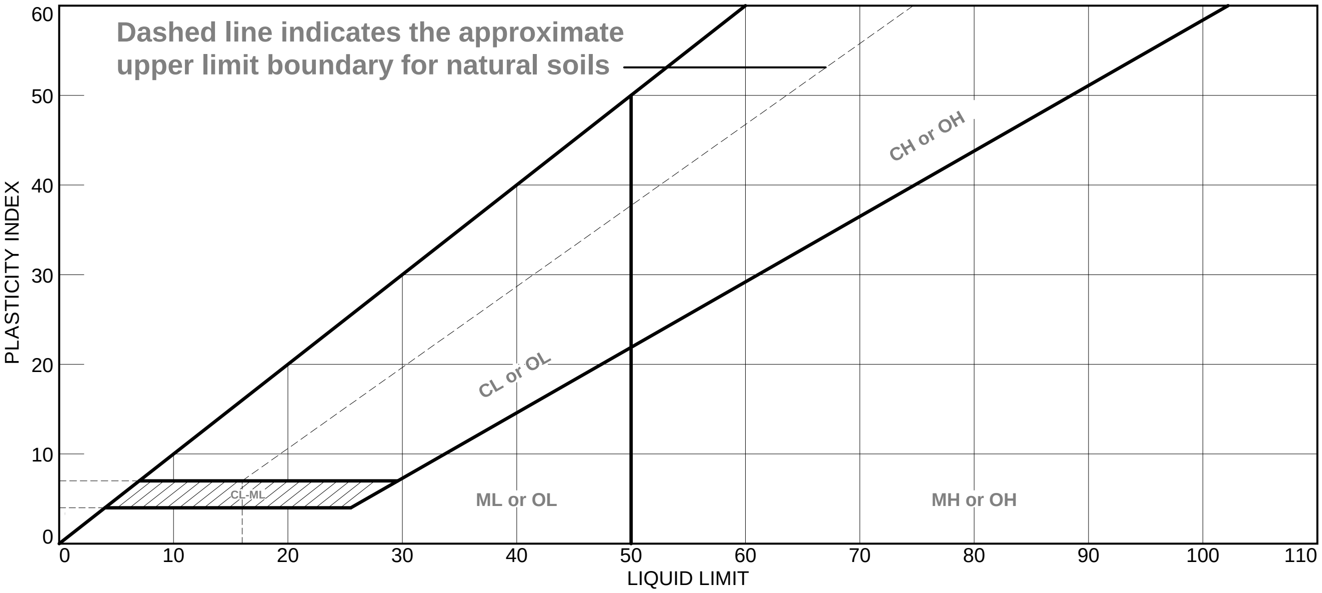
Natural Dry Density/Unit Weight

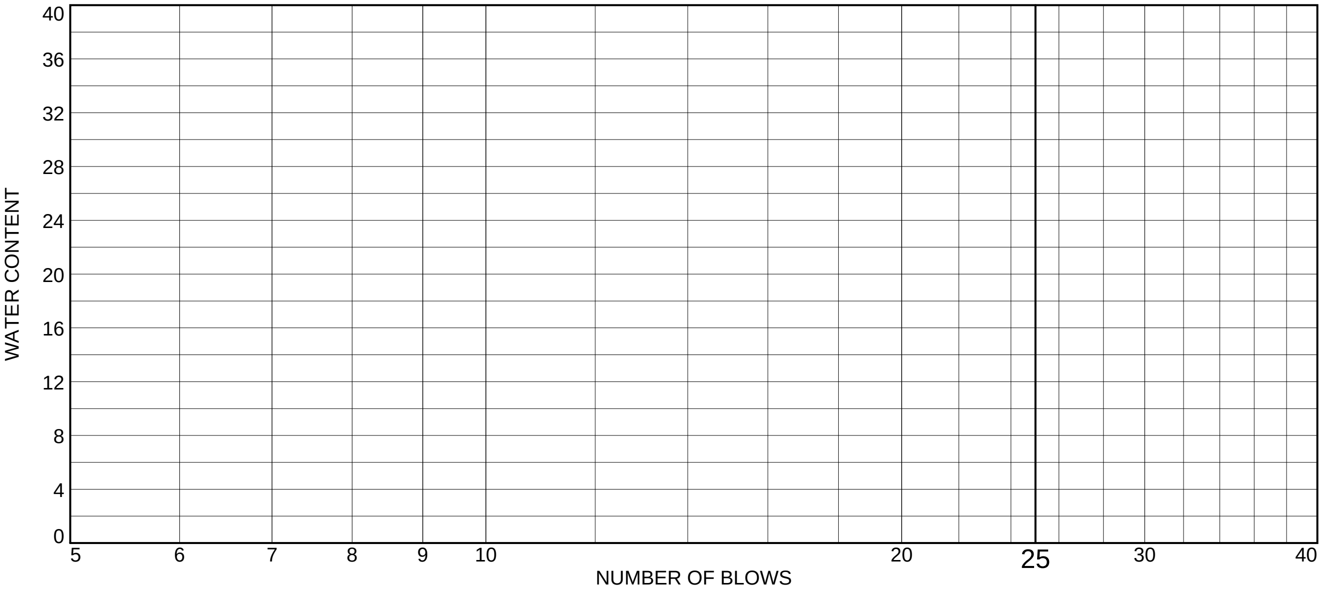
Sample #	B12-1	B13-1B	B14-1	B15-2	B16-2	B17-1	B18-1	B19-1
Date	8/6/2018	8/6/2018	8/6/2018	8/6/2018	8/6/2018	8/6/2018	8/6/2018	8/6/2018
Depth (ft)	6'	5'	3'	6'	6'	3'	3'	3'
Sleeve Diam. (in)	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5
Sleeve Area (sq in)	4.7	4.7	4.7	4.7	4.7	4.7	4.7	4.7
Sample Length (in)	6.0	5.8	6.0	5.7	5.4	5.8	6.0	6.0
Volume (cu.in)	28.2	27.1	28.2	26.7	25.4	27.4	28.2	28.2
Volume(cu ft)	0.016	0.016	0.016	0.015	0.015	0.016	0.016	0.016
Gross wt (grms)	1266.2	1281.6	1181.4	1100.2	1152.0	1050.6	989.6	1205.9
Tare wt (grms)	412.0	422.6	314.8	318.7	316.8	401.7	312.3	311.8
Soil wt (grms)	854.2	859.0	866.6	781.5	835.2	648.9	677.3	894.1
Soil wt (lbs)	1.9	1.9	1.9	1.7	1.8	1.4	1.5	2.0
Wet density (pcf)	115.4	120.9	117.1	111.5	125.4	90.4	91.5	120.8
Dry Density(pcf)	102.8	107.9	95.9	94.6	106.6	78.0	80.2	105.6

Moisture Content

Tare #	L	J	A	P	C	R	D	K
Wet wt & Tare (grms)	1266.2	1281.6	1181.4	1100.2	1152.0	1050.6	989.6	1205.9
Dry wt & Tare (grms)	1173.2	1189.6	1024.6	981.4	1027.3	962.1	906.0	1093.2
Wt of Water (grms)	93.0	92.0	156.8	118.8	124.7	88.5	83.6	112.7
Wt of Tare (grms)	412.0	422.6	314.8	318.7	316.8	401.7	312.3	311.8
Wt dry Soil (grms)	761.2	767.0	709.8	662.7	710.5	560.4	593.7	781.4
Moisture Content %	12.2	12.0	22.1	17.9	17.6	15.8	14.1	14.4

LIQUID AND PLASTIC LIMITS TEST REPORT





	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	Yellowish Brown Silt	NV	25	NP			ML

Project No. 7572A **Client:** Stockton Unified School District

Project: SUSD Geologic Hazard Preliminary Liquefaction Assessment

Location: Boring #1
Sample Number: B1 (27.5-29) **Depth:** 27.5-29'

CONDOR EARTH TECHNOLOGIES

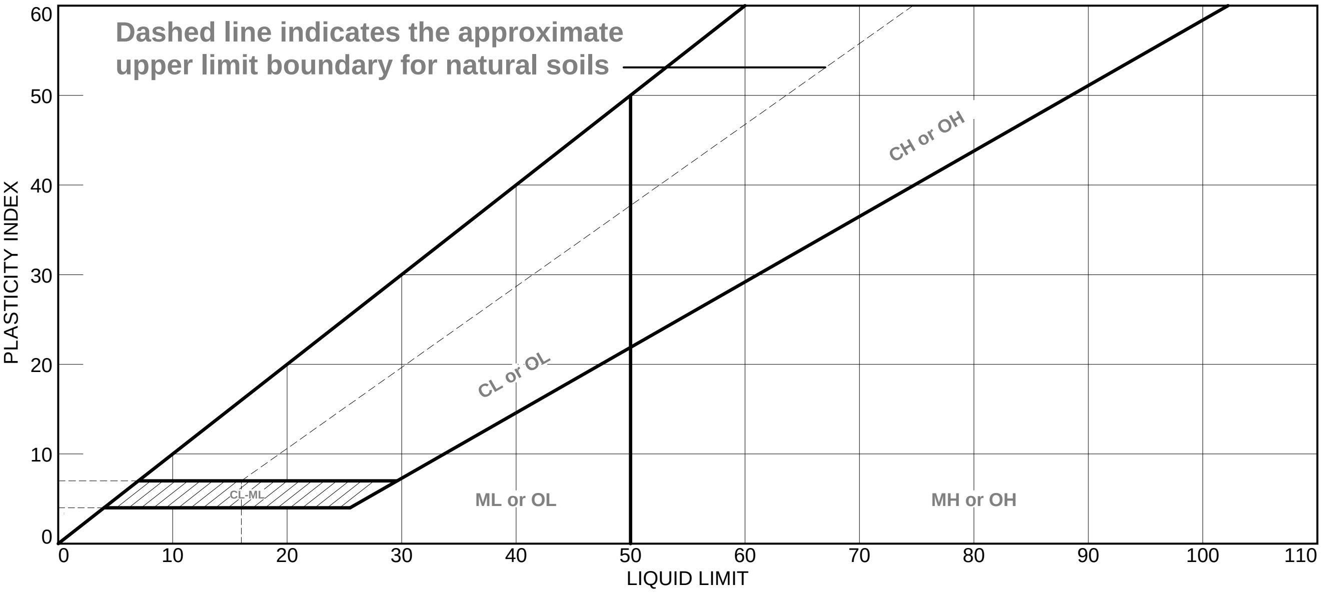
Jamestown, CA

Remarks:

Figure PI-1

Tested By: N. Garnica

LIQUID AND PLASTIC LIMITS TEST REPORT



	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	Yellowish Brown Sandy silt	NV	NP	NP			ML

Project No. 7572A **Client:** Stockton Unified School District

Project: SUSD Geologic Hazard Preliminary Liquefaction Assessment

Location: Boring #2
Sample Number: B2 (30.0-31.5) **Depth:** 30.0-31.5'

Remarks:

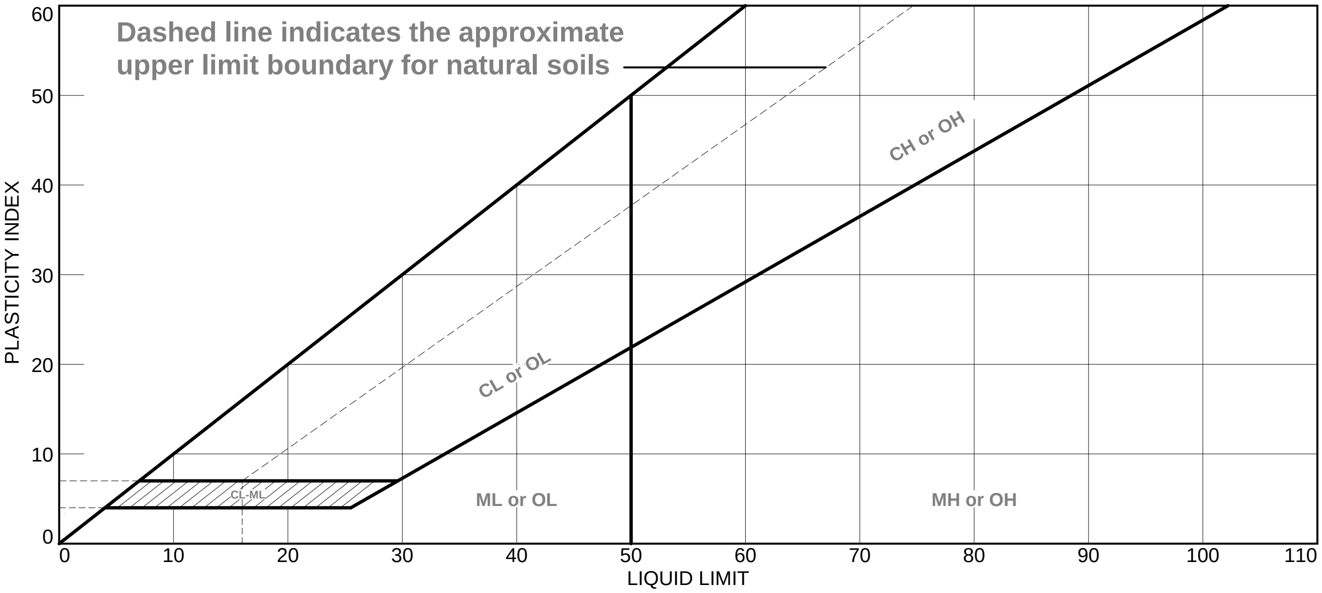
CONDOR EARTH TECHNOLOGIES

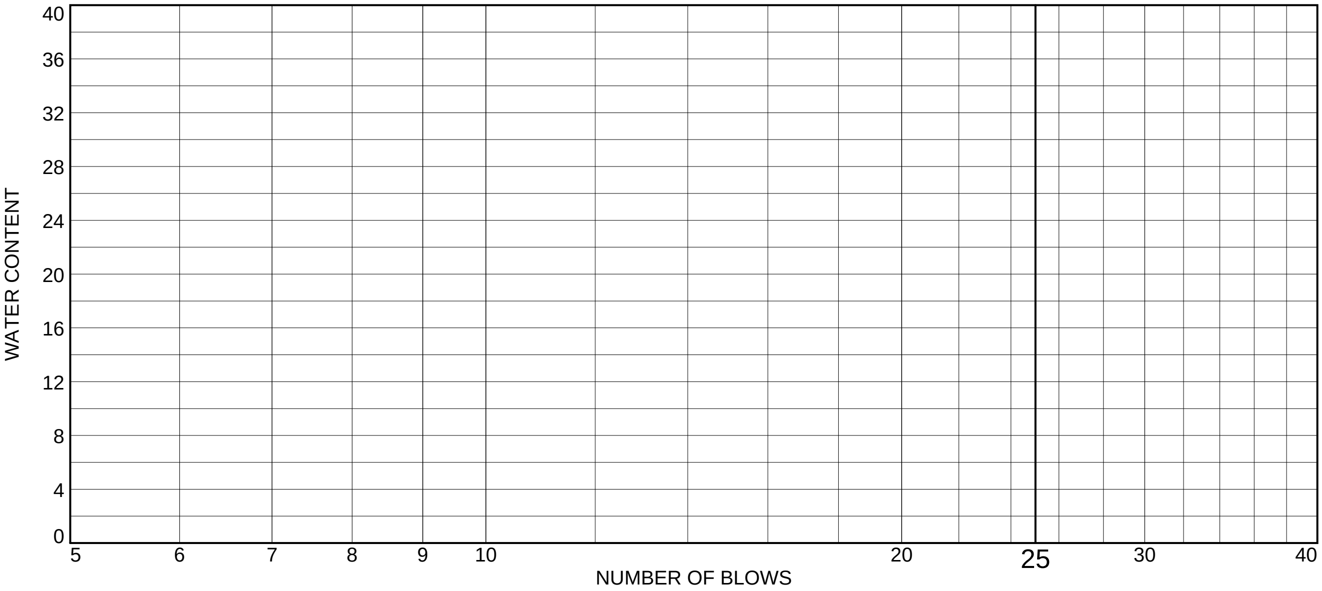
Jamestown, CA

Figure PI-2

Tested By: N. Garnica

LIQUID AND PLASTIC LIMITS TEST REPORT





	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	Yellowish Brown Sandy Silt	NV	NP	NP			ML

Project No. 7572A **Client:** Stockton Unified School District

Project: SUSD Geologic Hazard Preliminary Liquefaction Assessment

Location: Boring #4
Sample Number: B4 (27.5-29) **Depth:** 27.5-29'

CONDOR EARTH TECHNOLOGIES

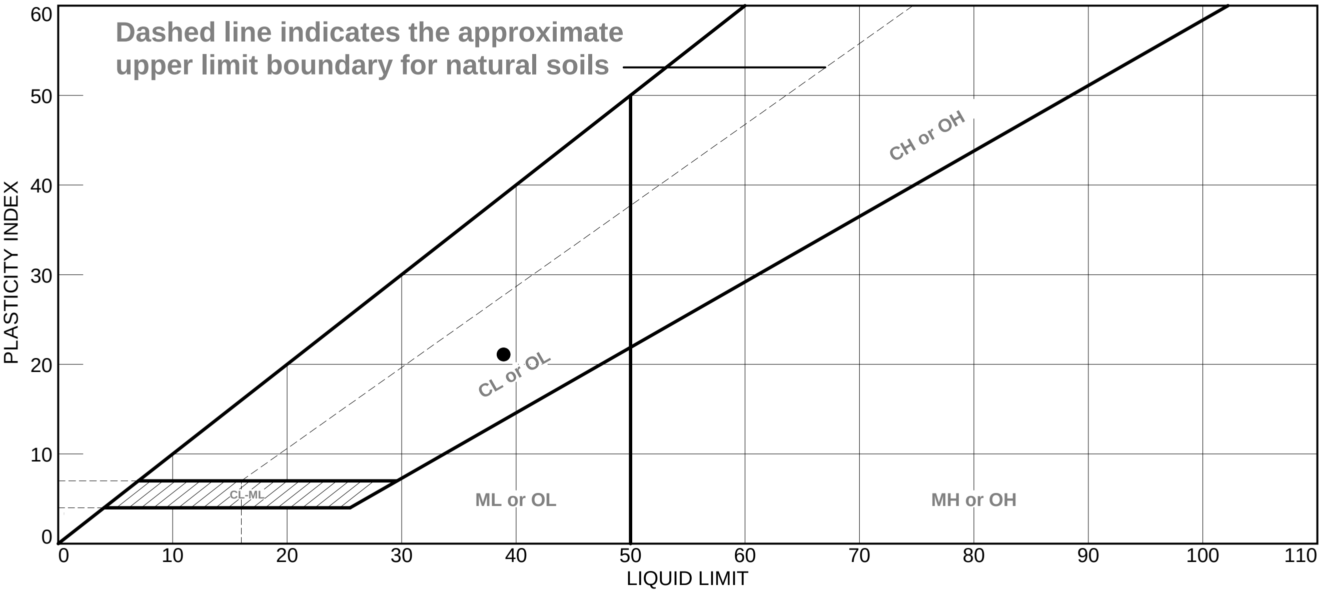
Jamestown, CA

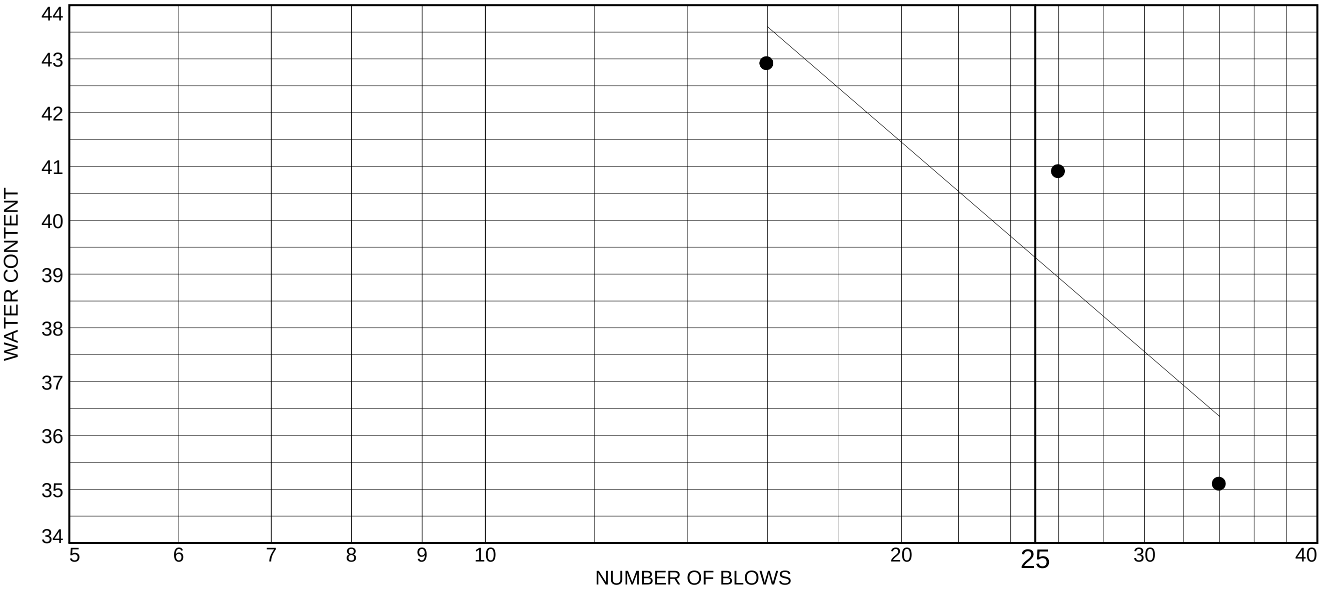
Remarks:

Figure PI-3

Tested By: N. Garnica

LIQUID AND PLASTIC LIMITS TEST REPORT





	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	Brown lean clay, moist, hard	39	18	21			CL

Project No. 7572D **Client:** Stockton Unified School District

Project: SUSD 2111 Quail Lakes Drive Project

Source of Sample: B-7 **Depth:** 5.0
Sample Number: 3

CONDOR EARTH TECHNOLOGIES INC.

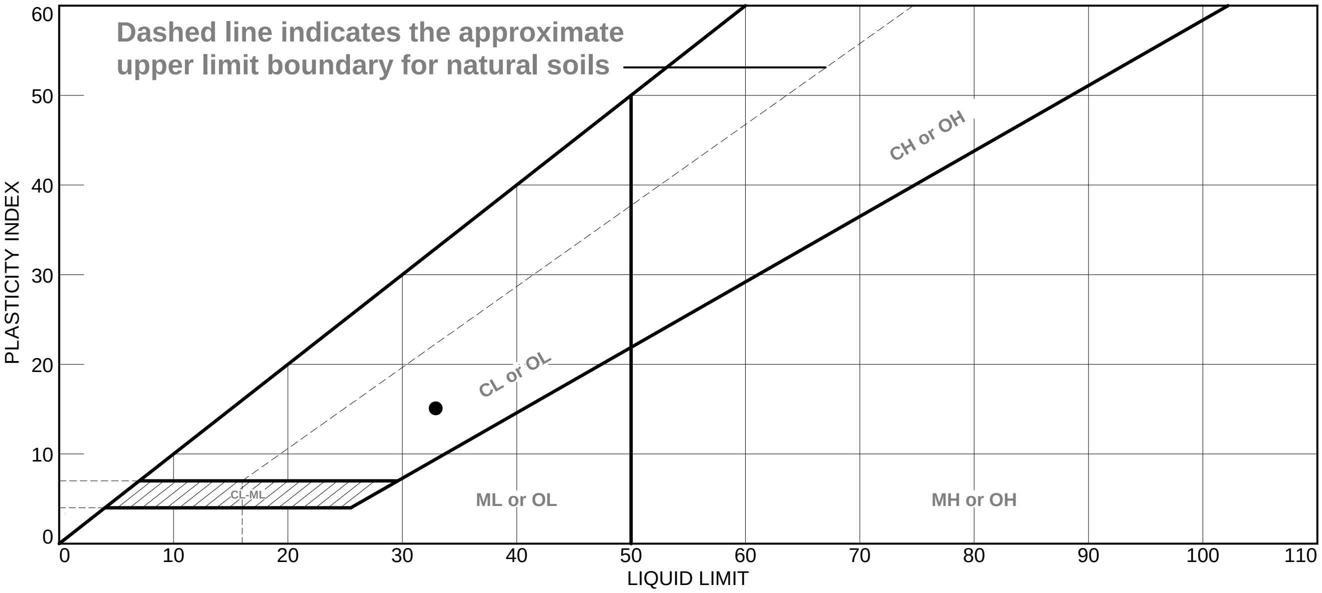
Stockton, California

Remarks:
●Sampled by N. Garnica

Figure PI-4

Tested By: N. Garnica

LIQUID AND PLASTIC LIMITS TEST REPORT



	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	Dark Gray Lean Clay	33	18	15			CL

Project No. 7572D **Client:** Stockton Unified School District

Project: SUSD 2111 Quail Lakes Drive Project

Source of Sample: B-9 **Depth:** 2.5
Sample Number: 2

CONDOR EARTH TECHNOLOGIES INC.

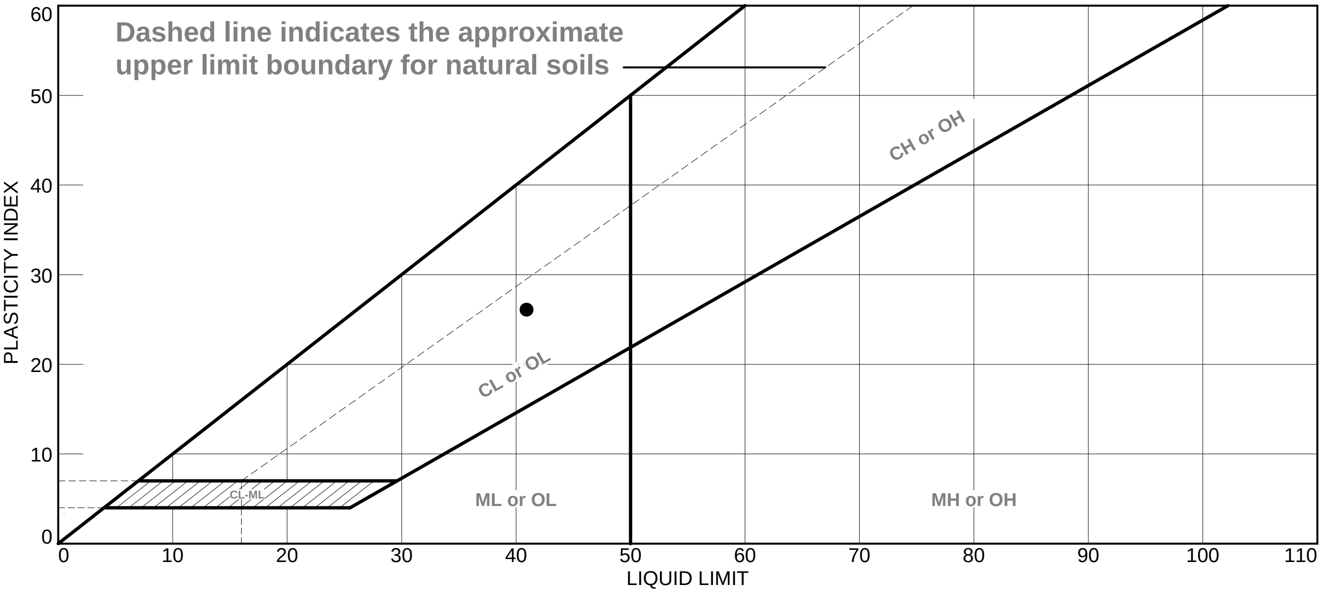
Stockton, California

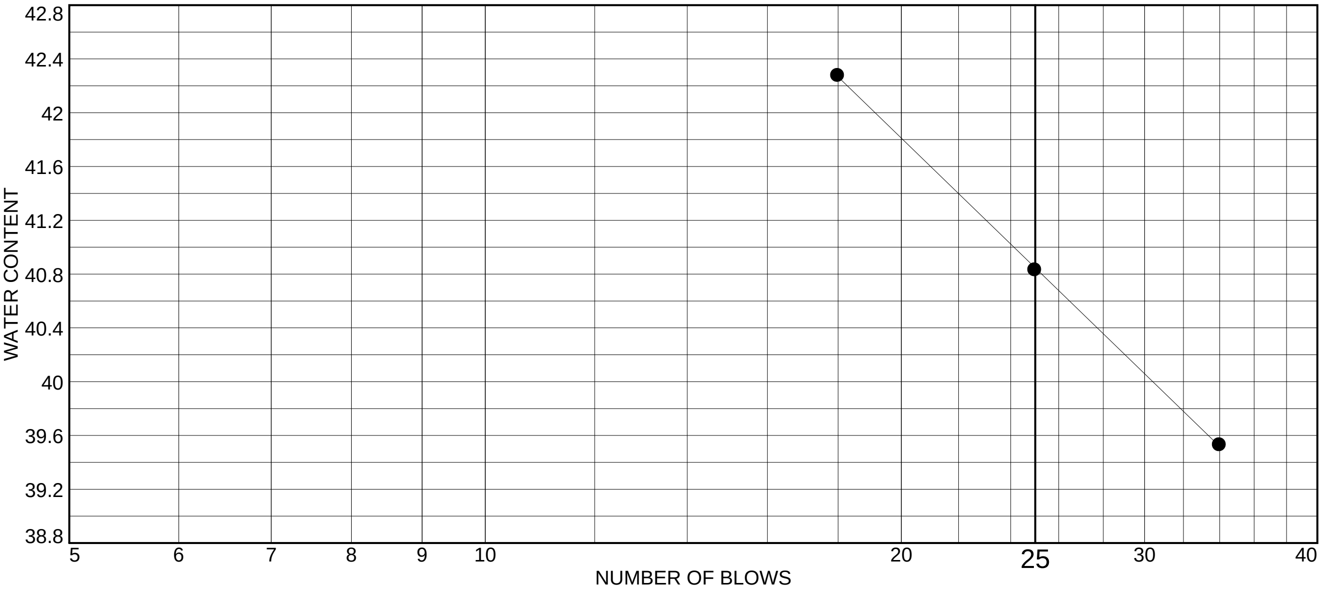
Remarks:
●Sampled by N. Garnica

Figure PI-5

Tested By: N. Garnica

LIQUID AND PLASTIC LIMITS TEST REPORT





	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	Dark Brown to Black Lean Clay	41	15	26			CL

Project No. 7572D **Client:** Stockton Unified School District

Project: SUSD 2111 Quail Lakes Drive Project

Source of Sample: B-10 **Depth:** 2.5
Sample Number: 2

CONDOR EARTH TECHNOLOGIES INC.

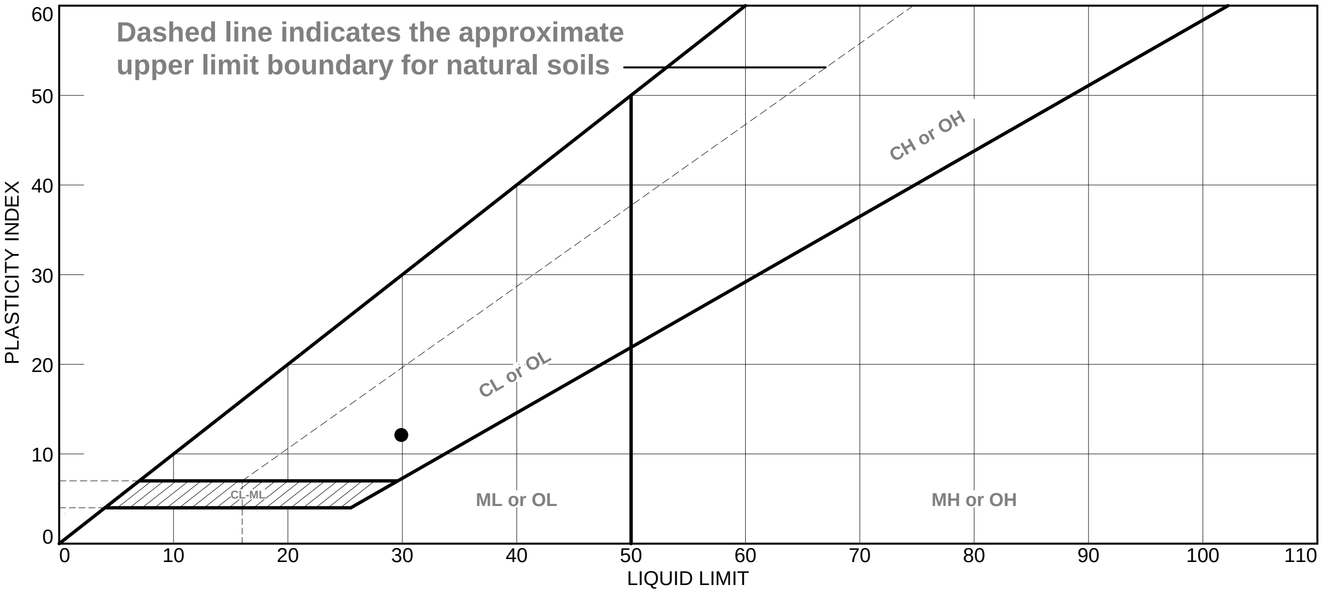
Stockton, California

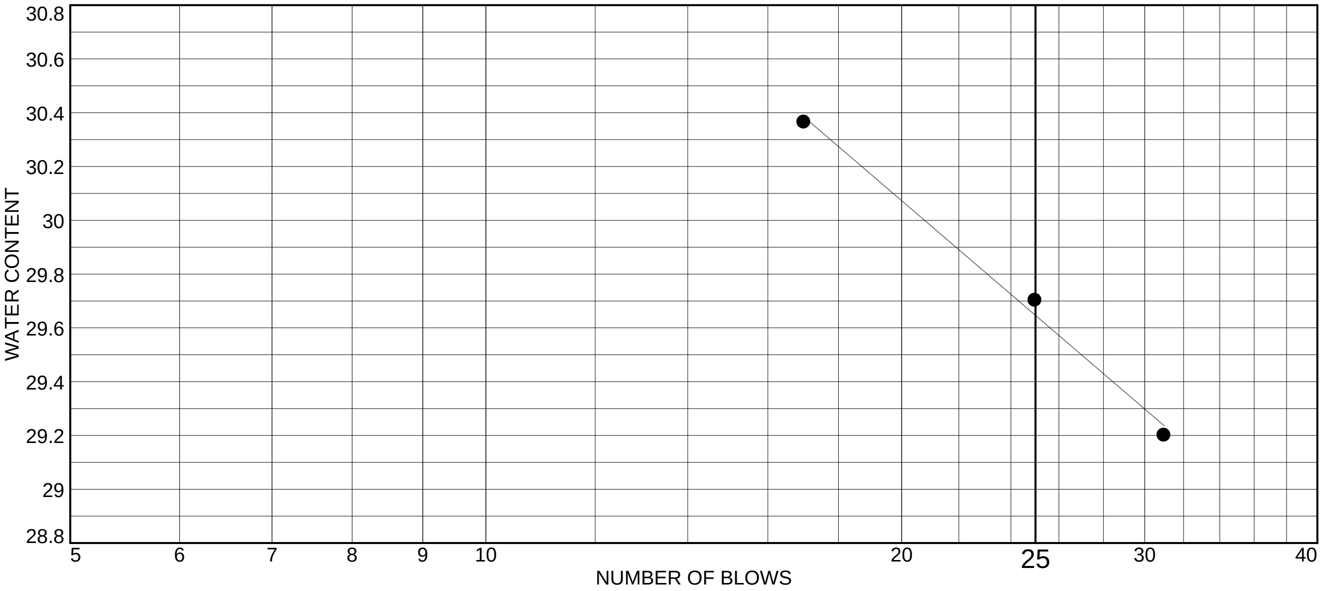
Remarks:

Figure PI-6

Tested By: N. Garnica

LIQUID AND PLASTIC LIMITS TEST REPORT





	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	Dark brown lean clay, moist	30	18	12			CL

Project No. 7572D **Client:** Stockton Unified School District

Project: SUSD 2111 Quail Lakes Drive Project

Source of Sample: B-13 **Depth:** 1.0

CONDOR EARTH TECHNOLOGIES INC.

Stockton, California

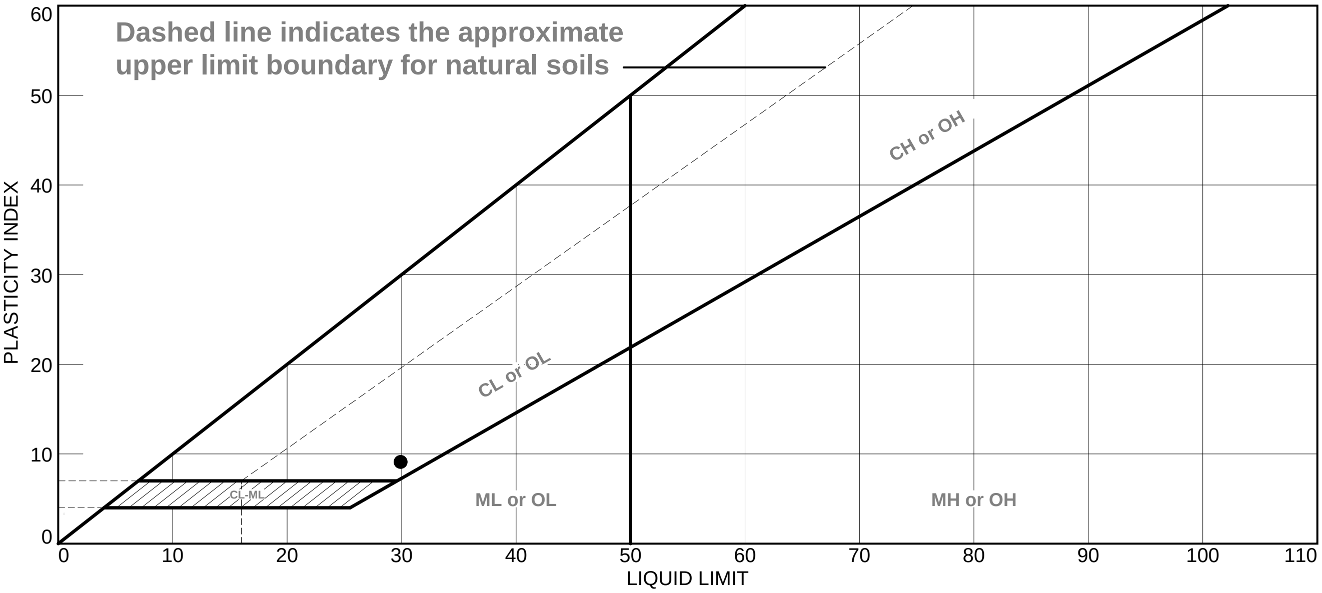
Remarks:

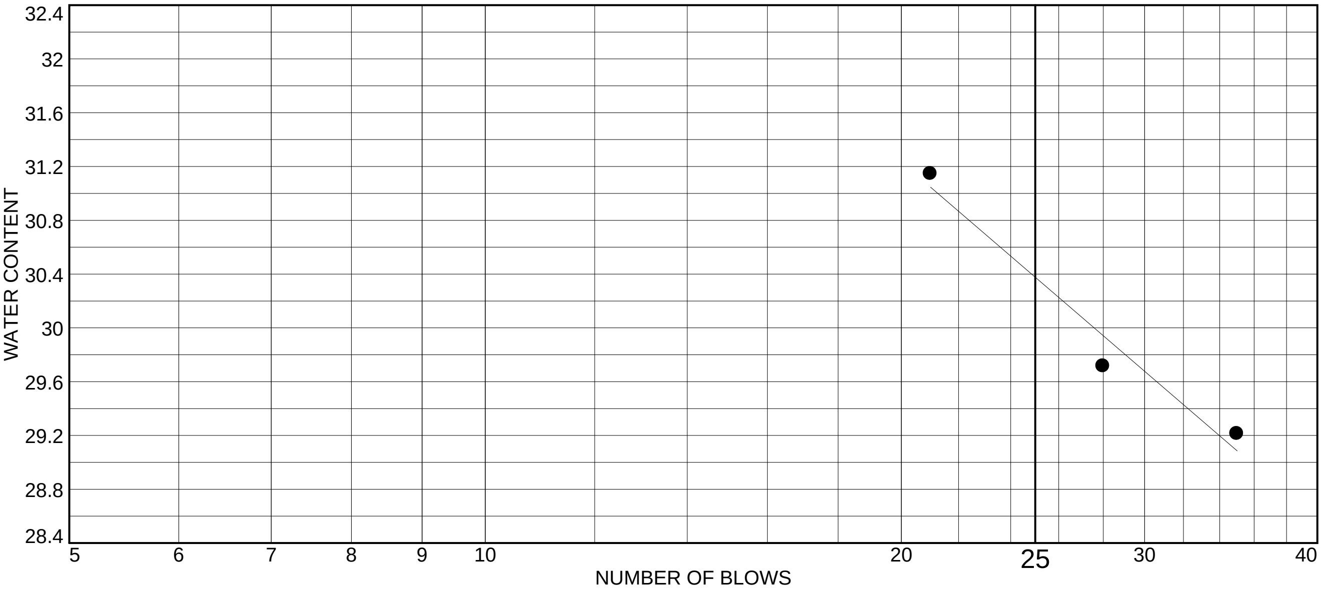
●Sampled by N. Garnica

Figure PI-7

Tested By: N. Garnica

LIQUID AND PLASTIC LIMITS TEST REPORT





	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	Light Brown Lean Clay	30	21	9			CL

Project No. 7572D **Client:** Stockton Unified School District

Project: SUSD 2111 Quail Lakes Drive Project

Source of Sample: B-13 **Depth:** 27.5
Sample Number: 7

CONDOR EARTH TECHNOLOGIES INC.

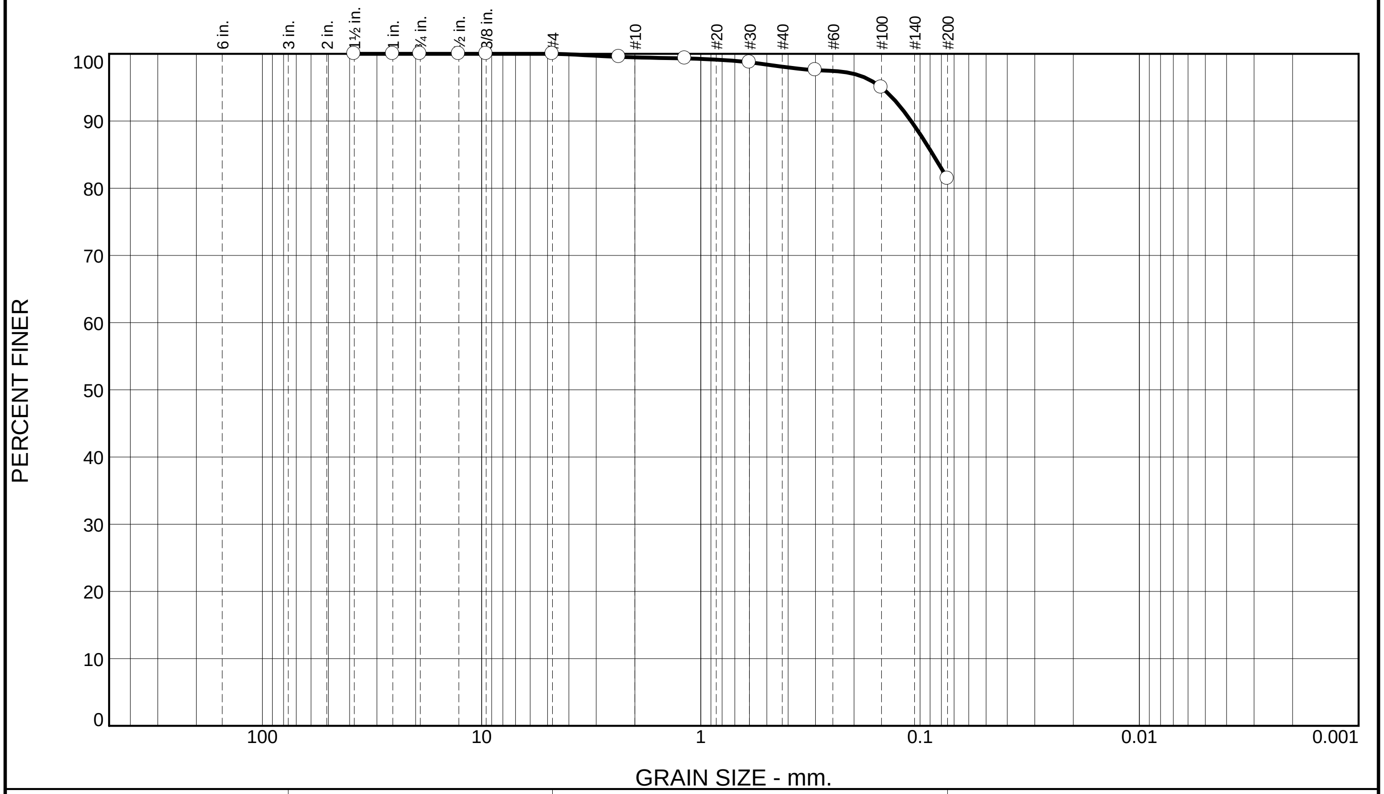
Stockton, California

Remarks:
●Sampled by N. Garnica

Figure PI-8

Tested By: N. Garnica

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.5	1.4	16.7	81.4	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
1-1/2"	100.0		
1"	100.0		
3/4"	100.0		
1/2"	100.0		
3/8"	100.0		
#4	100.0		
#8	99.5		
#16	99.3		
#30	98.7		
#50	97.6		
#100	95.0		
#200	81.4		

* (no specification provided)

Material Description

Light Brown Silt

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= 0.1099 D_{85}= 0.0873 D_{60}=

D_{50}= D_{30}= D_{15}=

D_{10}= C_u= C_c=

Classification

USCS= AASHTO=

Remarks

Sampled by Marc Crum
F.M.=0.10

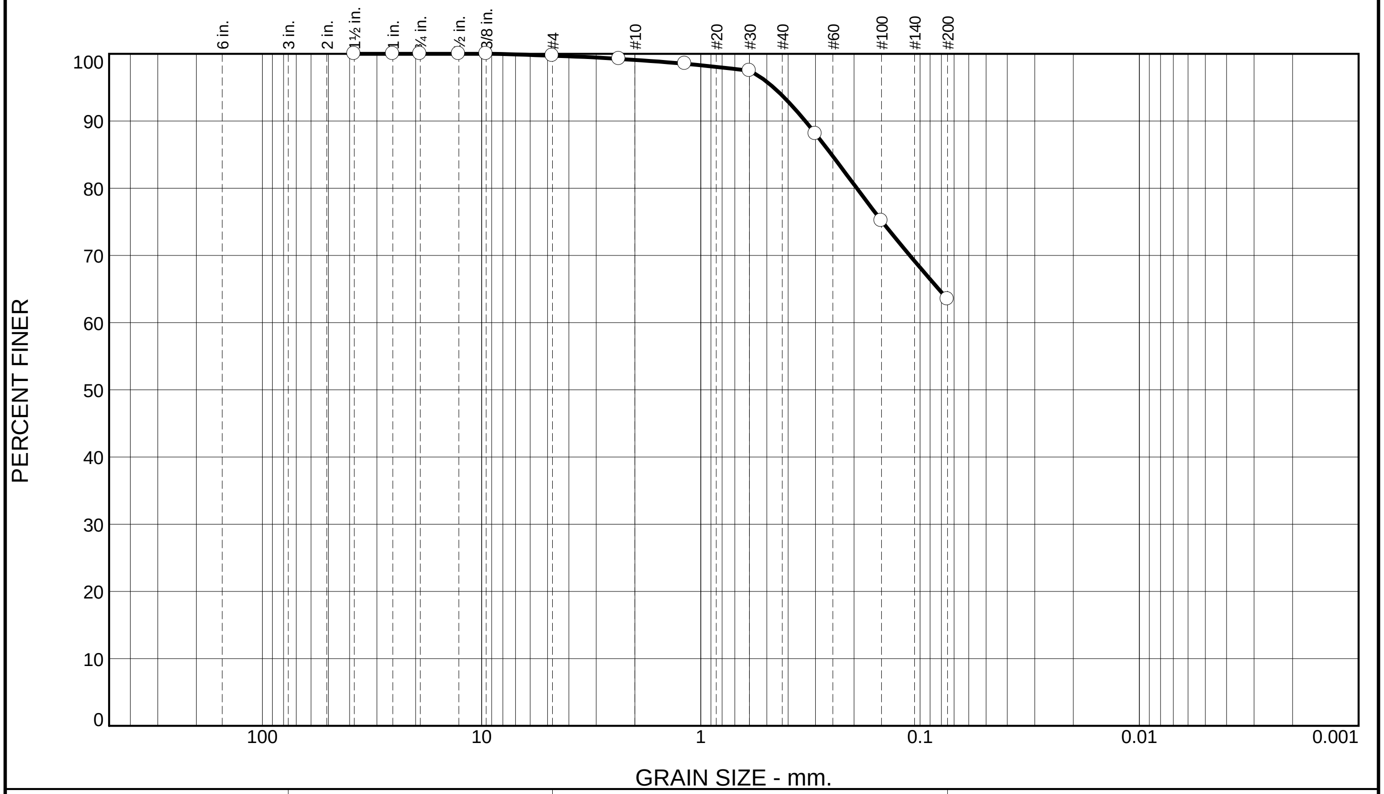
Location: Boring #1
Sample Number: B1 (25-26.5) **Depth:** 25-26.5' **Date:** 6/26/17

CONDOR
EARTH TECHNOLOGIES
Jamestown, CA

Client: Stockton Unified School District
Project: SUSD Geologic Hazard Preliminary Liquefaction Assessment
Project No: 7572A **Figure** GS-1

Tested By: N. Garnica

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.3	0.6	5.3	30.3	63.5	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
1-1/2"	100.0		
1"	100.0		
3/4"	100.0		
1/2"	100.0		
3/8"	100.0		
#4	99.7		
#8	99.2		
#16	98.5		
#30	97.5		
#50	88.1		
#100	75.2		
#200	63.5		

* (no specification provided)

Material Description

Yellowish Brown Silt with Sand

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= 0.3343 D_{85}= 0.2533 D_{60}=
D_{50}= D_{30}= D_{15}=
D_{10}= C_u= C_c=

Classification

USCS= AASHTO=

Remarks

Sampled by Marc Crum
F.M.=0.42

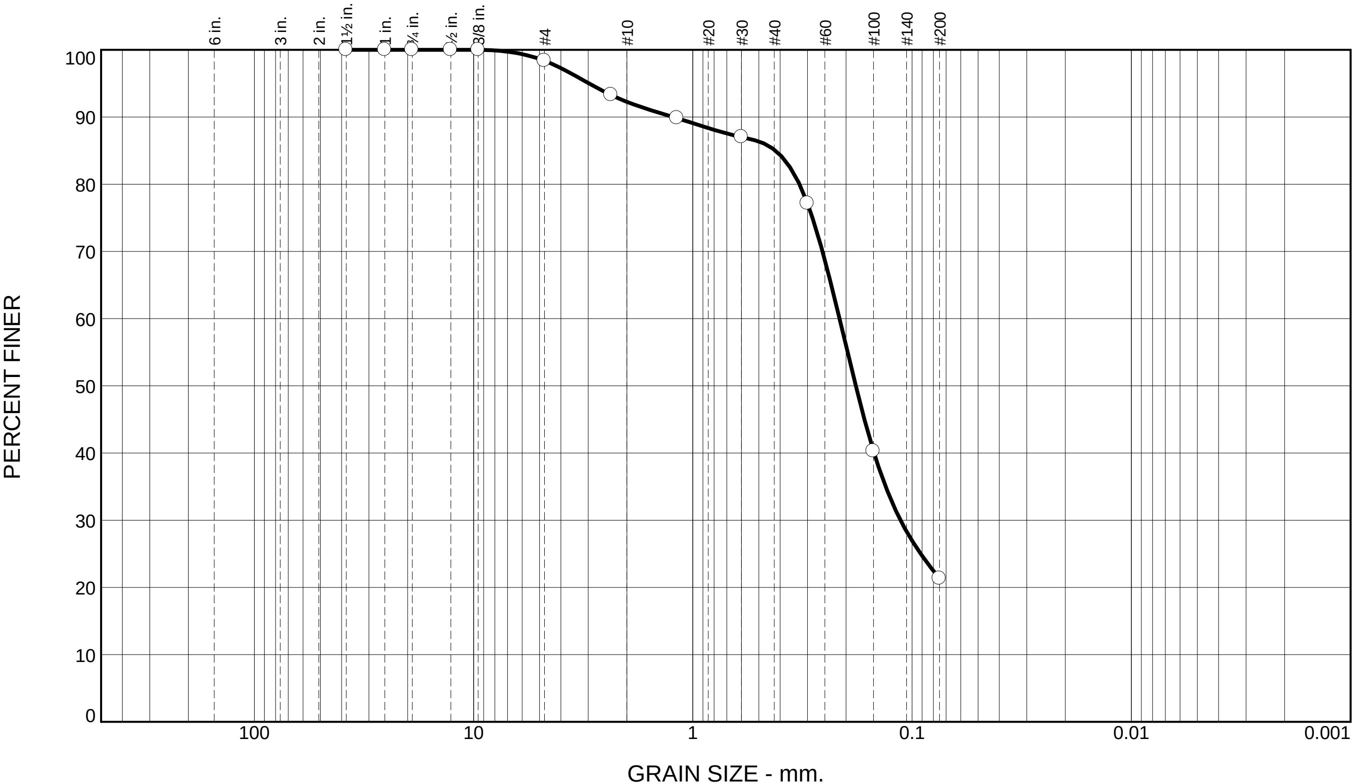
Location: Boring #1
Sample Number: B1 (32.5-34) **Depth:** 32.5-34' **Date:** 6/26/17

CONDOR
EARTH TECHNOLOGIES
Jamestown, CA

Client: Stockton Unified School District
Project: SUSD Geologic Hazard Preliminary Liquefaction Assessment
Project No: 7572A **Figure** GS-2

Tested By: N. Garnica

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	1.6	6.1	7.2	63.8	21.3	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
1-1/2"	100.0		
1"	100.0		
3/4"	100.0		
1/2"	100.0		
3/8"	100.0		
#4	98.4		
#8	93.3		
#16	89.8		
#30	87.0		
#50	77.1		
#100	40.3		
#200	21.3		

* (no specification provided)

Material Description

Yellowish Brown Silty Sand

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= 1.2305 D_{85}= 0.4202 D_{60}= 0.2142

D_{50}= 0.1805 D_{30}= 0.1130 D_{15}=

D_{10}= C_u= C_c=

Classification

USCS= AASHTO=

Remarks

Sampled by Marc Crum

F.M.=1.14

Location: Boring #1

Sample Number: B1 (37.5-39) **Depth:** 37.5-39' **Date:** 06/26/17

CONDOR
EARTH TECHNOLOGIES
Jamestown, CA

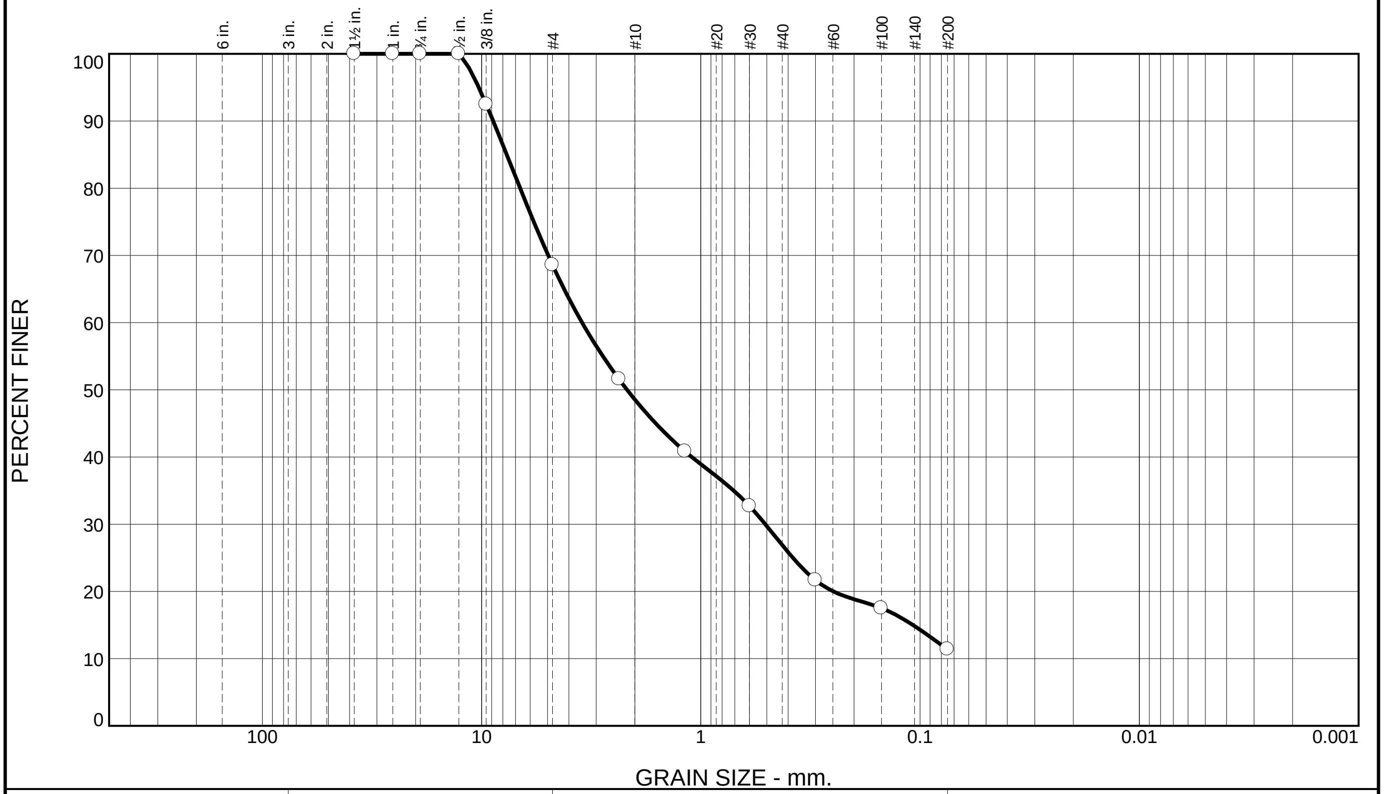
Client: Stockton Unified School District

Project: SUSD Geologic Hazard Preliminary Liquefaction Assessment

Project No: 7572A **Figure** GS-3

Tested By: N. Garnica

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	31.4	20.1	21.6	15.5	11.4	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
1.5"	100.0		
1.0"	100.0		
3/4"	100.0		
1/2"	100.0		
3/8"	92.5		
#4	68.6		
#8	51.6		
#16	40.8		
#30	32.7		
#50	21.7		
#100	17.5		
#200	11.4		

* (no specification provided)

Material Description

Brown Silty Sand w/ Gravel

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= 8.8583 D_{85}= 7.6791 D_{60}= 3.4813
D_{50}= 2.1702 D_{30}= 0.5081 D_{15}= 0.1078
D_{10}= C_u= C_c=

Classification

USCS= AASHTO=

Remarks

Sampled By Marc Crum
F.M.=3.75

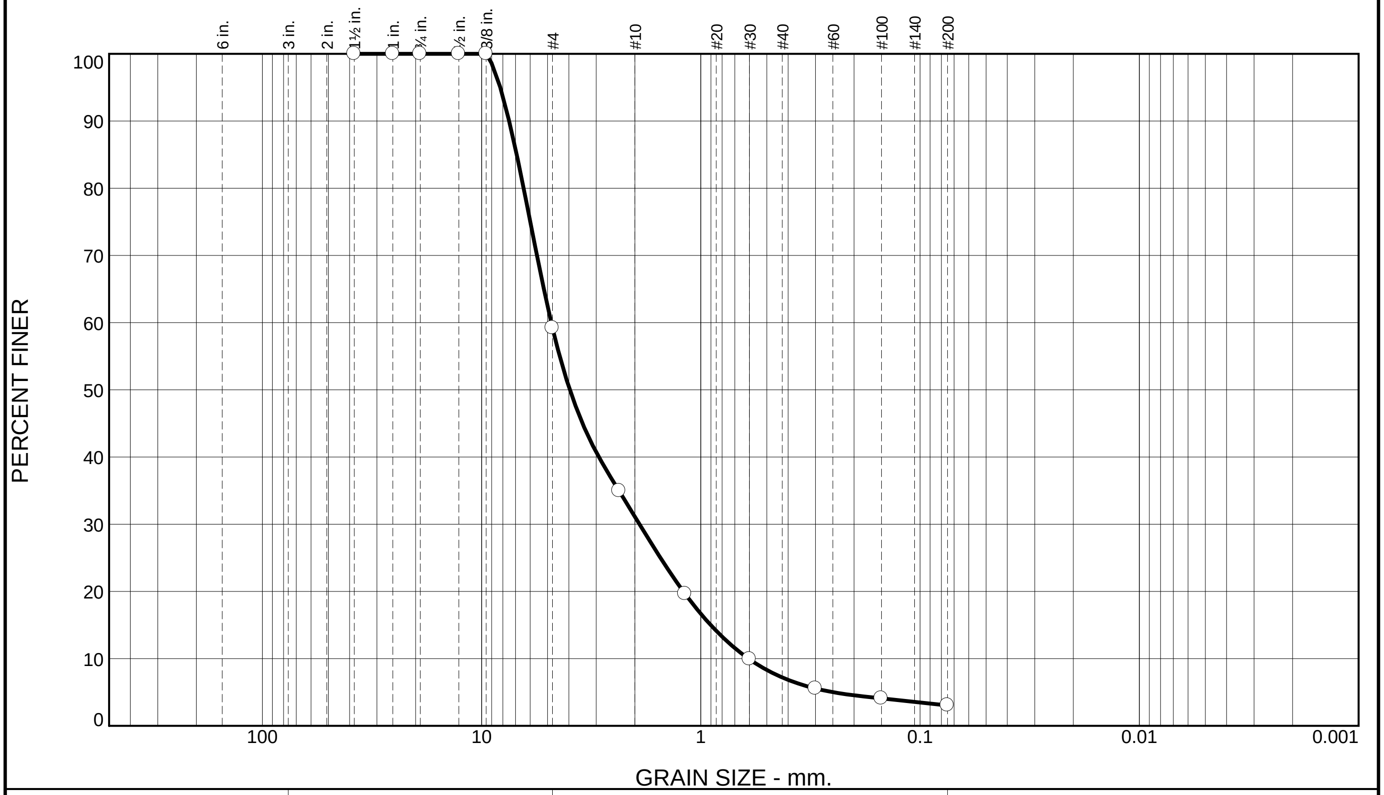
Location: Boring #2
Sample Number: B2 (32.5-34) **Depth:** 32.5-34' **Date:** 06/26/17

CONDOR
EARTH TECHNOLOGIES
Jamestown, CA

Client: Stockton Unified School District
Project: SUSD Geologic Hazard Preliminary Liquefaction Assessment
Project No: 7572A **Figure** GS-4

Tested By: N. Garnica

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	40.8	28.1	23.9	4.2	3.0	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
1.5"	100.0		
1.0"	100.0		
3/4"	100.0		
1/2"	100.0		
3/8"	100.0		
#4	59.2		
#8	35.0		
#16	19.6		
#30	9.9		
#50	5.6		
#100	4.1		
#200	3.0		

* (no specification provided)

Material Description

Brown Silty Sand w/ Gravel

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= 7.4864	D_{85}= 6.9165	D_{60}= 4.8128
D_{50}= 3.9585	D_{30}= 1.9049	D_{15}= 0.9014
D_{10}= 0.6059	C_u= 7.94	C_c= 1.24

Classification

USCS= SW AASHTO=

Remarks

Sampled By Marc Crum
F.M.=4.67

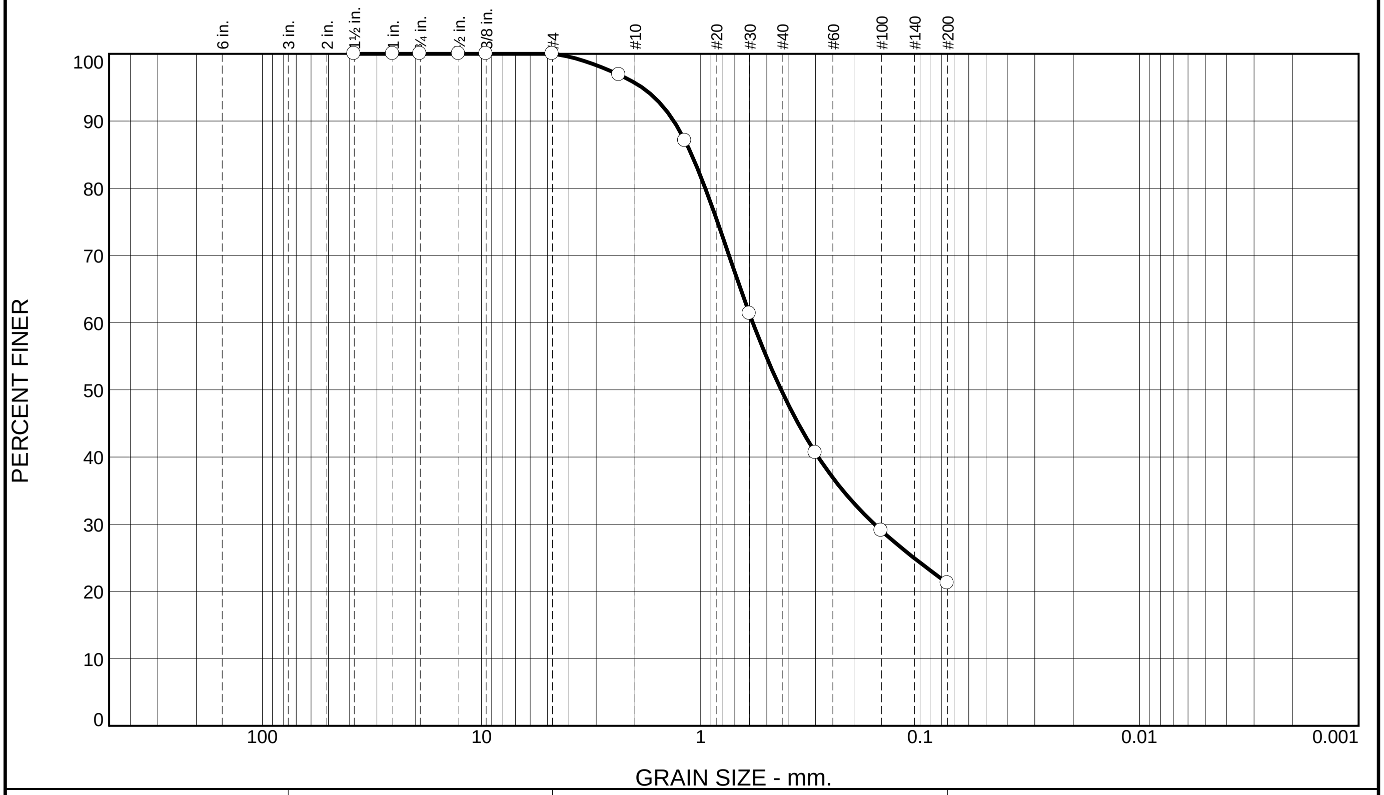
Location: Boring #2
Sample Number: B2 (37.5-39) **Depth:** 37.5-39' **Date:** 06/26/17

CONDOR
EARTH TECHNOLOGIES
Jamestown, CA

Client: Stockton Unified School District
Project: SUSD Geologic Hazard Preliminary Liquefaction Assessment
Project No: 7572A **Figure** GS-5

Tested By: N. Garnica

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	4.3	46.1	28.4	21.2	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
1.5"	100.0		
1.0"	100.0		
3/4"	100.0		
1/2"	100.0		
3/8"	100.0		
#4	100.0		
#8	96.9		
#16	87.0		
#30	61.3		
#50	40.6		
#100	29.0		
#200	21.2		

* (no specification provided)

Material Description

Well Graded Sand w/ Silty Clay

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= 1.3297 D_{85}= 1.1021 D_{60}= 0.5793
D_{50}= 0.4304 D_{30}= 0.1614 D_{15}=
D_{10}= C_u= C_c=

Classification

USCS= AASHTO=

Remarks

Sampled by Marc Crum
F.M.=1.85

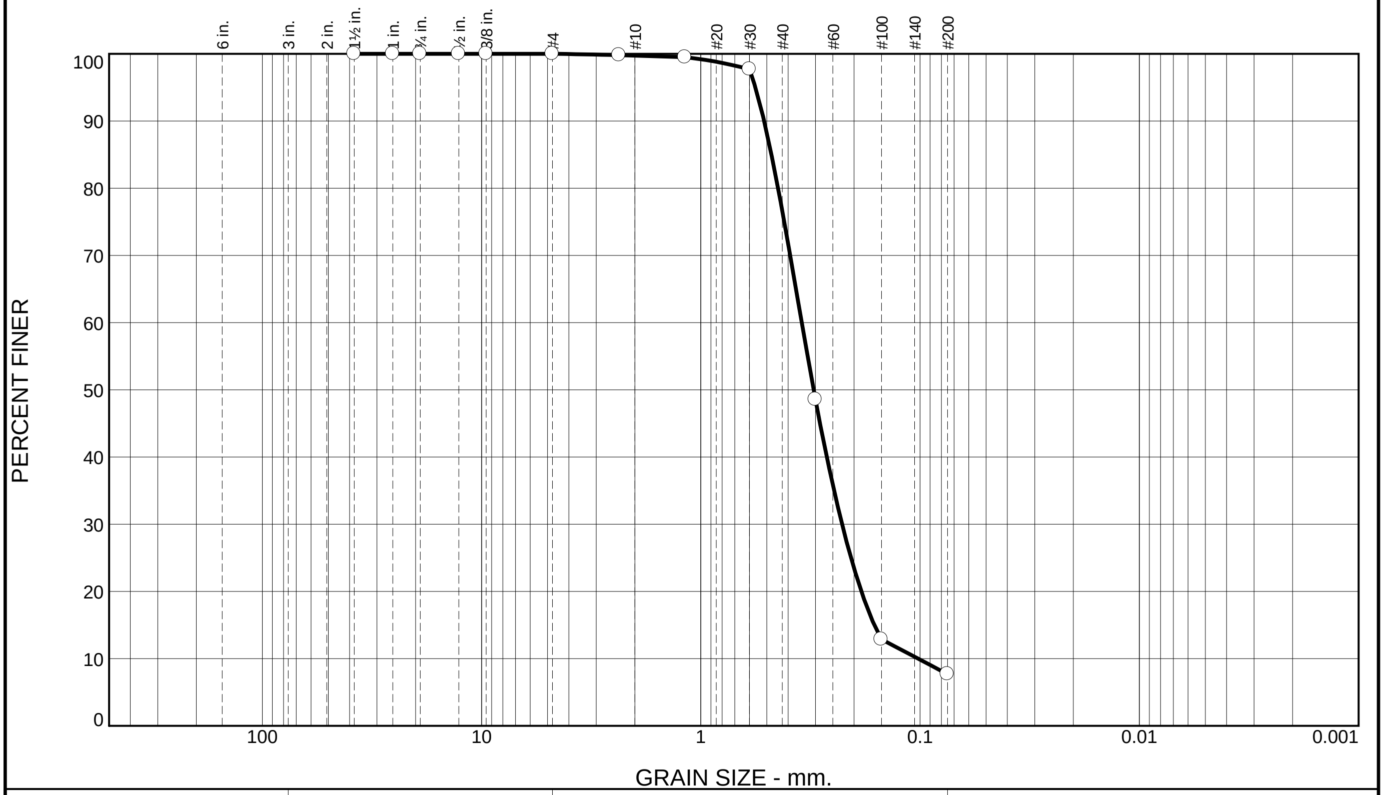
Location: Boring #2
Sample Number: B2 (42.5-44) **Depth:** 42.5-44' **Date:** 06/26/17

CONDOR
EARTH TECHNOLOGIES
Jamestown, CA

Client: Stockton Unified School District
Project: SUSD Geologic Hazard Preliminary Liquefaction Assessment
Project No: 7572A **Figure** GS-6

Tested By: N. Garnica

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.3	23.1	68.9	7.7	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
1.5"	100.0		
1.0"	100.0		
3/4"	100.0		
1/2"	100.0		
3/8"	100.0		
#4	100.0		
#8	99.8		
#16	99.5		
#30	97.7		
#50	48.5		
#100	12.9		
#200	7.7		

* (no specification provided)

Material Description

Brown Poorly Graded Sand

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= 0.5143 D_{85}= 0.4763 D_{60}= 0.3465
D_{50}= 0.3058 D_{30}= 0.2269 D_{15}= 0.1617
D_{10}= 0.1021 C_u= 3.39 C_c= 1.45

Classification

USCS= AASHTO=

Remarks

Sampled by Marc Crum
F.M.=1.42

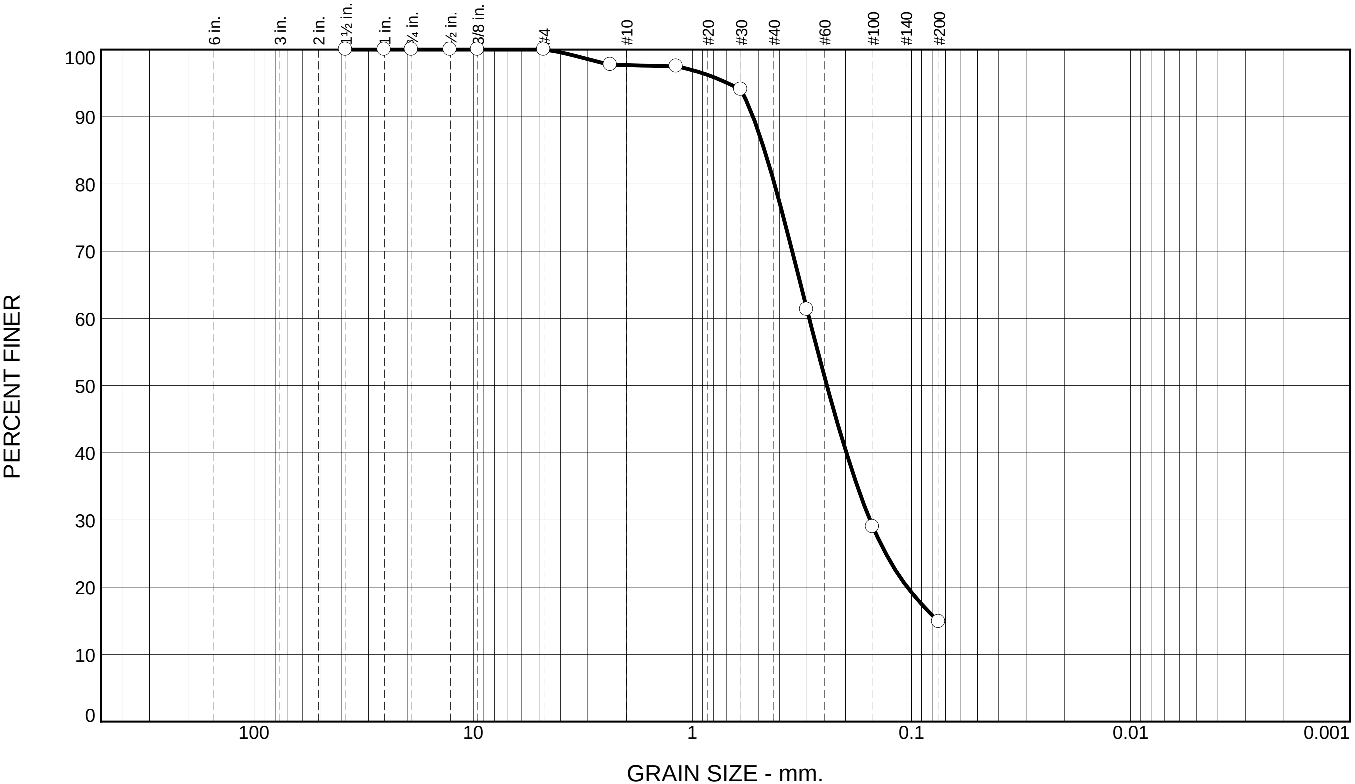
Location: Boring #2
Sample Number: B2 (45-46.5) **Depth:** 45-46.5' **Date:** 06/26/17

CONDOR
EARTH TECHNOLOGIES
Jamestown, CA

Client: Stockton Unified School District
Project: SUSD Geologic Hazard Preliminary Liquefaction Assessment
Project No: 7572A **Figure** GS-7

Tested By: N. Garnicd

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	2.3	17.4	65.5	14.8	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
1-1/2"	100.0		
1"	100.0		
3/4"	100.0		
1/2"	100.0		
3/8"	100.0		
#4	100.0		
#8	97.7		
#16	97.5		
#30	94.0		
#50	61.3		
#100	29.0		
#200	14.8		

* (no specification provided)

Material Description

Brown Sandy Silt

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= 0.5284 D_{85}= 0.4683 D_{60}= 0.2930

D_{50}= 0.2433 D_{30}= 0.1546 D_{15}= 0.0759

D_{10}= C_u= C_c=

Classification

USCS= AASHTO=

Remarks

Sampled by Marc Crum
F.M.=1.20

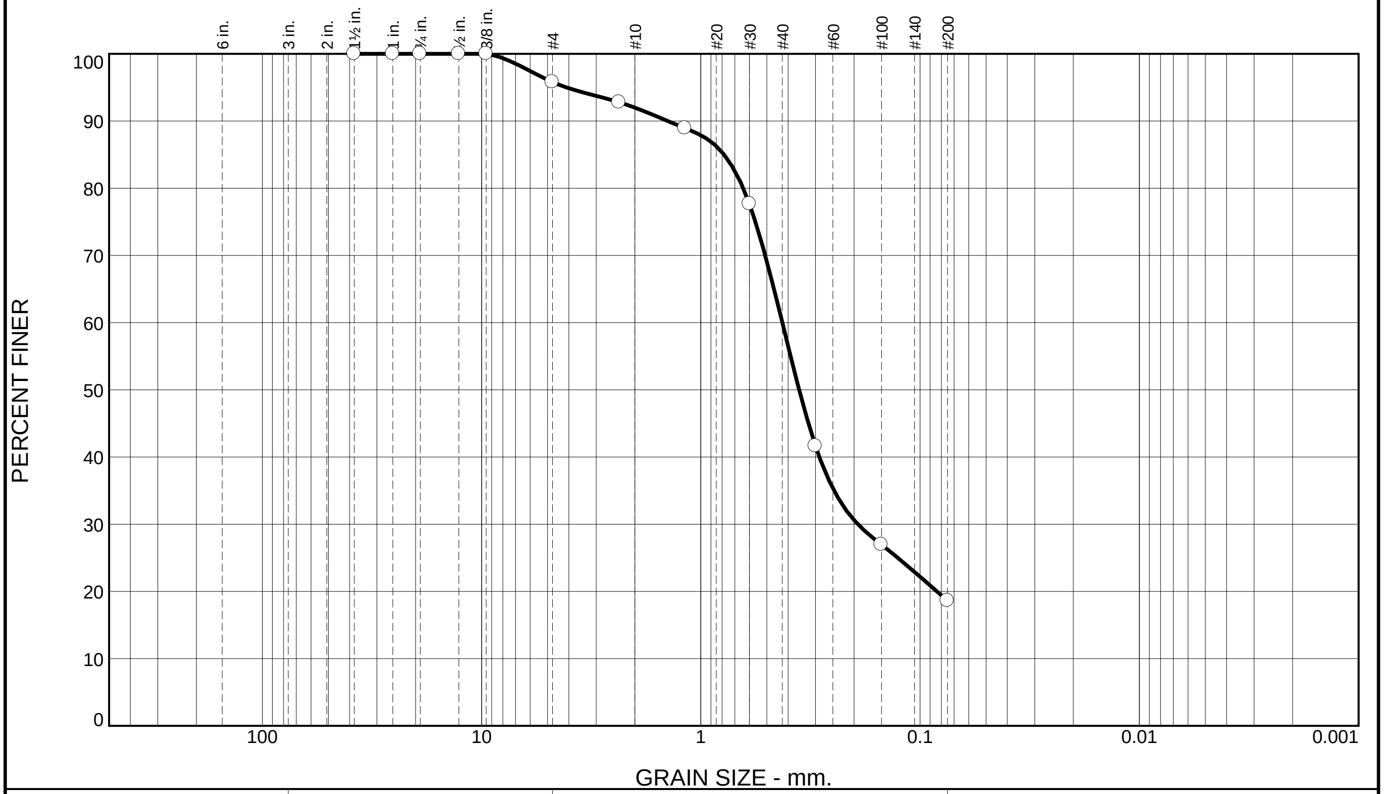
Location: Boring #3
Sample Number: B3 (30-31.5) **Depth:** 30-31.5' **Date:** 06/27/17

CONDOR
EARTH TECHNOLOGIES
Jamestown, CA

Client: Stockton Unified School District
Project: SUSD Geologic Hazard Preliminary Liquefaction Assessment
Project No: 7572A **Figure** GS-8

Tested By: N. Garnica

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	4.2	3.8	32.0	41.4	18.6	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
1-1/2"	100.0		
1"	100.0		
3/4"	100.0		
1/2"	100.0		
3/8"	100.0		
#4	95.8		
#8	92.8		
#16	88.9		
#30	77.6		
#50	41.6		
#100	27.0		
#200	18.6		

* (no specification provided)

Material Description

Yellowish Brown, Silty Clayey Sand

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= 1.4166 D_{85}= 0.7837 D_{60}= 0.4251
D_{50}= 0.3561 D_{30}= 0.1923 D_{15}=
D_{10}= C_u= C_c=

Classification

USCS= AASHTO=

Remarks

Sampled by Marc Crum
F.M.=1.76

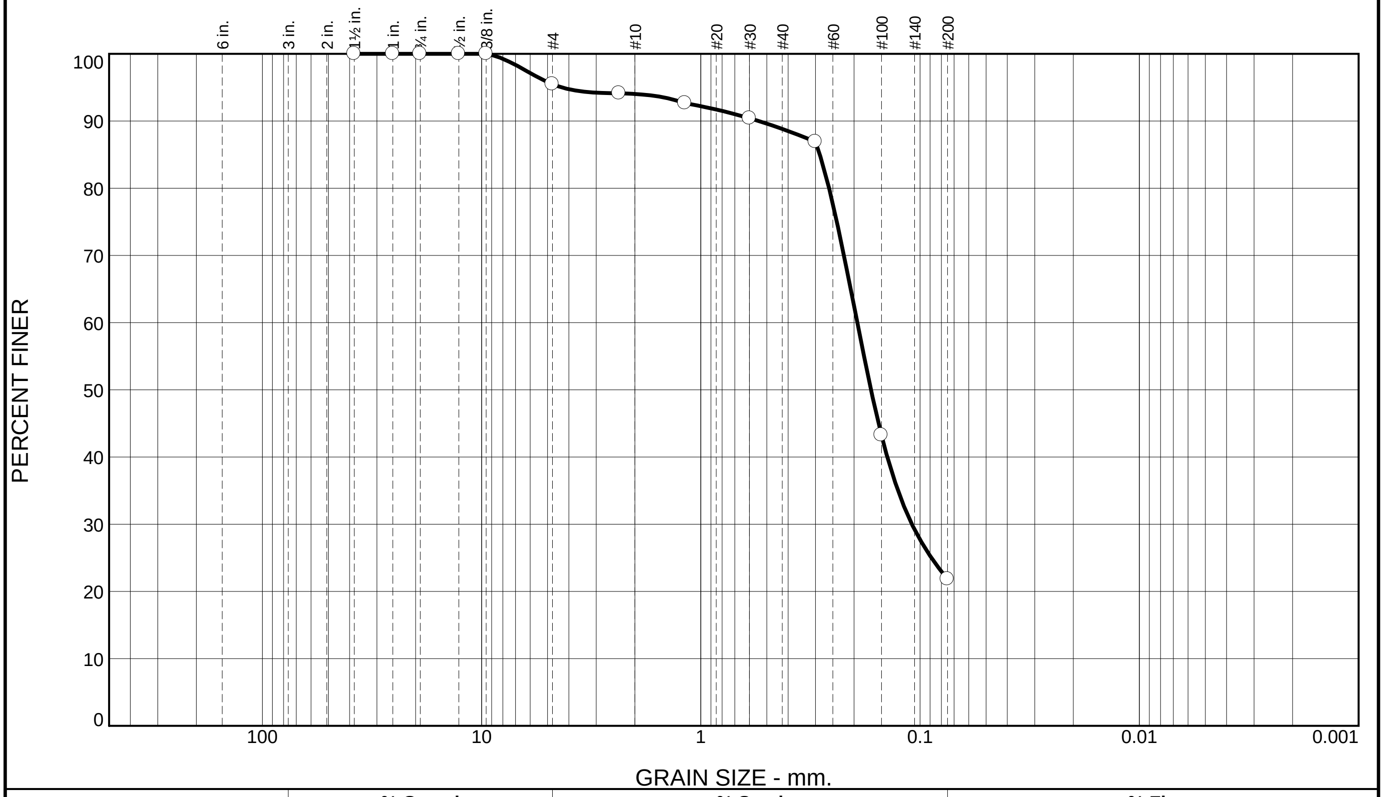
Location: Boring #3
Sample Number: B3 (32.5-34) **Depth:** 32.5-34' **Date:** 06/27/17

CONDOR
EARTH TECHNOLOGIES
Jamestown, CA

Client: Stockton Unified School District
Project: SUSD Geologic Hazard Preliminary Liquefaction Assessment
Project No: 7572A **Figure** GS-9

Tested By: N. Garnica

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	4.5	1.5	5.2	67.0	21.8	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
1-1/2"	100.0		
1"	100.0		
3/4"	100.0		
1/2"	100.0		
3/8"	100.0		
#4	95.5		
#8	94.1		
#16	92.6		
#30	90.4		
#50	86.9		
#100	43.2		
#200	21.8		

* (no specification provided)

Material Description

Tan Silty Sand

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= 0.5461 D_{85}= 0.2866 D_{60}= 0.1933
D_{50}= 0.1674 D_{30}= 0.1090 D_{15}=
D_{10}= C_u= C_c=

Classification

USCS= AASHTO=

Remarks

Sampled by Marc Crum
F.M.=0.97

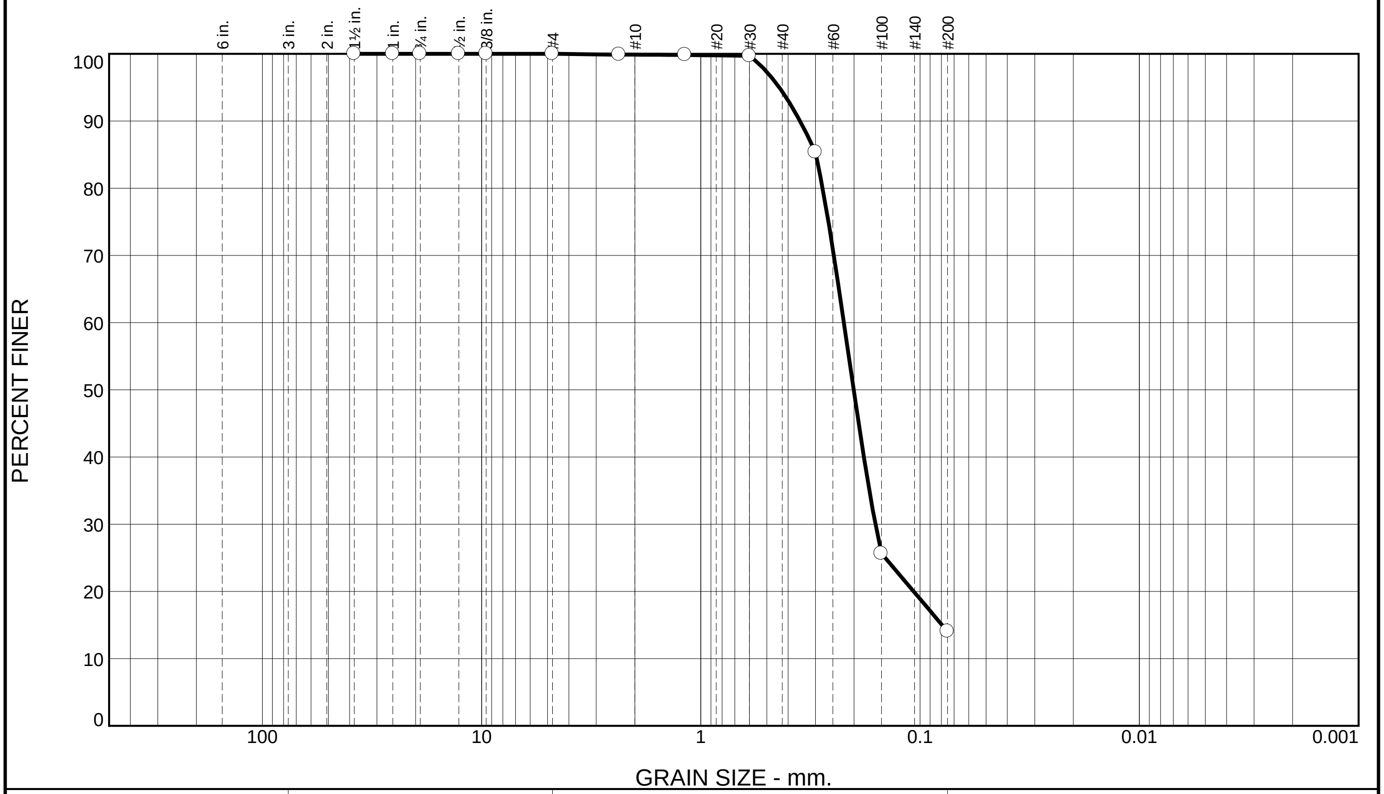
Location: Boring #3
Sample Number: B3 (42.5-44) **Depth:** 42.5-44' **Date:** 06/27/17

CONDOR
EARTH TECHNOLOGIES
Jamestown, CA

Client: Stockton Unified School District
Project: SUSD Geologic Hazard Preliminary Liquefaction Assessment
Project No: 7572A **Figure** GS-10

Tested By: N. Garnica

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.1	5.6	80.3	14.0	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
1-1/2"	100.0		
1"	100.0		
3/4"	100.0		
1/2"	100.0		
3/8"	100.0		
#4	100.0		
#8	99.9		
#16	99.8		
#30	99.7		
#50	85.3		
#100	25.6		
#200	14.0		

* (no specification provided)

Material Description

Gray Silty Sand

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= 0.3530 D_{85}= 0.2984 D_{60}= 0.2226
D_{50}= 0.2008 D_{30}= 0.1598 D_{15}= 0.0794
D_{10}= C_u= C_c=

Classification

USCS= AASHTO=

Remarks

Sampled by Marc Crum
F.M.=0.90

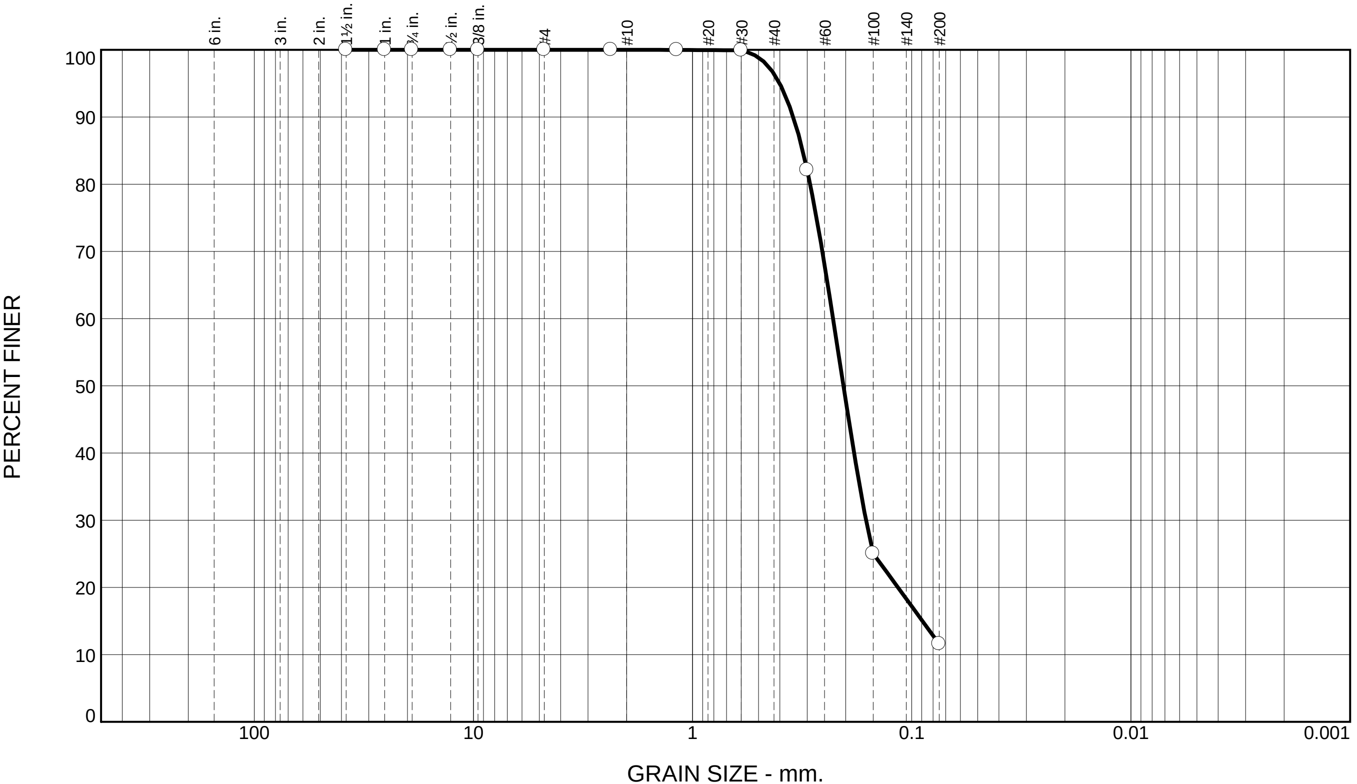
Location: Boring #3
Sample Number: B3 (47.5-49) **Depth:** 47.5-49' **Date:** 06/27/17

**CONDOR
EARTH TECHNOLOGIES
Jamestown, CA**

Client: Stockton Unified School District
Project: SUSD Geologic Hazard Preliminary Liquefaction Assessment
Project No: 7572A **Figure** GS-11

Tested By: N. Garnica

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.0	3.6	84.8	11.6	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
1-1/2"	100.0		
1"	100.0		
3/4"	100.0		
1/2"	100.0		
3/8"	100.0		
#4	100.0		
#8	100.0		
#16	100.0		
#30	99.9		
#50	82.1		
#100	25.0		
#200	11.6		

* (no specification provided)

Material Description

Yellowish Brown Silty Sand

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= 0.3473 D_{85}= 0.3145 D_{60}= 0.2286
D_{50}= 0.2050 D_{30}= 0.1616 D_{15}= 0.0894
D_{10}= C_u= C_c=

Classification

USCS= AASHTO=

Remarks

Sampled by Marc Crum
F.M.=0.93

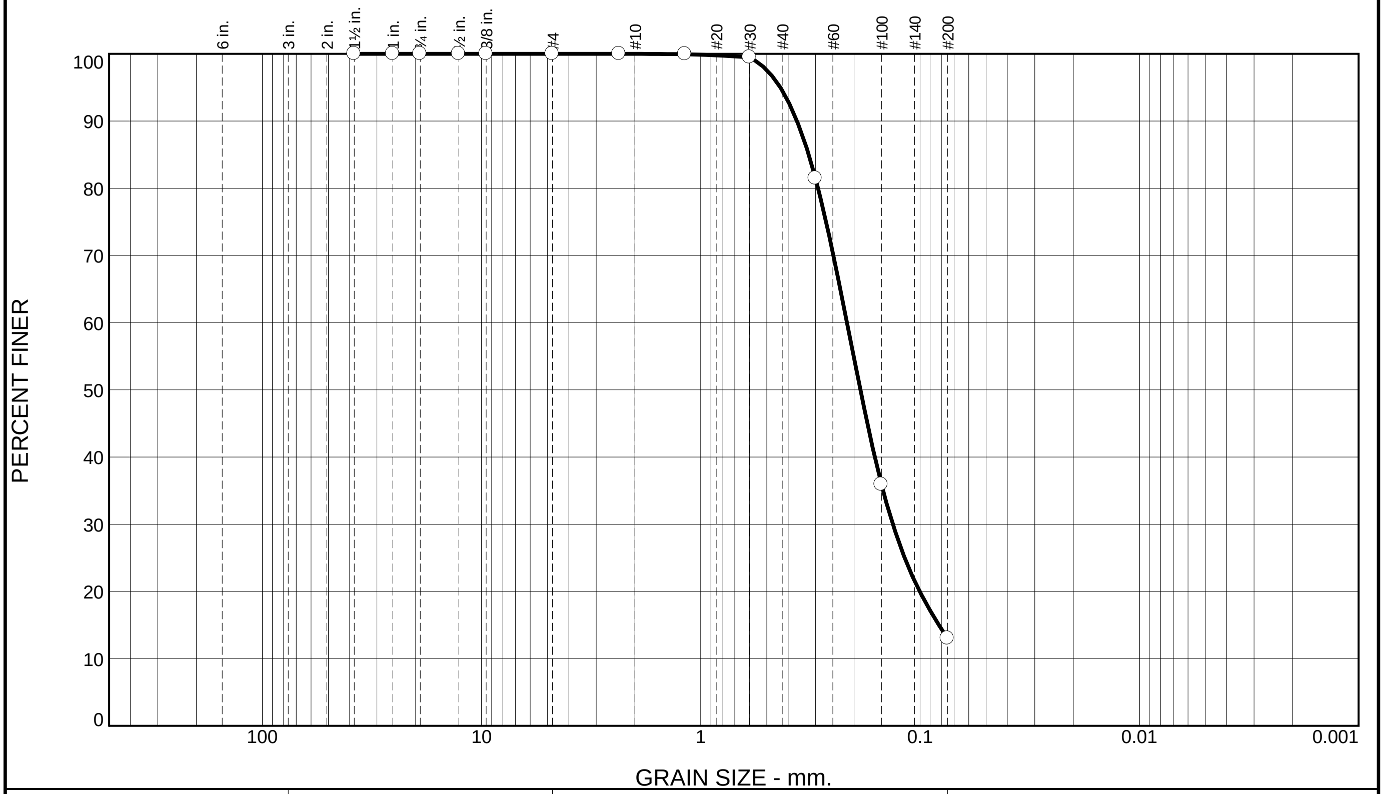
Location: Boring #4
Sample Number: B4 (30-31.5) **Depth:** 30.0-31.5' **Date:** 06/27/17

CONDOR
EARTH TECHNOLOGIES
Jamestown, CA

Client: Stockton Unified School District
Project: SUSD Geologic Hazard Preliminary Liquefaction Assessment
Project No: 7572A **Figure** GS-12

Tested By: N. Garnica

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.0	5.5	81.5	13.0	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
1-1/2"	100.0		
1"	100.0		
3/4"	100.0		
1/2"	100.0		
3/8"	100.0		
#4	100.0		
#8	100.0		
#16	99.9		
#30	99.5		
#50	81.5		
#100	35.9		
#200	13.0		

* (no specification provided)

Material Description

Tan Poorly Graded Sand with Silt

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= 0.3643 D_{85}= 0.3221 D_{60}= 0.2155
D_{50}= 0.1872 D_{30}= 0.1332 D_{15}= 0.0820
D_{10}= C_u= C_c=

Classification

USCS= AASHTO=

Remarks

Sampled by Marc Crum
F.M.=0.83

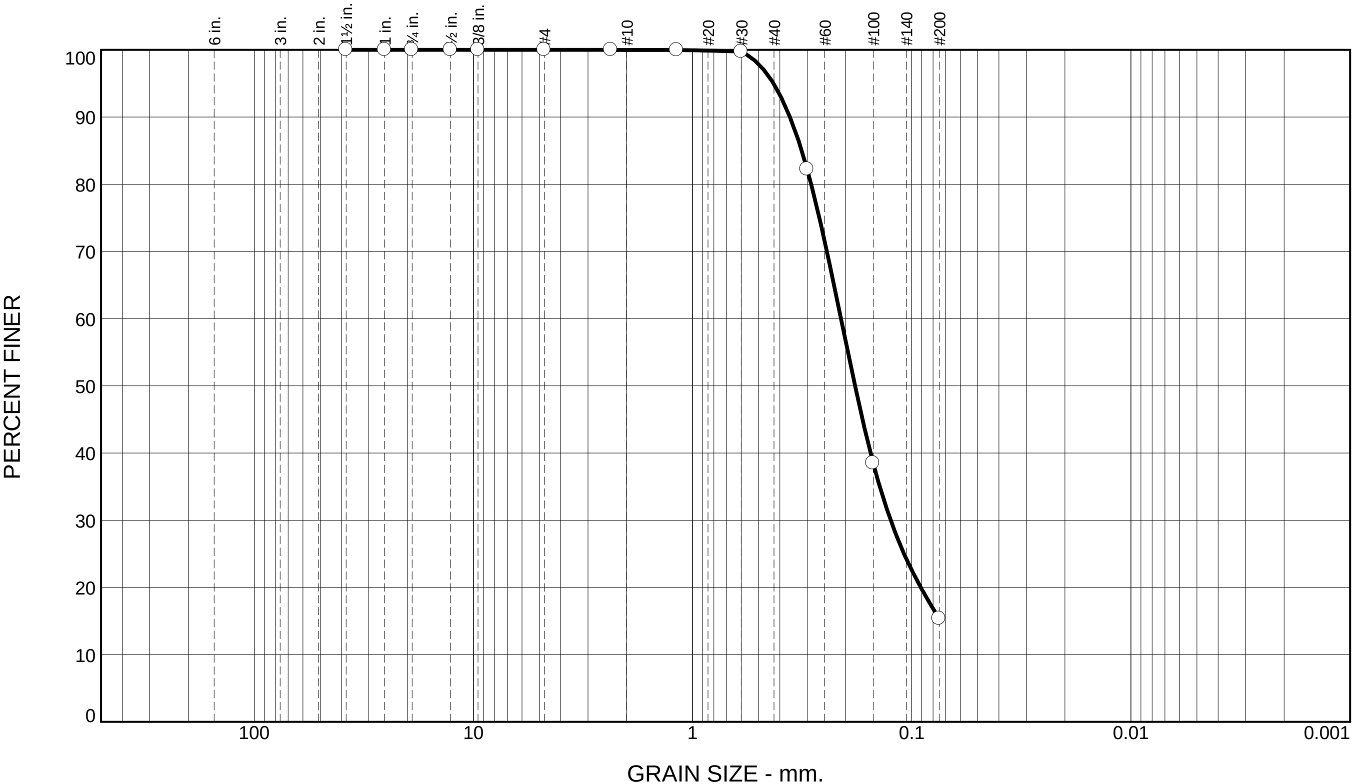
Location: Boring #4
Sample Number: B4 (32.5-34) **Depth:** 32.5-34' **Date:** 06/27/17

CONDOR
EARTH TECHNOLOGIES
Jamestown, CA

Client: Stockton Unified School District
Project: SUSD Geologic Hazard Preliminary Liquefaction Assessment
Project No: 7572A **Figure** GS-13

Tested By: N. Garnica

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.0	5.1	79.5	15.4	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
1-1/2"	100.0		
1"	100.0		
3/4"	100.0		
1/2"	100.0		
3/8"	100.0		
#4	100.0		
#8	100.0		
#16	100.0		
#30	99.7		
#50	82.2		
#100	38.5		
#200	15.4		

* (no specification provided)

Material Description

Yellowish Brown Silty Sand

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= 0.3597 D_{85}= 0.3178 D_{60}= 0.2103
D_{50}= 0.1814 D_{30}= 0.1249 D_{15}=
D_{10}= C_u= C_c=

Classification

USCS= AASHTO=

Remarks

Sampled by Marc Crum
F.M.=0.80

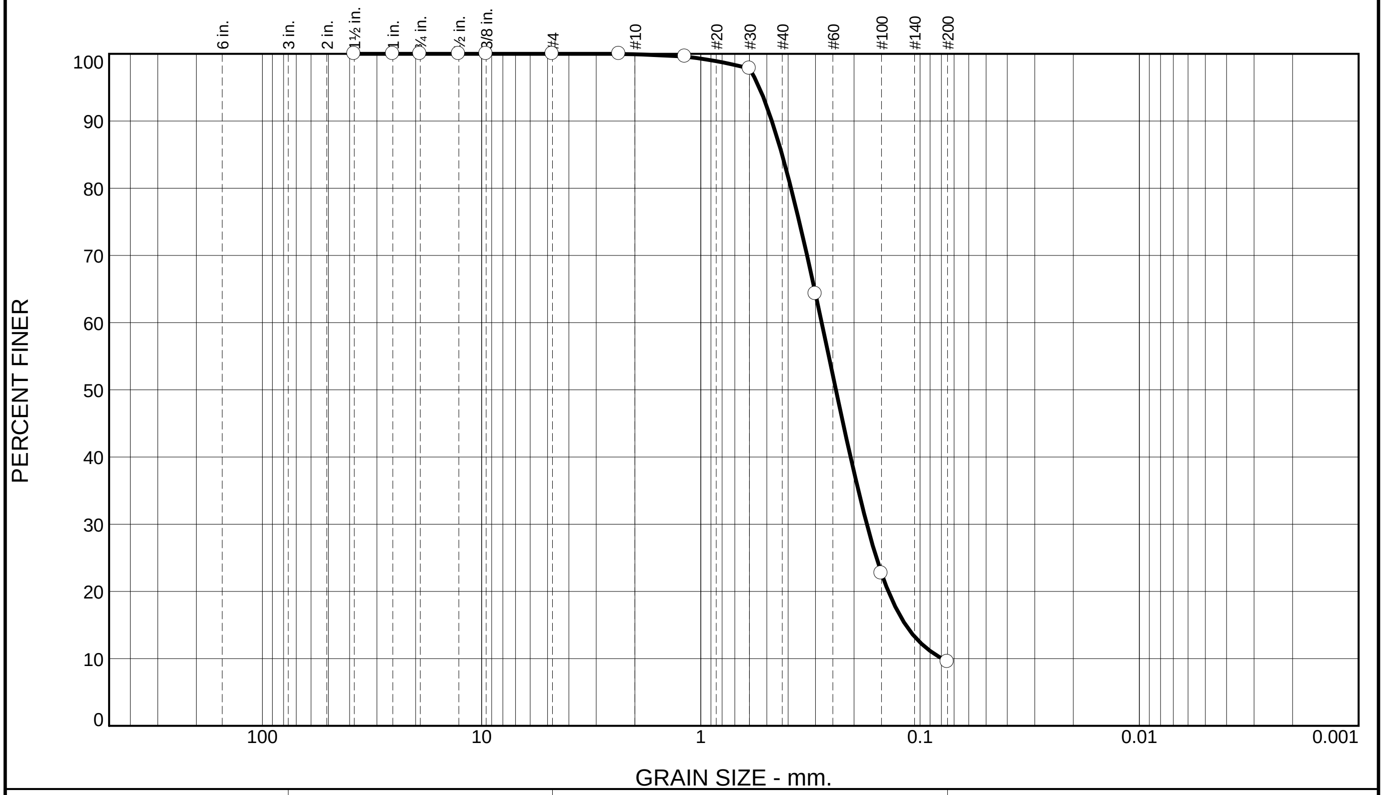
Location: Boring #4
Sample Number: B4 (35.0-36.5) **Depth:** 35.0-36.5' **Date:** 06/27/17

CONDOR
EARTH TECHNOLOGIES
Jamestown, CA

Client: Stockton Unified School District
Project: SUSD Geologic Hazard Preliminary Liquefaction Assessment
Project No: 7572A **Figure** GS-14

Tested By: N. Garnica

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.1	15.0	75.4	9.5	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
1-1/2"	100.0		
1"	100.0		
3/4"	100.0		
1/2"	100.0		
3/8"	100.0		
#4	100.0		
#8	100.0		
#16	99.6		
#30	97.8		
#50	64.3		
#100	22.7		
#200	9.5		

* (no specification provided)

Material Description

Yellowish Brown Poorly Graded Sand with Silt

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= 0.4744 D_{85}= 0.4262 D_{60}= 0.2811
D_{50}= 0.2421 D_{30}= 0.1749 D_{15}= 0.1163
D_{10}= 0.0794 C_u= 3.54 C_c= 1.37

Classification

USCS= AASHTO=

Remarks

Sampled by Marc Crum
F.M.=1.16

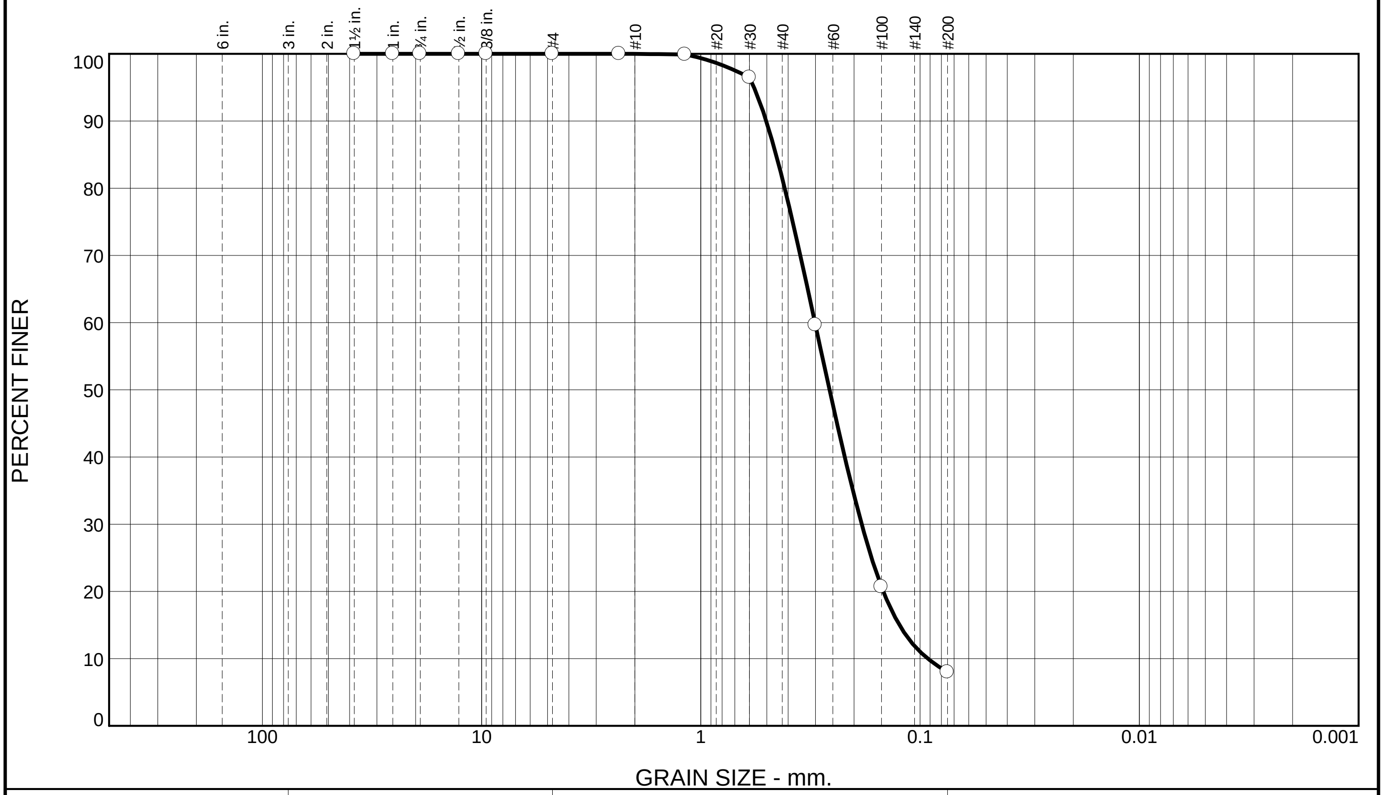
Location: Boring #4
Sample Number: B4 (37.5-39) **Depth:** 37.5-39' **Date:** 06/27/17

CONDOR
EARTH TECHNOLOGIES
Jamestown, CA

Client: Stockton Unified School District
Project: SUSD Geologic Hazard Preliminary Liquefaction Assessment
Project No: 7572A **Figure** GS-15

Tested By: N. Garnica

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.0	18.6	73.4	8.0	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
1-1/2"	100.0		
1"	100.0		
3/4"	100.0		
1/2"	100.0		
3/8"	100.0		
#4	100.0		
#8	100.0		
#16	99.9		
#30	96.5		
#50	59.6		
#100	20.7		
#200	8.0		

* (no specification provided)

Material Description

Tan Poorly Graded Sand with Silt

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= 0.5032 D_{85}= 0.4540 D_{60}= 0.3017
D_{50}= 0.2589 D_{30}= 0.1846 D_{15}= 0.1243
D_{10}= 0.0923 C_u= 3.27 C_c= 1.22

Classification

USCS= AASHTO=

Remarks

Sampled by Marc Crum
F.M.=1.23

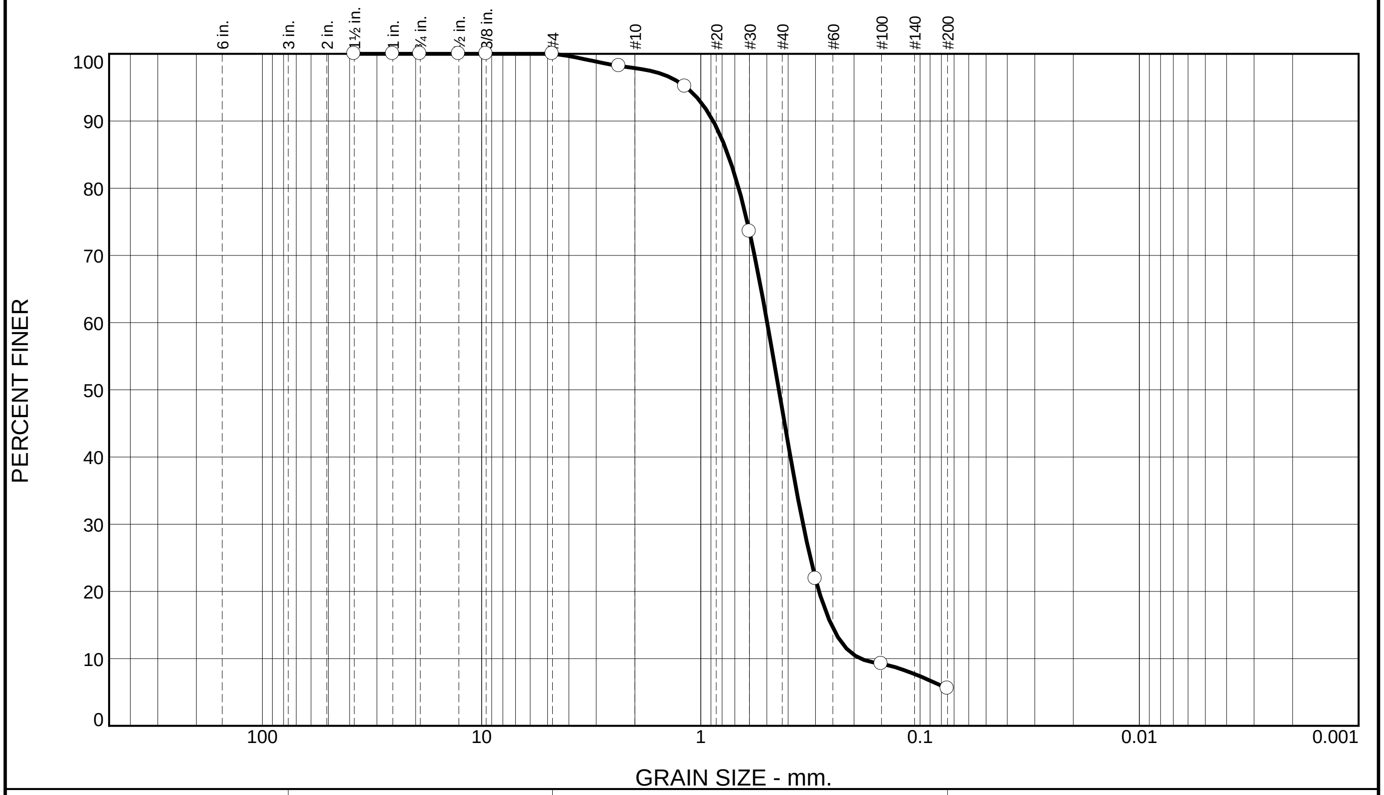
Location: Boring #4
Sample Number: B4 (40.0-41.5) **Depth:** 40.0-41.5' **Date:** 06/27/17

CONDOR
EARTH TECHNOLOGIES
Jamestown, CA

Client: Stockton Unified School District
Project: SUSD Geologic Hazard Preliminary Liquefaction Assessment
Project No: 7572A **Figure** GS-16

Tested By: N. Garnica

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	2.1	50.9	41.5	5.5	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
1-1/2"	100.0		
1"	100.0		
3/4"	100.0		
1/2"	100.0		
3/8"	100.0		
#4	100.0		
#8	98.2		
#16	95.1		
#30	73.6		
#50	21.9		
#100	9.2		
#200	5.5		

* (no specification provided)

Material Description

Tan Poorly Graded Sand with Silt

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= 0.8784	D_{85}= 0.7519	D_{60}= 0.4981
D_{50}= 0.4409	D_{30}= 0.3419	D_{15}= 0.2537
D_{10}= 0.1870	C_u= 2.66	C_c= 1.25

Classification

USCS= AASHTO=

Remarks

Sampled by Marc Crum

F.M.=2.02

Location: Boring #4

Sample Number: B4 (42.5-44) **Depth:** 42.5-44.0' **Date:** 06/27/17

CONDOR
EARTH TECHNOLOGIES
Jamestown, CA

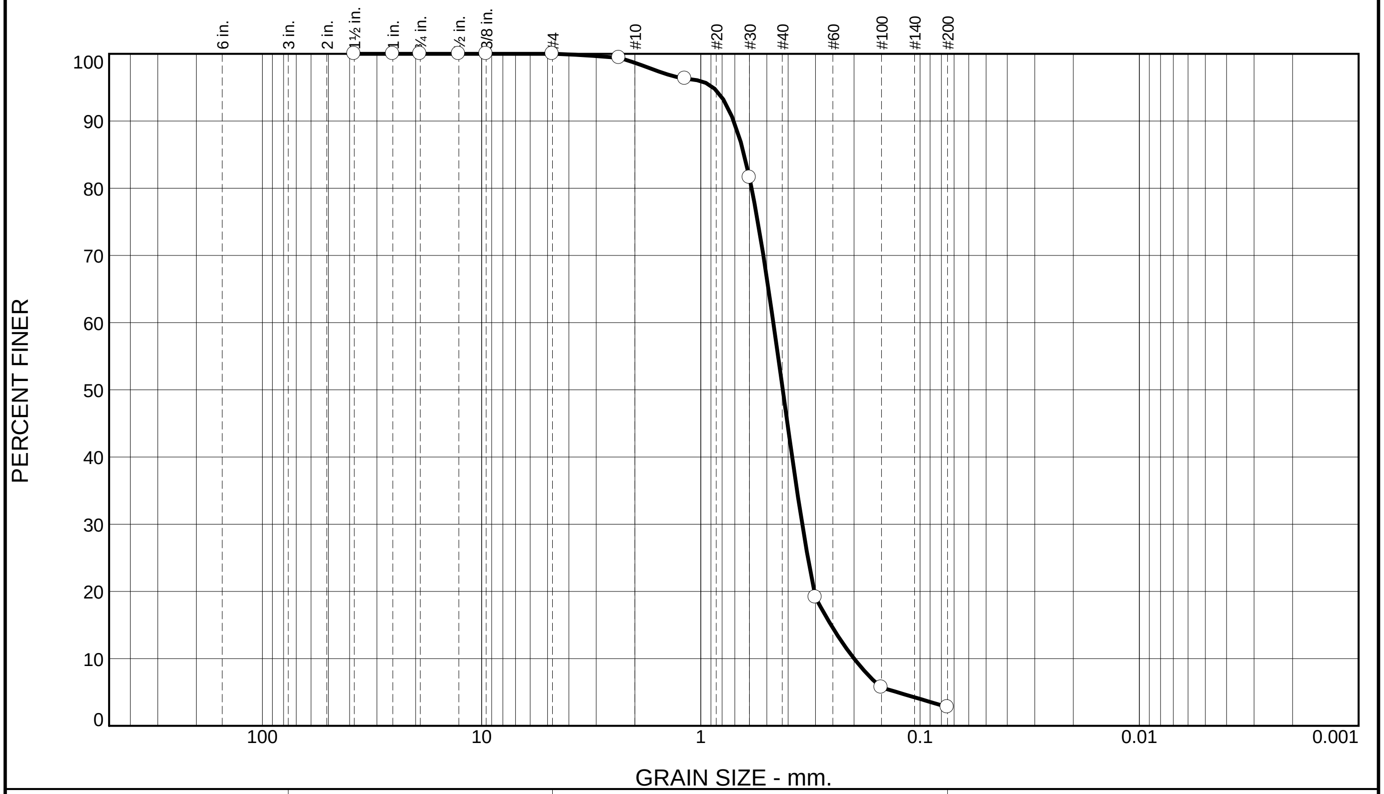
Client: Stockton Unified School District

Project: SUSD Geologic Hazard Preliminary Liquefaction Assessment

Project No: 7572A **Figure** GS-17

Tested By: N. Garnica

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	1.3	48.3	47.6	2.8	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
1-1/2"	100.0		
1"	100.0		
3/4"	100.0		
1/2"	100.0		
3/8"	100.0		
#4	100.0		
#8	99.4		
#16	96.3		
#30	81.6		
#50	19.1		
#100	5.7		
#200	2.8		

* (no specification provided)

Material Description

Tan Poorly Graded Sand

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= 0.7075 D_{85}= 0.6345 D_{60}= 0.4671
D_{50}= 0.4232 D_{30}= 0.3448 D_{15}= 0.2548
D_{10}= 0.2001 C_u= 2.33 C_c= 1.27

Classification

USCS= SP AASHTO=

Remarks

Sampled by Marc Crum
F.M.=1.98

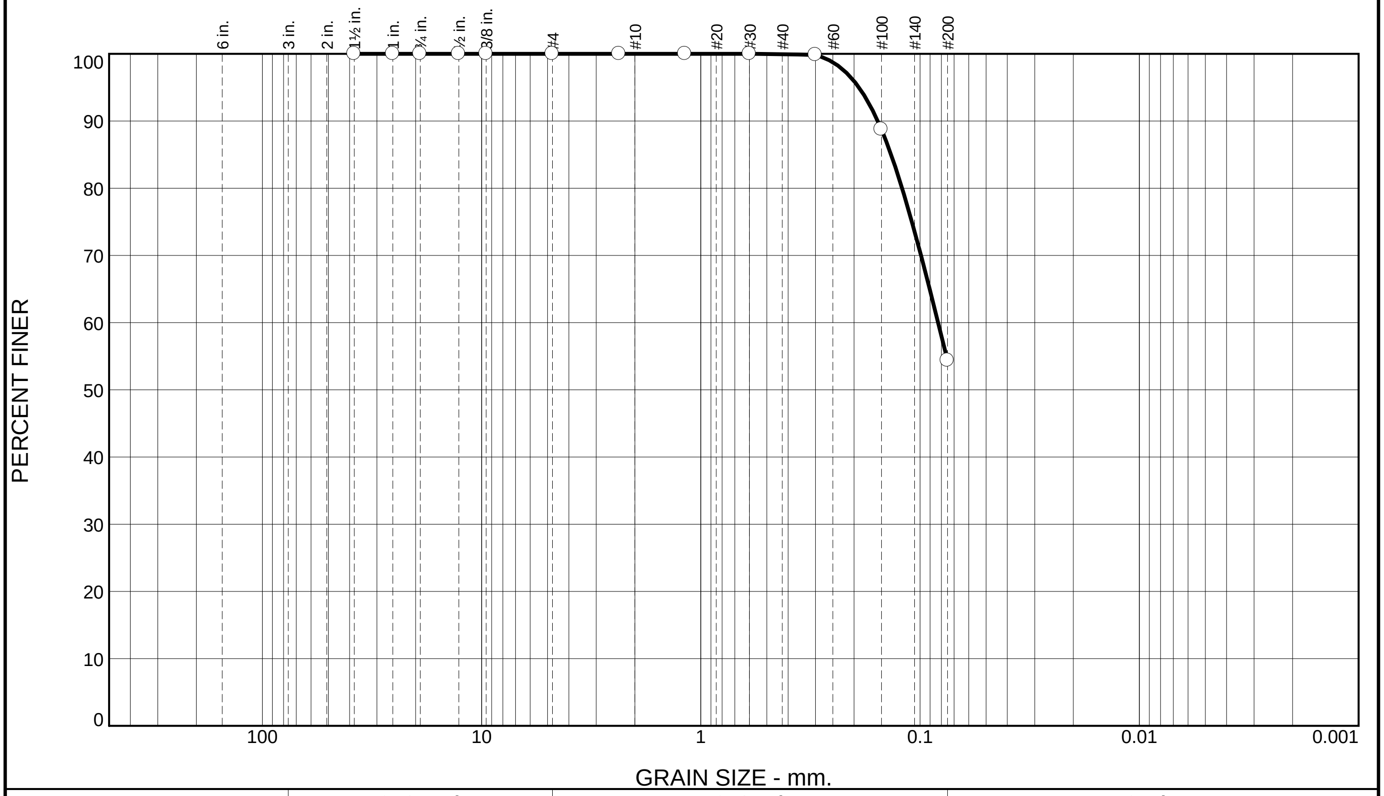
Location: Boring #4
Sample Number: B4 (45-46.5) **Depth:** 45.0-46.5' **Date:** 06/27/17

CONDOR
EARTH TECHNOLOGIES
Jamestown, CA

Client: Stockton Unified School District
Project: SUSD Geologic Hazard Preliminary Liquefaction Assessment
Project No: 7572A **Figure** GS-18

Tested By: N. Garnica

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.0	0.1	45.5	54.4	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)

* (no specification provided)

Material Description

Sandy Silt

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= 0.1559 D_{85}= 0.1356 D_{60}= 0.0828
D_{50}= D_{30}= D_{15}=
D_{10}= C_u= C_c=

Classification

USCS= ML AASHTO=

Remarks

Sampled by N. Garnica
F.M.=0.11

Sample Number: B12-12 **Depth:** -37.5'

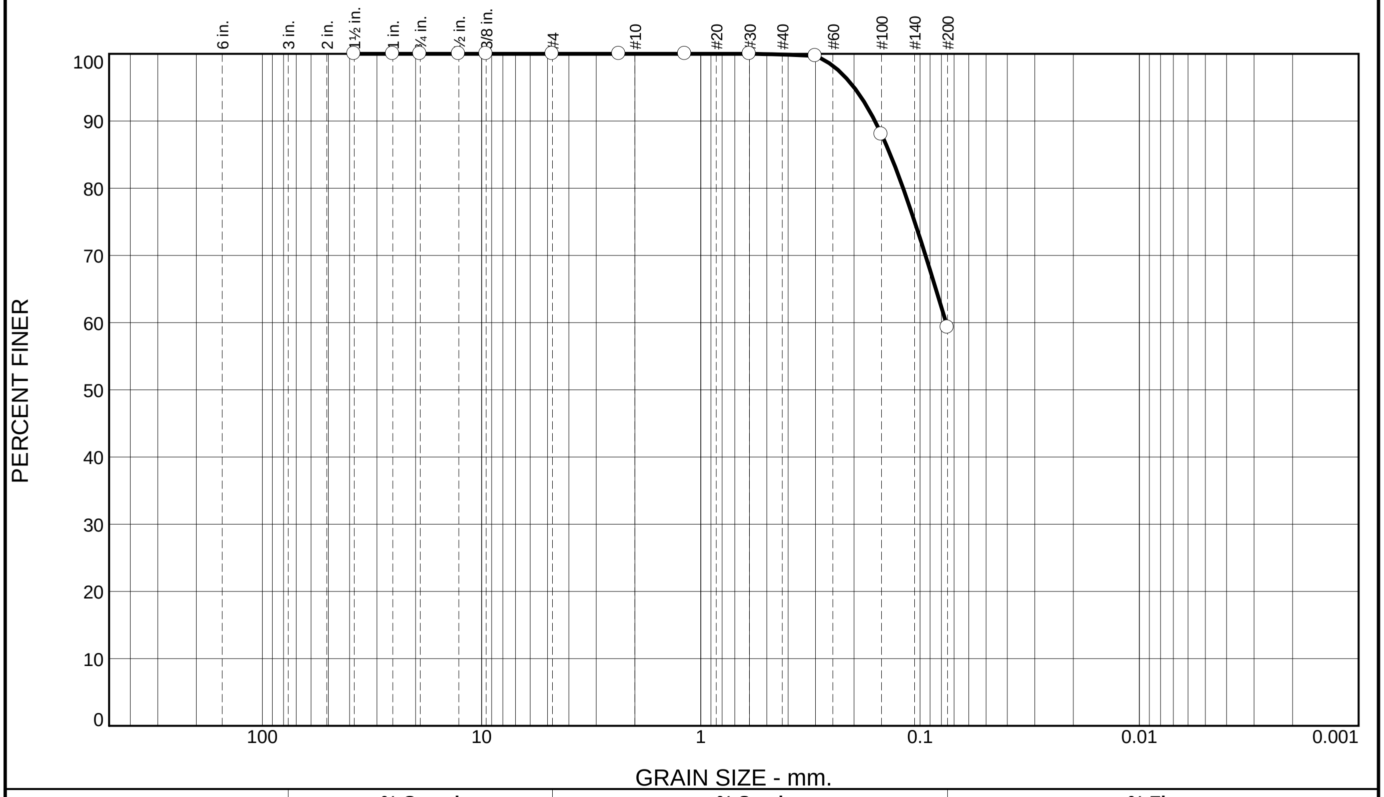
Date: 8/1/18

CONDOR
EARTH TECHNOLOGIES, INC.
Stockton, California

Client: Stockton Unified School District
Project: SUSD 2111 Quail Lakes Drive Project
Project No: 7572D **Figure** GS-19

Tested By: E. Gamez **Checked By:** N. Garnica

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.0	0.1	40.6	59.3	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)

* (no specification provided)

Material Description

Sandy Silt

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= 0.1606 D_{85}= 0.1367 D_{60}= 0.0761
D_{50}= D_{30}= D_{15}=
D_{10}= C_u= C_c=

Classification

USCS= ML AASHTO=

Remarks

Sampled by N. Garnica
F.M.=0.12

Sample Number: B12-14 **Depth:** -43.5'

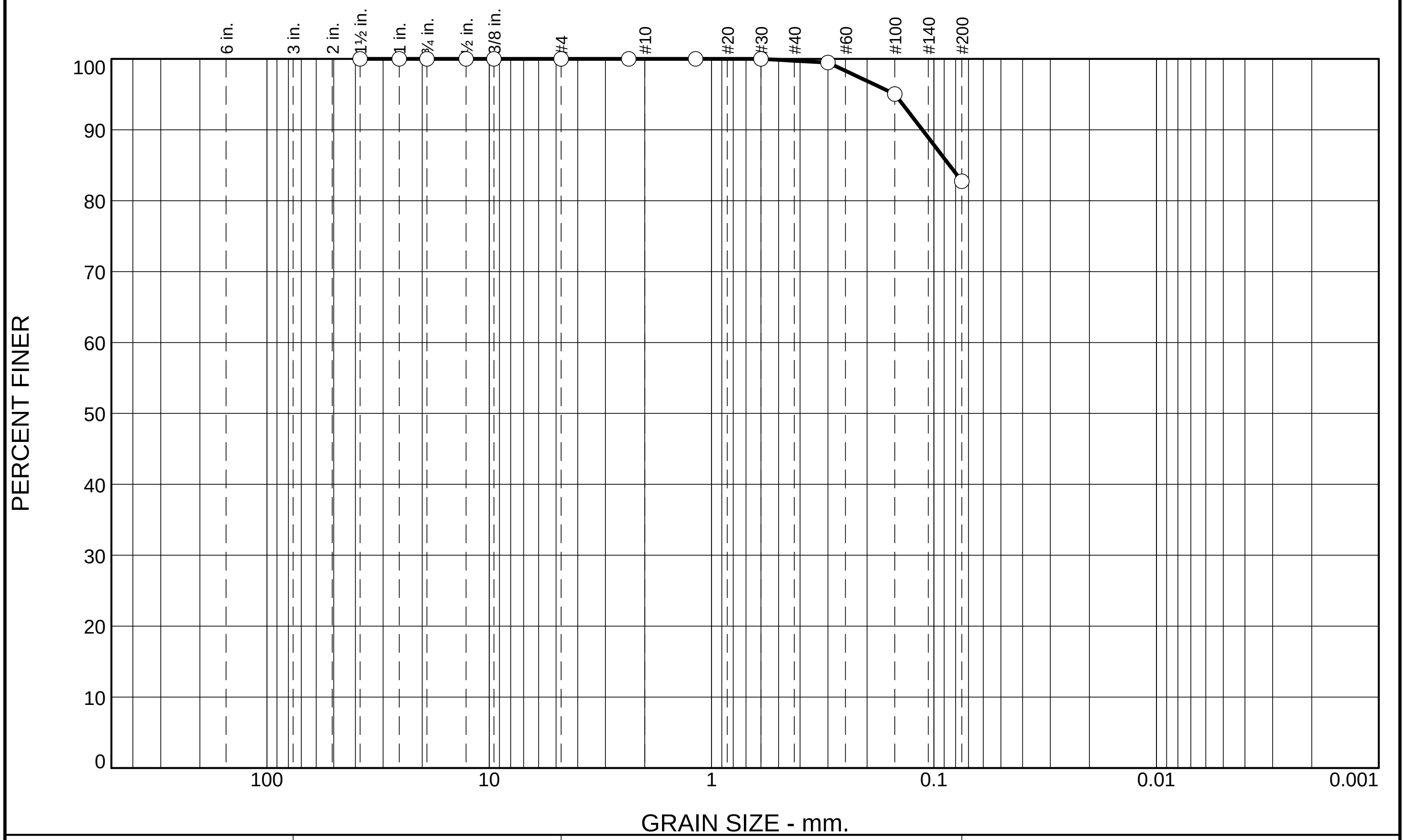
Date: 8/1/18

CONDOR
EARTH TECHNOLOGIES, INC.
Stockton, California

Client: Stockton Unified School District
Project: SUSD 2111 Quail Lakes Drive Project
Project No: 7572D **Figure** GS-20

Tested By: E. Gamez **Checked By:** N. Garnica

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.0	0.3	17.0	82.7	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
1.5"	100.0		
1.0"	100.0		
3/4"	100.0		
1/2"	100.0		
3/8"	100.0		
#4	100.0		
#8	100.0		
#16	100.0		
#30	100.0		
#50	99.5		
#100	95.0		
#200	82.7		

* (no specification provided)

Material Description

Light Brown Sandy Lean Clay

Atterberg Limits

PL= 20.8
LL= 30.4
PI= 9.6

Coefficients

D_{90}= 0.1129
D_{85}= 0.0852
D_{60}=
D_{50}=
D_{30}=
D_{15}=
D_{10}=
C_u=
C_c=

Classification

USCS= CL
AASHTO= A-4(7)

Remarks

Sampled by N. Garnica
F.M.=0.05

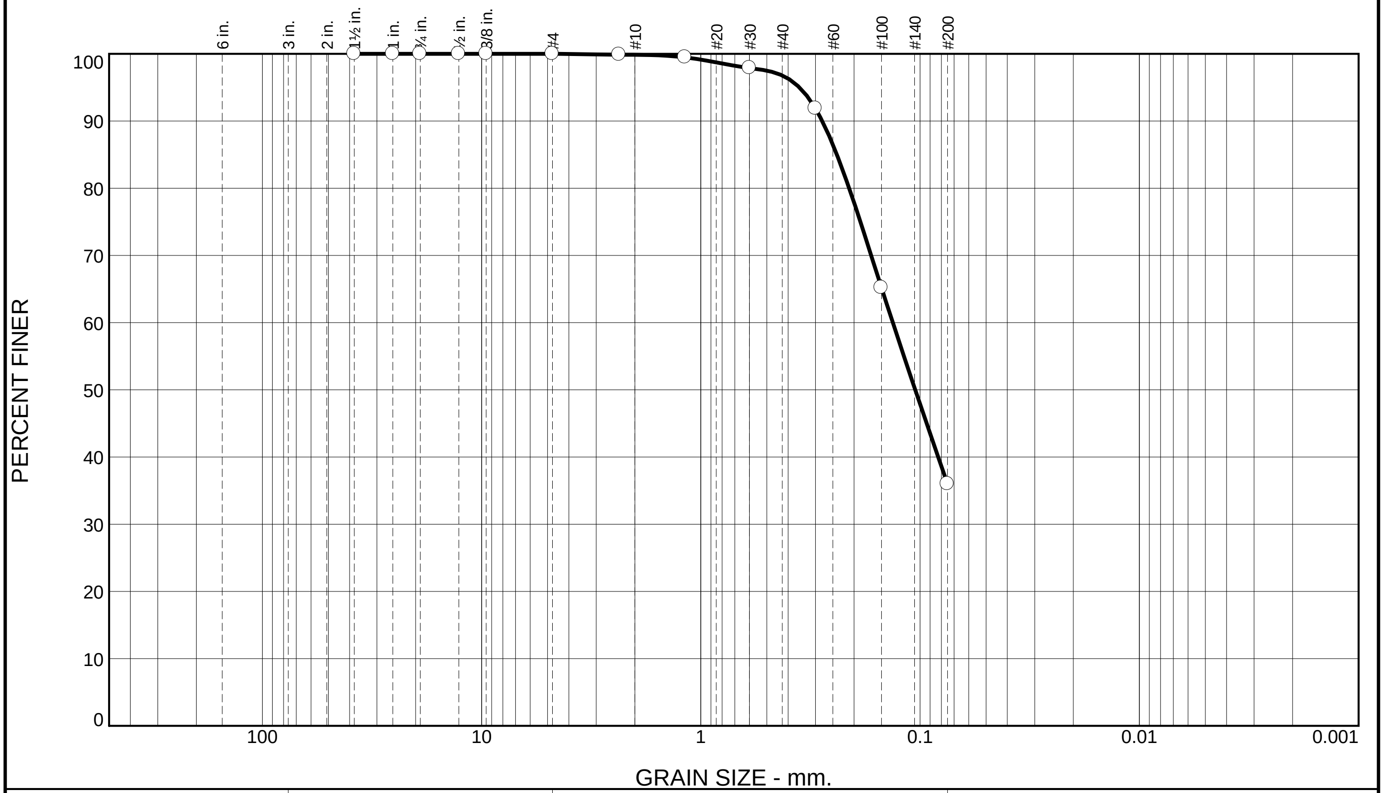
Source of Sample: B-13 **Depth:** 27.5
Sample Number: 7
Date: 8/8/18

CONDOR
EARTH TECHNOLOGIES, INC.
Stockton, California

Client: Stockton Unified School District
Project: SUSD 2111 Quail Lakes Drive Project
Project No: 7572D **Figure** GS-21

Tested By: E. Gamez **Checked By:** N. Garnica

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.2	3.0	60.8	36.0	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)

* (no specification provided)

Material Description

Silty Sand

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= 0.2795 D_{85}= 0.2397 D_{60}= 0.1332

D_{50}= 0.1053 D_{30}= D_{15}=

D_{10}= C_u= C_c=

Classification

USCS= SM AASHTO=

Remarks

Sampled by N. Garnica
F.M.=0.46

Sample Number: B13-8 **Depth:** -30'

Date: 8/1/18

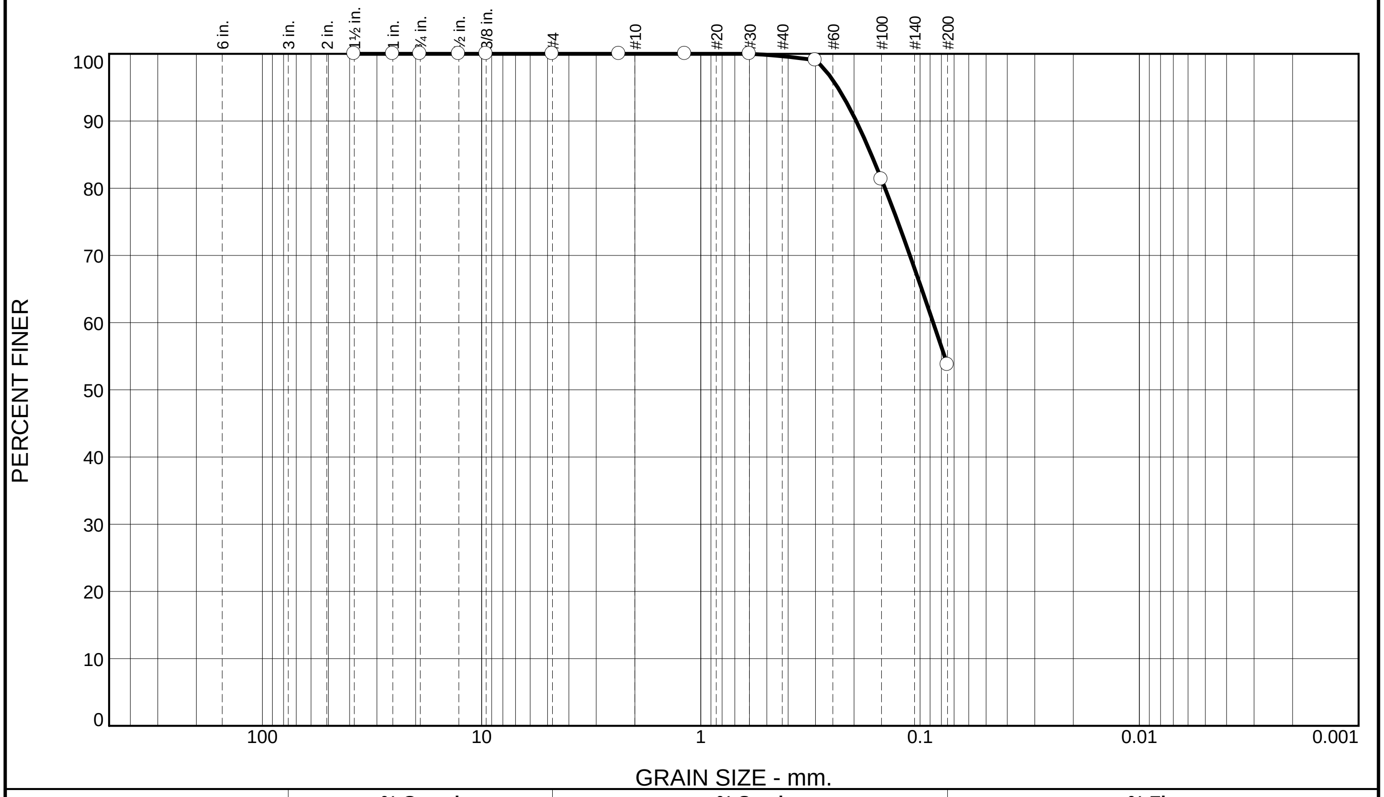
CONDOR
EARTH TECHNOLOGIES, INC.
Stockton, California

Client: Stockton Unified School District
Project: SUSD 2111 Quail Lakes Drive Project

Project No: 7572D **Figure** GS-22

Tested By: E. Gamez **Checked By:** N. Garnica

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.0	0.4	45.9	53.7	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)

* (no specification provided)

Material Description

Greenish Blue Sandy Silt

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= 0.1957 D_{85}= 0.1669 D_{60}= 0.0872
D_{50}= D_{30}= D_{15}=
D_{10}= C_u= C_c=

Classification

USCS= ML AASHTO=

Remarks

Sampled by N. Garnica
F.M.=0.20

Sample Number: B13-13 **Depth:** -42.5'

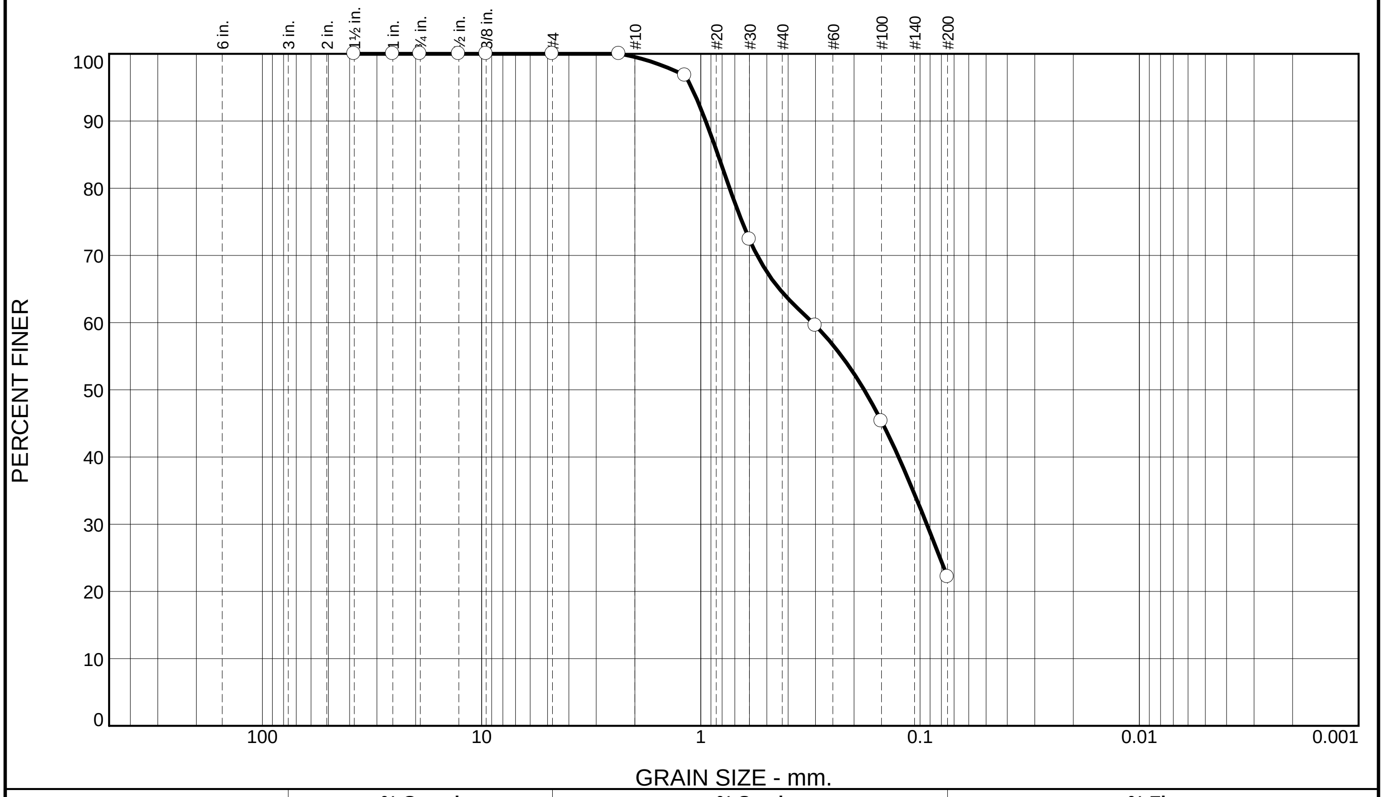
Date: 8/1/18

CONDOR
EARTH TECHNOLOGIES, INC.
Stockton, California

Client: Stockton Unified School District
Project: SUSD 2111 Quail Lakes Drive Project
Project No: 7572D **Figure** GS-23

Tested By: E. Gamez **Checked By:** N. Garnica

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.5	35.0	42.3	22.2	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)

* (no specification provided)

Material Description

Yellowish Brown Silty Sand

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= 0.9501	D_{85}= 0.8362	D_{60}= 0.3095
D_{50}= 0.1799	D_{30}= 0.0933	D_{15}=
D_{10}=	C_u=	C_c=

Classification

USCS= SM AASHTO=

Remarks

Sampled by N. Garnica
F.M.=1.26

Sample Number: B16-3 **Depth:** -10'

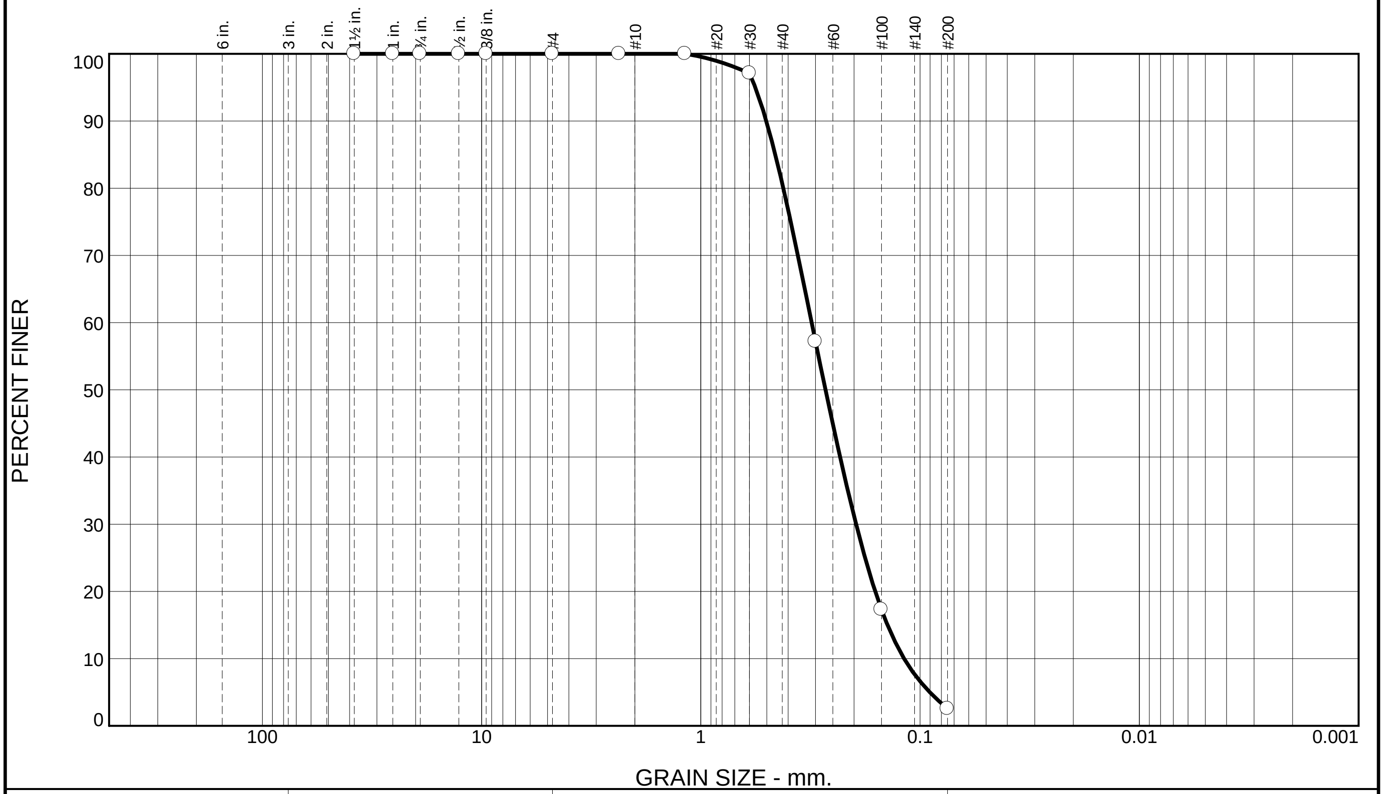
Date: 8/1/18

CONDOR
EARTH TECHNOLOGIES, INC.
Stockton, California

Client: Stockton Unified School District
Project: SUSD 2111 Quail Lakes Drive Project
Project No: 7572D **Figure** GS-24

Tested By: E. Gamez **Checked By:** N. Garnica

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.0	19.4	78.0	2.6	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
1.5"	100.0		
1.0"	100.0		
3/4"	100.0		
1/2"	100.0		
3/8"	100.0		
#4	100.0		
#8	100.0		
#16	100.0		
#30	97.1		
#50	57.2		
#100	17.3		
#200	2.6		

* (no specification provided)

Material Description

Yellowish orange poorly graded sand

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= 0.5027 D_{85}= 0.4575 D_{60}= 0.3124
D_{50}= 0.2700 D_{30}= 0.1958 D_{15}= 0.1408
D_{10}= 0.1183 C_u= 2.64 C_c= 1.04

Classification

USCS= SP AASHTO=

Remarks

sampled by N. Garnica
F.M.=1.28

Source of Sample: B-19 **Depth:** 10.0
Sample Number: 3 **Date:** 8/8/18

CONDOR
EARTH TECHNOLOGIES, INC.
Stockton, California

Client: Stockton Unified School District
Project: SUSD 2111 Quail Lakes Drive Project
Project No: 7572D **Figure** GS-25

Tested By: E. Gamez **Checked By:** N. Garnica

CONDOR EARTH TECHNOLOGIES INC
188 Frank West Circle, Suite I
Stockton CA 95206
Phone 209.234.0518
FAX 209.234.0538
www.condorearth.com

Project #: 7572A
Client: S.U.S.D
Project: 2111 Quail Lakes, Stockton
Tested by: N. Garnica
Soil Description: Various

Date Sampled: 6/13/2017
Date Tested: 6/23/2017

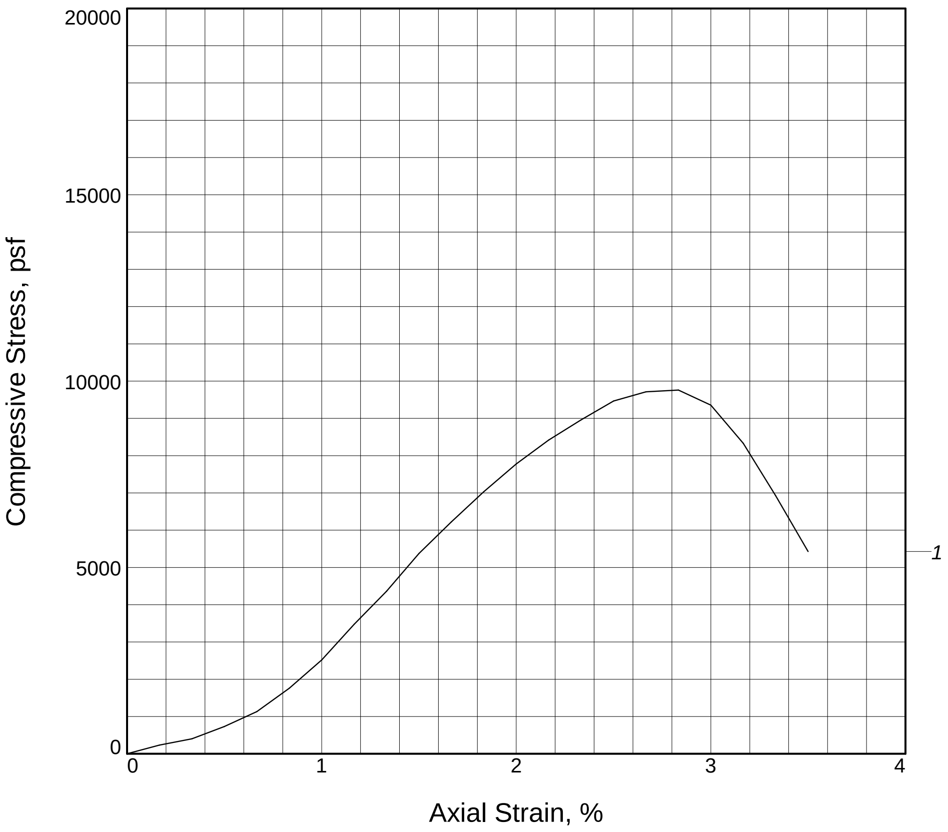
Natural Dry Density/Unit Weight

Sample #	B3-21.5	B3-39	B4-23.5					
Date	6/23/2017	6/23/2017	6/23/2017					
Depth	21.5'	39'	32.5'					
Sleeve Diam. (in)	2.5	2.5	2.5					
Sleeve Area (sq in)	4.7	4.7	4.7					
Sample Length (in)	6.0	6.0	5.4					
Volume (cu.in)	28.3	28.3	25.6					
Volume(cu ft)	0.016	0.016	0.015					
Gross wt (grms)	1461.0	1591.6	1283.4					
Tare wt (grms)	517.8	675.9	439.6					
Soil wt (grms)	943.2	915.7	843.8					
Soil wt (lbs)	2.1	2.0	1.9					
Wet density (pcf)	127.1	123.4	125.6					
Dry Density(pcf)	106.2	101.7	98.8					

Moisture Content

Tare #	DA	DF	DI					
Wet wt & Tare (grms)	1461.0	1591.6	1283.4					
Dry wt & Tare (grms)	1305.6	1430.4	1102.9					
Wt of Water (grms)	155.4	161.2	180.5					
Wt of Tare (grms)	517.8	675.9	439.6					
Wt dry Soil (grms)	787.8	754.5	663.3					
Moisture Content %	19.7	21.4	27.2					

UNCONFINED COMPRESSION TEST



Sample No.	1			
Unconfined strength, psf	9761			
Undrained shear strength, psf	4880			
Failure strain, %	2.8			
Strain rate, in./min.	0.050			
Water content, %	16.3			
Wet density, pcf	133.5			
Dry density, pcf	114.8			
Saturation, %	93.8			
Void ratio	0.4680			
Specimen diameter, in.	2.34			
Specimen height, in.	6.00			
Height/diameter ratio	2.56			

Description:

LL =	**PL =**	**PI =**	**GS=** 2.7	**Type:** Shelby Tube

Project No.: 18-156
Date Sampled:
Remarks:

Figure ________

Client: Condor

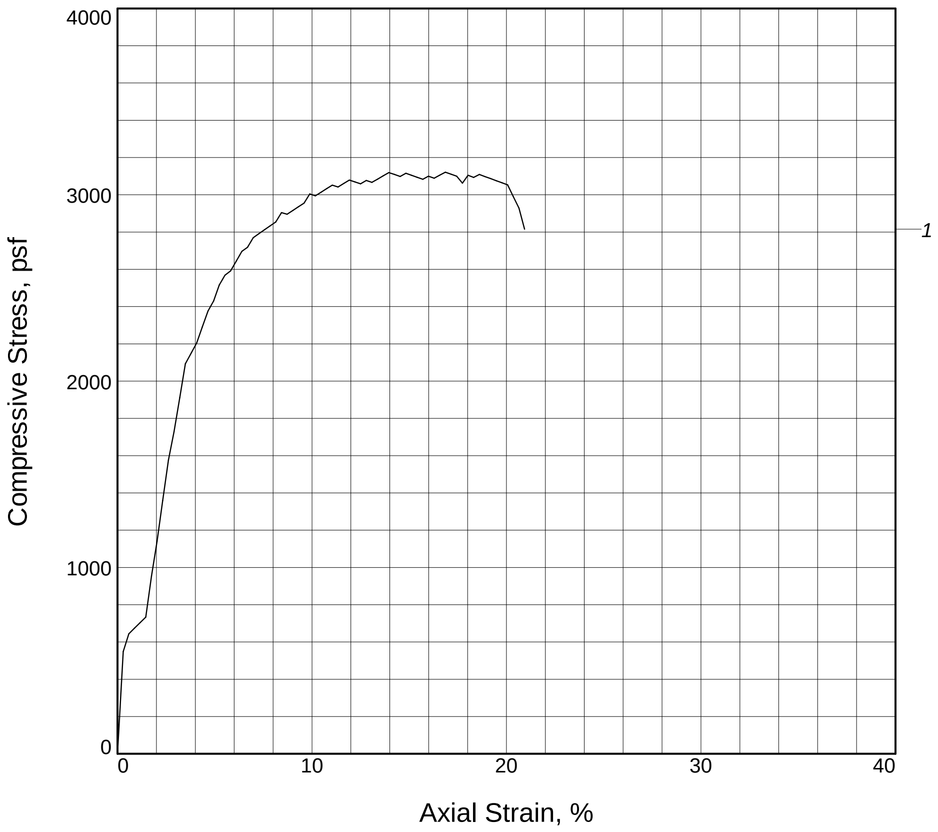
Project: Quail Lakes LUSD

Location: B6-3
Sample Number: 30205 **Depth:** N/A

GS GULF SHORE

Tested By: MW **Checked By:** CHM

UNCONFINED COMPRESSION TEST



Sample No.	1			
Unconfined strength, psf	3122			
Undrained shear strength, psf	1561			
Failure strain, %	16.9			
Strain rate, in./min.	0.050			
Water content, %	24.3			
Wet density, pcf	123.0			
Dry density, pcf	99.0			
Saturation, %	93.2			
Void ratio	0.7028			
Specimen diameter, in.	2.38			
Specimen height, in.	3.44			
Height/diameter ratio	1.45			

Description:

LL =	**PL =**	**PI =**	**GS=** 2.7	**Type:** Shelby Tube

Project No.: 18-156
Date Sampled:
Remarks:

Figure ________

Client: Condor

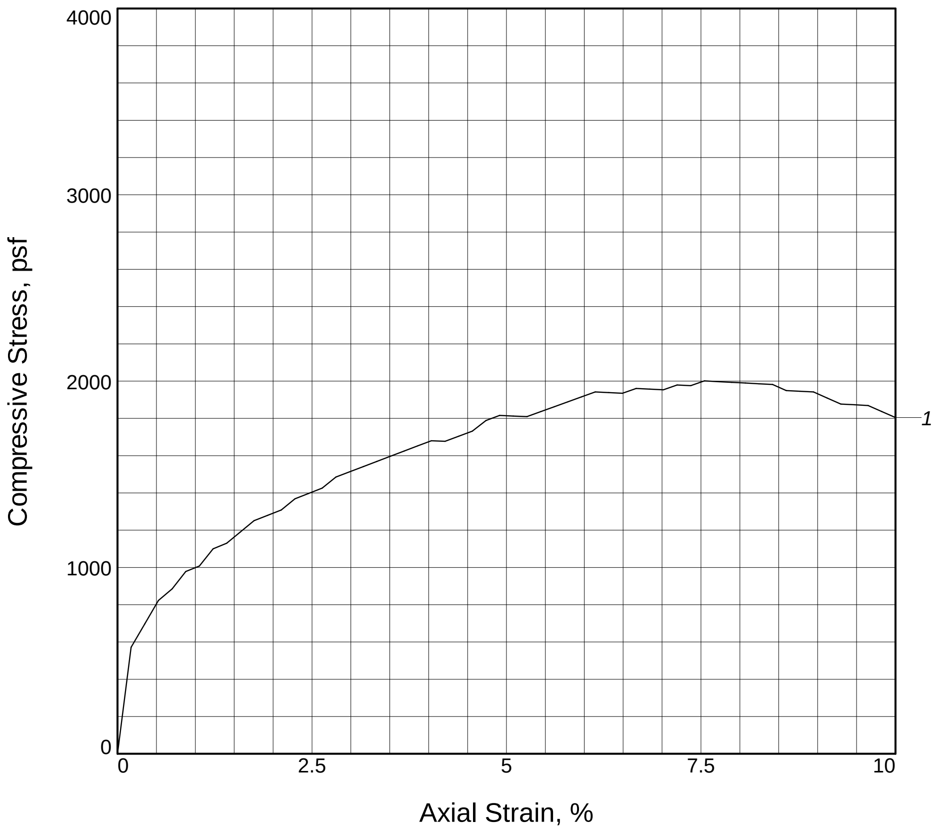
Project: Quail Lakes LUSD

Location: B7-2
Sample Number: 30203 **Depth:** 3'-4'

GS GULF SHORE

Tested By: MW **Checked By:** CHM

UNCONFINED COMPRESSION TEST



Sample No.	1			
Unconfined strength, psf	2001			
Undrained shear strength, psf	1001			
Failure strain, %	7.5			
Strain rate, in./min.	0.050			
Water content, %	22.7			
Wet density, pcf	126.1			
Dry density, pcf	102.8			
Saturation, %	95.9			
Void ratio	0.6404			
Specimen diameter, in.	2.40			
Specimen height, in.	5.70			
Height/diameter ratio	2.38			

Description:

LL = | **PL =** | **PI =** | **GS=** 2.7 | **Type:** Shelby Tube

Project No.: 18-156
Date Sampled:
Remarks:

Figure ________

Client: Condor

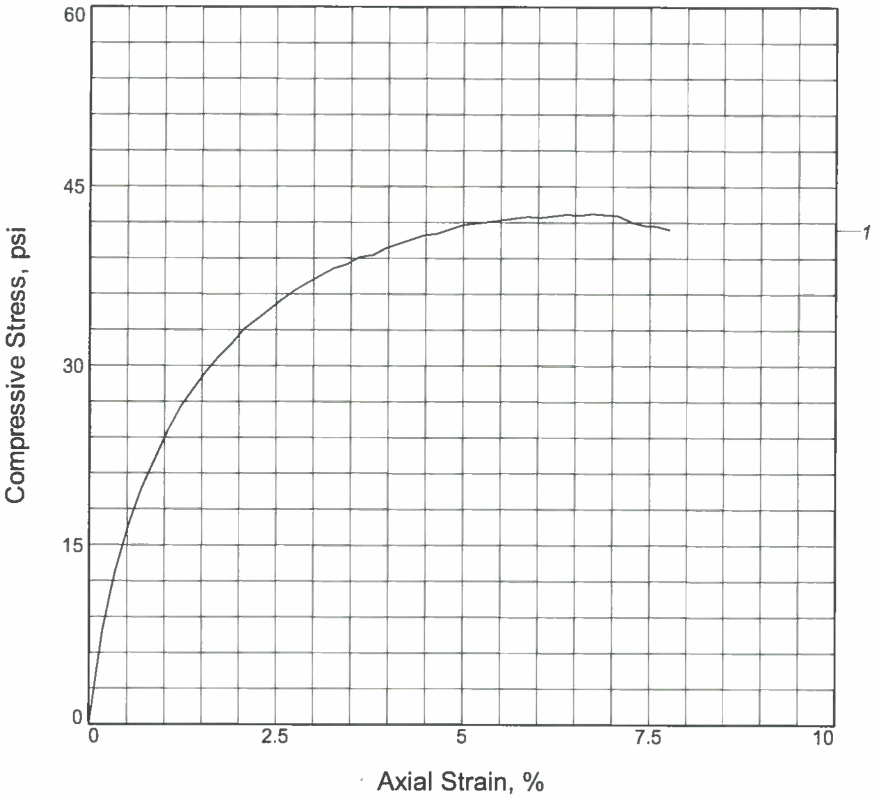
Project: Quail Lakes LUSD

Location: B8-2
Sample Number: 30204 **Depth:** N/A

GS GULF SHORE

Tested By: MW **Checked By:** CHM

UNCONFINED COMPRESSION TEST



Sample No.	1			
Unconfined strength, psi	42.71			
Undrained shear strength, psi	21.36			
Failure strain, %	6.7			
Strain rate, in./min.	0.050			
Water content, %	20.2			
Wet density, pcf	128.3			
Dry density, pcf	106.7			
Saturation, %	94.2			
Void ratio	0.5799			
Specimen diameter, in.	2.37			
Specimen height, in.	5.80			
Height/diameter ratio	2.45			

Description:

LL =	**PL =**	**PI =**	**GS=** 2.7	**Type:** Shelby Tube

Project No.: 18-223
Date Sampled:
Remarks:

Figure ________

Client: Condor Earth Technologies

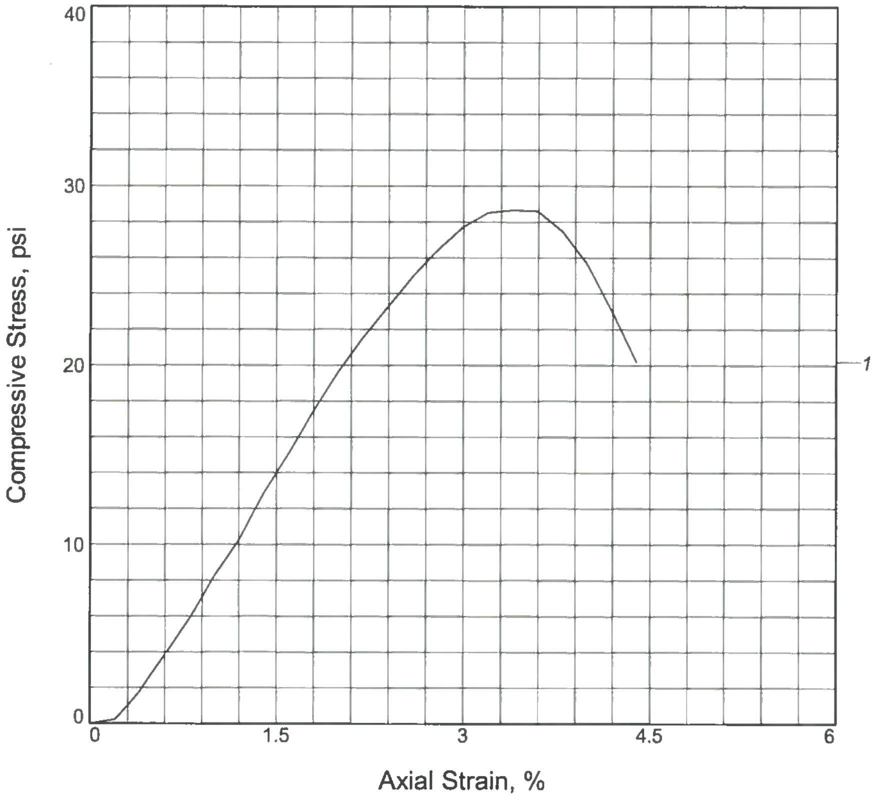
Project: 2111 Quail Lakes Dr. Project

Location: B14-1 (3.5')
Sample Number: 36571 **Depth:** 3.5'

GS GULF SHORE

Tested By: MPW **Checked By:** CHM

UNCONFINED COMPRESSION TEST



Sample No.	1			
Unconfined strength, psi	28.66			
Undrained shear strength, psi	14.33			
Failure strain, %	3.4			
Strain rate, in./min.	0.050			
Water content, %	16.3			
Wet density, pcf	122.4			
Dry density, pcf	105.2			
Saturation, %	73.3			
Void ratio	0.6023			
Specimen diameter, in.	2.38			
Specimen height, in.	5.01			
Height/diameter ratio	2.11			

Description:

LL =	**PL =**	**PI =**	**GS=** 2.7	**Type:** Shelby Tube

Project No.: 18-223
Date Sampled:
Remarks:

Figure ________

Client: Condor Earth Technologies

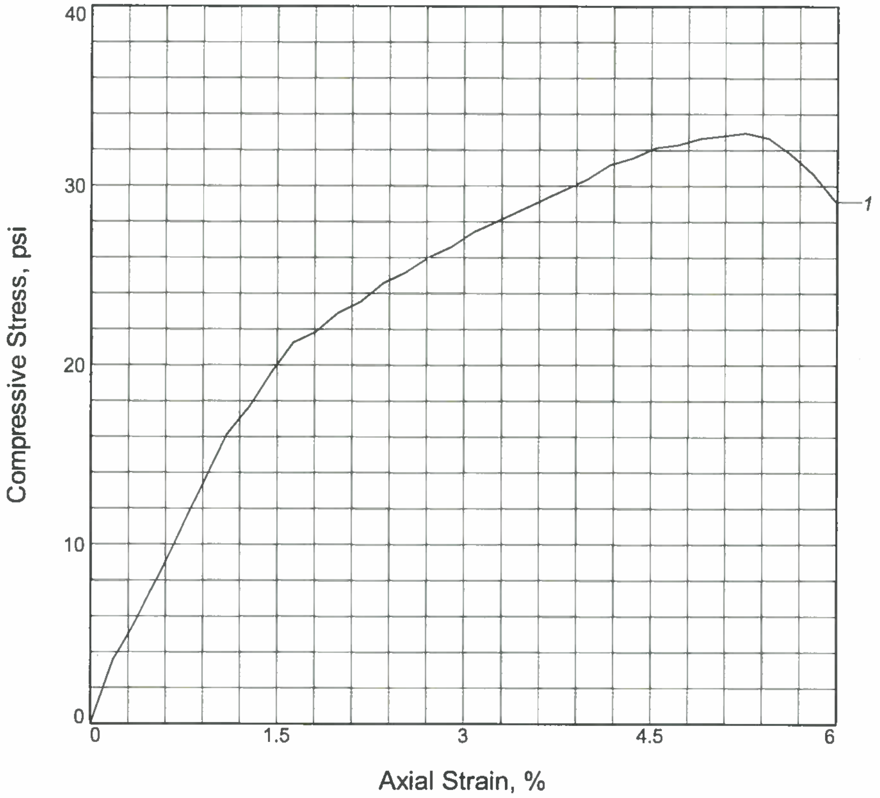
Project: 2111 Quail Lakes Dr. Project

Location: B18-1 (3.5')
Sample Number: 36572 **Depth:** 3.5'

GS GULF SHORE

Tested By: MPW **Checked By:** CHM

UNCONFINED COMPRESSION TEST



Sample No.	1			
Unconfined strength, psi	32.94			
Undrained shear strength, psi	16.47			
Failure strain, %	5.3			
Strain rate, in./min.	0.050			
Water content, %	19.4			
Wet density, pcf	126.5			
Dry density, pcf	105.9			
Saturation, %	88.5			
Void ratio	0.5913			
Specimen diameter, in.	2.39			
Specimen height, in.	5.51			
Height/diameter ratio	2.31			

Description:

LL =	**PL =**	**PI =**	**GS=** 2.7	**Type:** Shelby Tube

Project No.: 18-223
Date Sampled:
Remarks:

Figure ________

Client: Condor Earth Technologies

Project: 2111 Quail Lakes Dr. Project

Location: B19-1 (3.5')
Sample Number: 36571 **Depth:** 3.5'

GS GULF SHORE

Tested By: MPW **Checked By:** CHM

CONDOR

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

Project #: 7572D
Client: S.U.S.D
Project: Quail Lakes
Test Date: 3/26/2018
Tested by: J. Gamez

Natural Dry Density/Unit Weight

Sample #	B5-3	B5-4	B6-3	B6-4	B7-4	B8-4	B9-4	B10-3
Date	3/26/2018	3/26/2018	3/26/2018	3/26/2018	3/26/2018	3/26/2018	3/26/2018	3/26/2018
Depth (ft)	5.5'	10'	6'	11'	11'	11'	11'	5.5'
Sleeve Diam. (in)	2.45	2.45	2.45	2.45	2.45	2.45	2.5	2.5
Sleeve Area (sq in)	4.7	4.7	4.7	4.7	4.7	4.7	4.7	4.7
Sample Length (in)	5.8	5.8	5.8	5.3	5.4	5.9	5.4	5.4
Volume (cu.in)	27.2	27.3	27.5	25.1	25.4	27.7	25.3	25.6
Volume(cu ft)	0.016	0.016	0.016	0.015	0.015	0.016	0.015	0.015
Gross wt (grms)	1191.0	1162.9	1252.8	1096.6	1102.2	1167.1	1205.9	1213.3
Tare wt (grms)	320.1	315.6	315.1	318.9	315.9	321.2	326.2	325.9
Soil wt (grms)	870.9	847.3	937.7	777.7	786.3	845.9	879.7	887.4
Soil wt (lbs)	1.9	1.9	2.1	1.7	1.7	1.9	1.9	2.0
Wet density (pcf)	121.8	118.1	129.8	118.0	118.2	116.3	132.5	132.2
Dry Density(pcf)	104.1	98.3	116.6	98.8	102.2	98.3	112.4	114.6

Moisture Content

Tare #	H	G	A	P	F	O	I	DH
Wet wt & Tare (grms)	1191.0	1162.9	1252.8	1096.6	1102.2	1167.1	1205.9	1213.3
Dry wt & Tare (grms)	1064.0	1021.0	1157.0	970.0	996.0	1036.0	1072.0	1095.0
Wt of Water (grms)	127.0	141.9	95.8	126.6	106.2	131.1	133.9	118.3
Wt of Tare (grms)	320.1	315.6	315.1	318.9	315.9	321.2	326.2	325.9
Wt dry Soil (grms)	743.9	705.4	841.9	651.1	680.1	714.8	745.8	769.1
Moisture Content %	17.1	20.1	11.4	19.4	15.6	18.3	18.0	15.4

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

Project #: 7572D
Client: S.U.S.D
Project: Quail Lakes
Test Date: 3/26/2018
Tested by: J. Gamez

Natural Dry Density/Unit Weight

Sample #	B11-3	B11-1						
Date	3/26/2018	3/26/2018						
Depth (ft)	5.5'	1.5'						
Sleeve Diam. (in)	2.45	2.45						
Sleeve Area (sq in)	4.7	4.7						
Sample Length (in)	5.8	5.0						
Volume (cu.in)	27.2	23.4						
Volume(cu ft)	0.016	0.014						
Gross wt (grms)	1197.7	1061.4						
Tare wt (grms)	317.1	311.3						
Soil wt (grms)	880.6	750.1						
Soil wt (lbs)	1.9	1.7						
Wet density (pcf)	123.2	122.0						
Dry Density(pcf)	105.9	104.7						

Moisture Content

Tare #	C	B						
Wet wt & Tare (grms)	1197.7	1061.4						
Dry wt & Tare (grms)	1074.0	955.0						
Wt of Water (grms)	123.7	106.4						
Wt of Tare (grms)	317.1	311.3						
Wt dry Soil (grms)	756.9	643.7						
Moisture Content %	16.3	16.5						

CONDOR EARTH TECHNOLOGIES INC
188 Frank West Circle, Suite I
Stockton CA 95206
Phone 209.234.0518
FAX 209.234.0538
www.condorearth.com

(ASTM D6276)

Ph to Estimate the Soil-Lime Proportion Requirement for Soil Stabilization

Client:	SUSD	**Date Received:**	N/A
Project:	SUSD Quail Lakes	**Date Tested:**	4/2/2018
Project No.:	7572D	**Tested By:**	N. Garnica
Date Sampled:	4/15/2018	**Material Type:**	Dark Brown Lean Clay
Sample Number:	Comp. Boring 6-7	**Specified Percentage of Quicklime:**	N/A
Sampled By:	N. Garnica	**Results To:**	R. Skaggs

Laboratory Results

Ph Value Indicated for Each Soil-Lime-Water Mixture

	Percentage of Quicklime				
	2%	*3%*	*4%*	*5%*	*6%*
Ph Reading	***12.10***	***12.31***	***12.36***	***12.40***	***12.48***

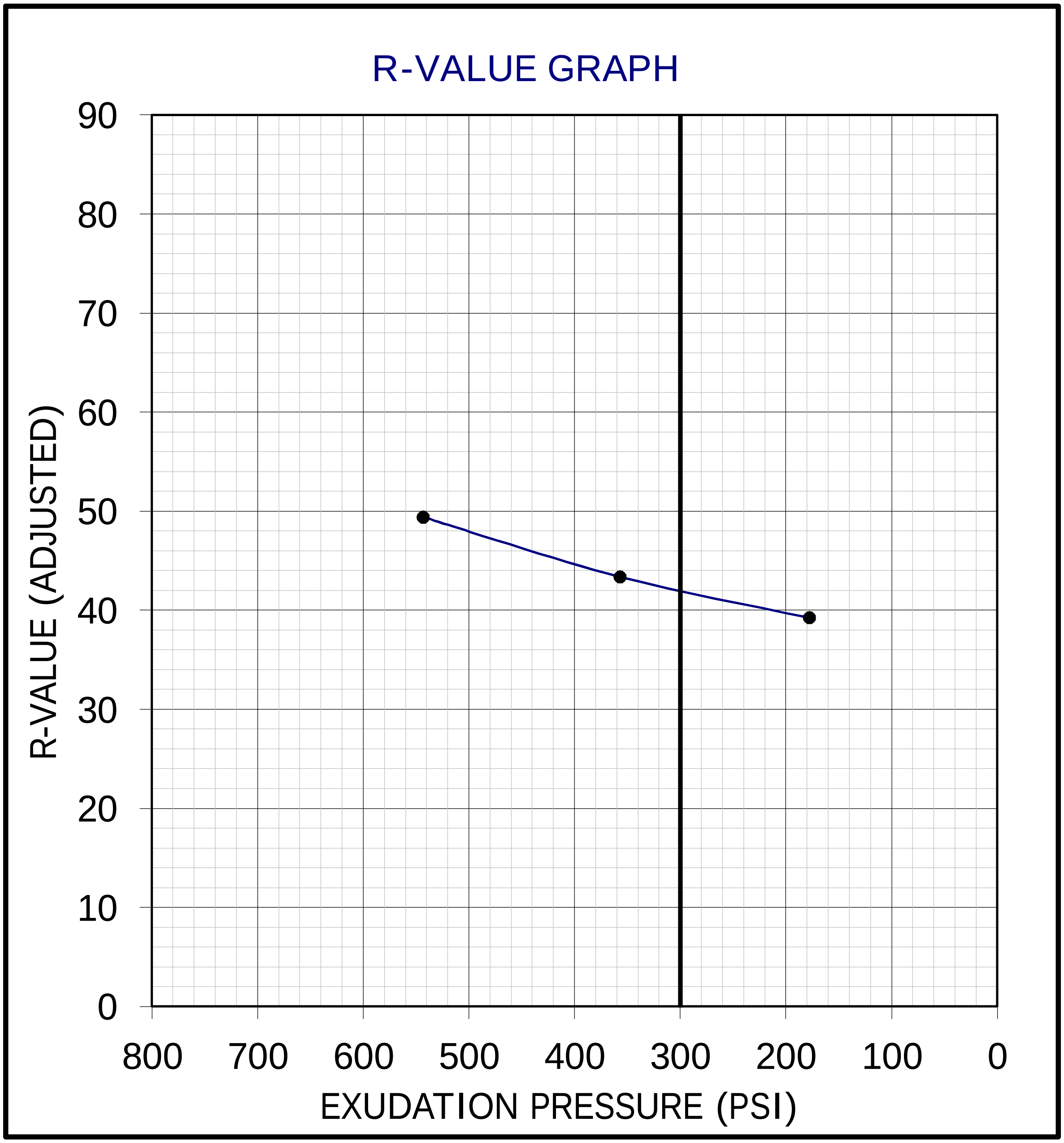
Based on the Ph Values Indicated Above, The Appropriate Minimum Percentage of Quicklime for Soil Stabilization Should Be

5%

Conversion for the use of *Standard Hydrated Lime* based on the percentage of *Quicklime*

6.60%

JOB NAME:	NA181075	JOB #:	Quail Lakes
SAMPLE NUMBER:	B7 (0-2ft)	Location:	0
SAMPLE CLASSIFICATION:	Brown Clay		



R-VALUE AT 300 PSI EXUDATION PRESSURE: 42

NOTES:

R VALUE

CALIFORNIA TEST 301

JOB NAME: NA181075
JOB NUMBER: Quail Lakes
SAMPLE NUMBER: B7 (0-2ft)
SAMPLE SOURCE:
SAMPLE CLASSIFICATION: Brown Clay (+5% lime)

DATE RECEIVED:
DATE BATCHED: 11-Apr-18
TECHNICIAN: B.S.

BATCH & MOISTURE DAY ONE:

TARE	210
TARE WEIGHT	145
WET WEIGHT	1440
DRY WEIGHT	1251.6
MOISTURE	17.0%

BATCH WEIGHT **1200**

COMPACTION DAY TWO:

DATE	4/13	4/13	4/13	4/13
MOLD ID	Q-14	44	Q-16	
MOLD WT (g)	2105	2101.9	2125.9	
INITIAL WATER ADDED (ml)	40	40	40	
ADDITIONAL WATER ADDED (ml)	65	50	40	
TOTAL WATER ADDED (ml)	105	90	80	
COMPACTION AIR PRESSURE (350 psi)	180	210	250	
EXUDIATION FORCE (lbs @ 5 Lights)	2230	4480	6820	
SPECIMEN & MOLD WT (g)	3114	3174	3192.4	
SAMPLE HEIGHT (2.45"-2.55")	2.49	2.55	2.55	
EXPANSION DIAL INITIAL READING	0.0000	0.0000	0.0000	

STABILOMETER DAY THREE:

DATE	4/16	4/14	4/14	4/14
EXPANSION DIAL FINAL READING	0.0016	0.0011	0.0005	
STABILOMETER @ 2000 LBS (psi)	76	70	59	
TURNS INDICATOR (.001" ex .245)	0.424	0.442	0.462	

CALCULATIONS:

EXUDATION PRESSURE (psi)	178	357	543	
EXPANSION DISTANCE (in)	0.0016	0.0011	0.0005	
EXPANSION PRESSURE (psf)	69.28	47.63	21.65	
RESISTANCE VALUE ("R")	39.5	42.1	48.1	
% MOISTURE AT TEST	25.8%	24.5%	23.7%	
DRY DENSITY AT TEST (pcf)	97.6	102.3	102.5	
ADJUSTED "R" VALUE	39.2	43.4	49.4	

R-VALUE: 42

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

16 April, 2018

Job No. 1804034
Cust. No.12257

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

Subject: Project No.: 7572D
Project Name: SUSD Quail Lakes
Corrosivity Analysis – ASTM Test Methods

Dear Mr. Garnica:

Pursuant to your request, CERCO Analytical has analyzed the soil sample submitted on April 3, 2018. Based on the analytical results, this brief corrosivity evaluation is enclosed for your consideration.

Based upon the resistivity measurement, the 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 is none detected with a detection limit of 15 mg/kg.

The sulfate ion concentration is 29 mg/kg and is determined to be insufficient to damage reinforced concrete structures and cement mortar-coated steel at these locations.

The pH of the soil is 8.23 which does not present corrosion problems for buried iron, steel, mortar-coated steel and reinforced concrete structures.

The redox potential 310-mV which 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

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

Client:	Condor Earth Technologies, Inc.
Client's Project No.:	7572D
Client's Project Name:	SUSD Quail Lakes
15	3-Apr-18
Date Received:	4-Apr-18
Matrix:	Soil
Authorization:	Unsigned Chain of Custody

Date of Report: 16-Apr-2018

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)*
1804034-001	B8-1 @ 0.5'-2.0'	310	8.23	-	1,200	-	N.D.	29

Method:	ASTM D1498	ASTM D4972	ASTM D1125M	ASTM G57	ASTM D4658M	ASTM D4327	ASTM D4327
Reporting Limit:	-	-	10	-	50	15	15
Date Analyzed:	13-Apr-2018	13-Apr-2018		13-Apr-2018	-	13-Apr-2018	13-Apr-2018

* 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

1804034

Page 1 of 1

Concord, CA 94520-1006
925 462 2771
Fax: 925 462 2775

CERCO analytical

Job No.	CU#		Client Project I.D.	Schedule	Date Sampled	Date Due
7572D	6257			Analyte		

Full Name NARCISO GARNICA

Phone (209) 601 x6851

Fax

Company and/or Mailing Address CONDOR EARTH

Cell ☒

Sample Source SUSD Quail Lakes

Lab No.	Sample I.D.	Date	Time	Matrix	Contain.	Size	Preserv.	Qty.	Redox Potential	pH	Sulfate	Chloride	Resistivity-100% Saturated			Brief Evaluation						
001	↑	4/3/18	10:40AM	S	SEALED BAG	9"X12"	NONE	1	X	X	X	X	X			X						
	B8-1 (0.5'-2.0')																					

ANALYSIS — ASTM

MATRIX
- DW - Drinking Water
- GW - Ground Water
- SW - Surface Water
- WW - Waste Water
- Water
- SL - Sludge
- [✓ S] - Soil
- Product

ABBREVIATIONS
- HB - Hosebib
- PV - Petcock Valve
- PT - Pressure Tank
- PH - Pump House
- RR - Restroom
- GL - Glass
- PL - Plastic
- ST - Sterile

SAMPLE RECEIPT

Total No. of Containers

Rec'd Good Cond/Cold

Conforms to Record

Temp. a t Lab -°C

Sampler

Relinquished By:	Narciso Garnica	Date	4/03/18	Time	10:40 AM
Received By:		Date	4/4/18	Time	1400
Relinquished By:		Date		Time	
Received By:		Date		Time	
Relinquished By:		Date		Time	
Received By:		Date		Time	

Comments:

THERE IS AN ADDITIONAL CHARGE FOR EXTRUDING SOIL FROM METAL TUBES

Email Address ngarnica@condorearth.com

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

15 August, 2018

Job No. 1808015
Cust. No. 12016

Mr. Narciso Garnica
Condor Earth Technologies, Inc.
P.O. Box 3905
Sonora, CA 95370

Subject: Project No.: 7572D
Project Name: SUSD Quail Lakes Project - GES
Corrosivity Analysis – ASTM Test Methods

Dear Mr. Garnica:

Pursuant to your request, CERCO Analytical has analyzed the soil sample submitted on August 02, 2018. 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 59 mg/kg and is determined to be insufficient to damage reinforced concrete structures and cement mortar-coated steel at this location.

The pH of the soil is 7.85, which does not present corrosion problems for buried iron, steel, mortar-coated steel and reinforced concrete structures.

The redox potential is 260-mV, which 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.

for Sheri Moore
J. Darby Howard, Jr., P.E.
President

JDH/jdl
Enclosure

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

Client: Condor Earth Technologies, Inc.
Client's Project No.: 7572D
Client's Project Name: SUSD Quail Lakes Project - GES
Date Sampled: 27-Jul-18
Date Received: 2-Aug-18
Matrix: Soil
Authorization: Signed Chain of Custody

Date of Report: 15-Aug-2018

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)*
1808015-001	B16- 1 @ 2.5' - 3.5'	260	7.85	-	1,100	-	N.D.	59

Method:	ASTM D1498	ASTM D4972	ASTM D1125M	ASTM G57	ASTM D4658M	ASTM D4327	ASTM D4327
Reporting Limit:	-	-	10	-	50	15	15
Date Analyzed:	10-Aug-2018	10-Aug-2018	-	13-Aug-2018	-	10-Aug-2018	10-Aug-2018

for Sheri Moore
Cheryl McMillen
Laboratory Director

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

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

Chain of Custody

Page 1 of 1

Concord, CA 94520-1006
925 462 2771
Fax: 925 462 2775
CERCO analytical

Job No. 1808015
CU# 120116
Client Project I.D. 7572D

Schedule
Analyte

Date Sampled
Date Due

Full Name NARCISO GARNICA
Phone (209) 601 x 6851
Fax
Company and/or Mailing Address CONDOR EARTH
Cell ☒
Sample Source SUSD QUAIL LAKES PROJECT - GES

Lab No.	Sample I.D.	Date	Time	Matrix	Contain.	Size	Preserv.	Qty.	Redox Potential	pH	Sulfate	Chloride	Resistivity-100% Saturated			Brief Evaluation						
001	B16 - ① (2.5'-3.5')	7/27/18	1:30PM	S	SEALED BAG	9"X12"	NONE	1	X	X	X	X	X			X						

ANALYSIS
ASTM

MATRIX
- DW - Drinking Water
- GW - Ground Water
- SW - Surface Water
- WW - Waste Water
- Water
- SL - Sludge
- [✓ S] - Soil
- Product

ABBREVIATIONS
- HB - Hosebib
- PV - Petcock Valve
- PT - Pressure Tank
- PH - Pump House
- RR - Restroom
- GL - Glass
- PL - Plastic
- ST - Sterile

SAMPLE RECEIPT
- Total No. of Containers: 1
- Rec'd Good Cond/Cold:
- Conforms to Record:
- Temp. a t Lab -°C:
- Sampler:

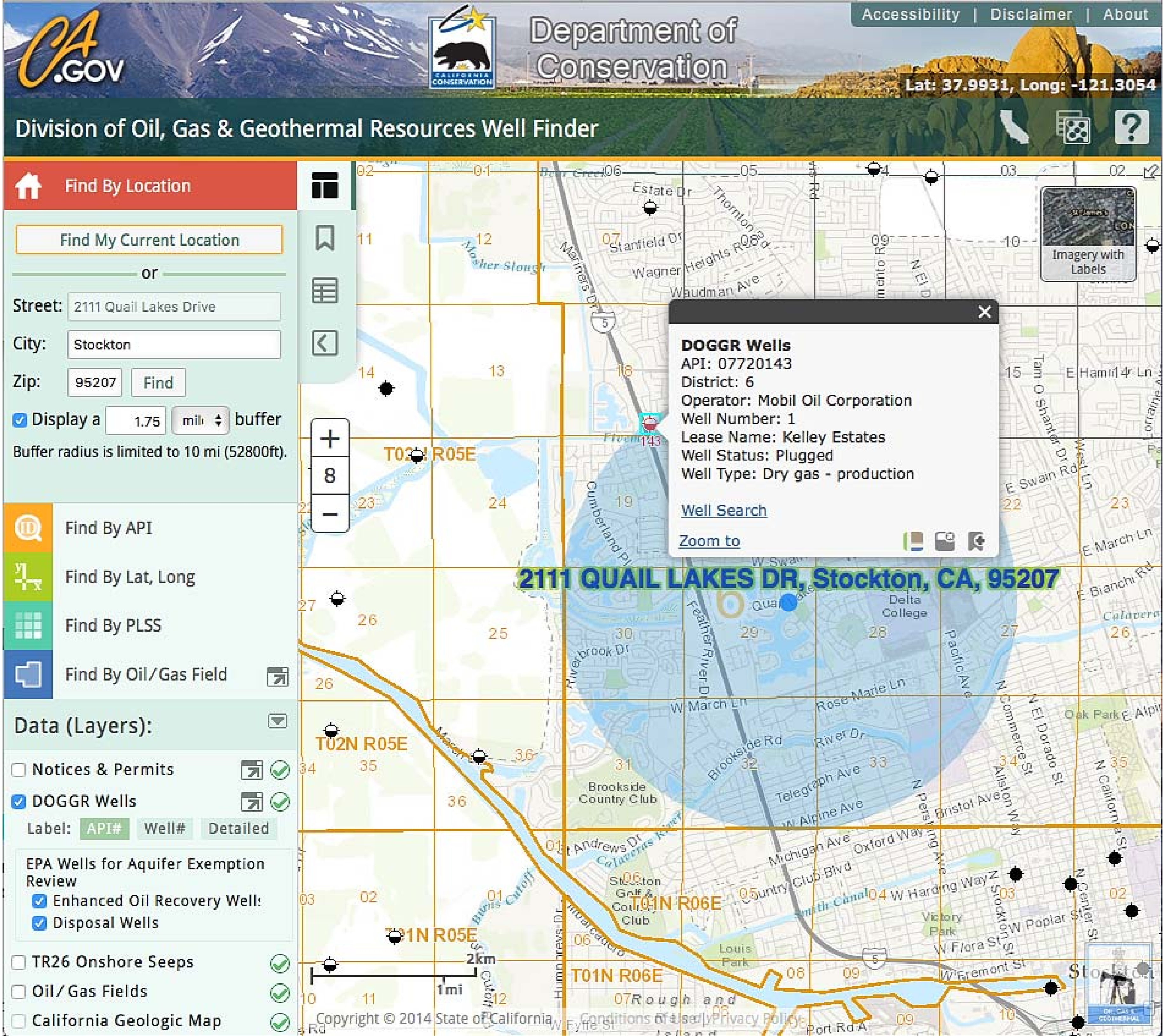
Relinquished By: Narciso Garnica Date 7/27/18 Time 1:30 PM
Received By: Misty Lorence Date 8/2/18 Time 0807am
Relinquished By: Date Time
Received By: Date Time
Relinquished By: Date Time
Received By: Date Time

Comments:

THERE IS AN ADDITIONAL CHARGE FOR EXTRUDING SOIL FROM METAL TUBES

Email Address: ngarnica@condorearth.com

APPENDIX E
OIL AND GAS WELLS



Street: 2111 Quail Lakes Drive

City: Stockton

Zip: 95207

☑ Display a 1.75 mile buffer

☐ Notices & Permits

☑ DOGGR Wells

EPA Wells for Aquifer Exemption Review

☑ Enhanced Oil Recovery Wells

☑ Disposal Wells

☐ TR26 Onshore Seeps

☐ Oil/Gas Fields

☐ California Geologic Map

DOGGR Wells

API: 07720143

District: 6

Operator: Mobil Oil Corporation

Well Number: 1

Lease Name: Kelley Estates

Well Status: Plugged

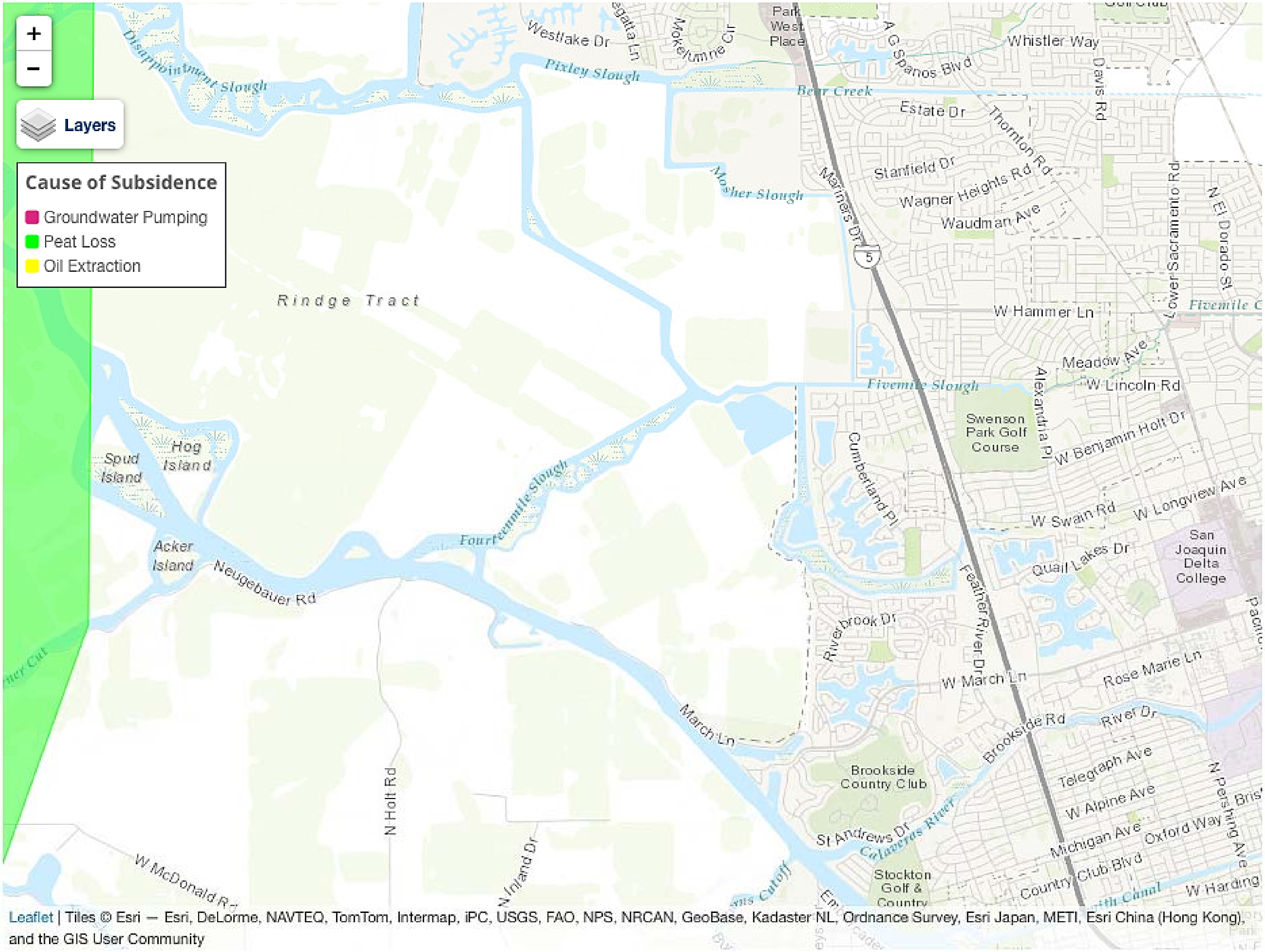
Well Type: Dry gas - production

Well Search

Zoom to

Areas of Land Subsidence in California

In California, large areas of land subsidence were first documented by USGS scientists in the first half of the 20th century. Most of this subsidence was a result of excessive groundwater pumping. Completion of California's State and Federal water projects that bring water from California's wet north to its dry south allowed some groundwater aquifers to recover, and subsidence decreased in these areas. However, subsidence continues today, sometimes at nearly historically high rates of more than 1 foot/year (ft/yr). The map below illustrates areas of recorded subsidence—historical and current—across California.



Leaflet | Tiles © Esri — Esri, DeLorme, NAVTEQ, TomTom, Intermap, iPC, USGS, FAO, NPS, NRCAN, GeoBase, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), and the GIS User Community

APPENDIX F
LIQUEFACTION ANALYSIS

Liquefaction SPT Analysis 3.3.1

Organization: **Stockton Unified School Dist.**
Project Name: **2111 Quail Lakes Drive B12**
Job #: **7572D**
Analysis by: **R. Skaggs**
Date: **8/10/2018**

Input Parameters

Units: **English**

Variable	Value	Variable	Value
Peak Ground Acceleration	0.390 g	Design GWT (Historical)	5.00 ft
Earthquake Magnitude	6.6 MW	Site GWT	18.0 ft
Bottom Depth	51.50 ft	Average Soil Unit Weight	
Bore Hole Diameter	8.0 in	above GWT	120.0 pcf
Rod Length Height Stick up	3.5 ft	below GWT	125.0 pcf
Correction for Sample Liners	No	Sloping Ground	No

Geotechnical Properties

#	Material Type	USCS	Bottom Depth, ft	Consistency	Flags	SPT field	Fines Content, %	Energy Ratio, %
1	Cohesive Soil	CL	5.00	Stiff	Unsaturated	20	80	80
2	Cohesive Soil	CL	34.00	Stiff	Clay	15	80	80
3	Granular Soil	SP	37.00	Loose		12	5	80
4	Cohesive Soil	ML	45.00	Firm		12	55	80
5	Granular Soil	SP	47.50	Medium Dense		19	5	80
6	Granular Soil	SM	50.00	Medium Dense		13	15	80
7	Cohesive Soil	CL	51.50	Stiff	Clay	12	80	80

Results

Settlement:	3.98 in
Lateral Displacement:	0.00 ft

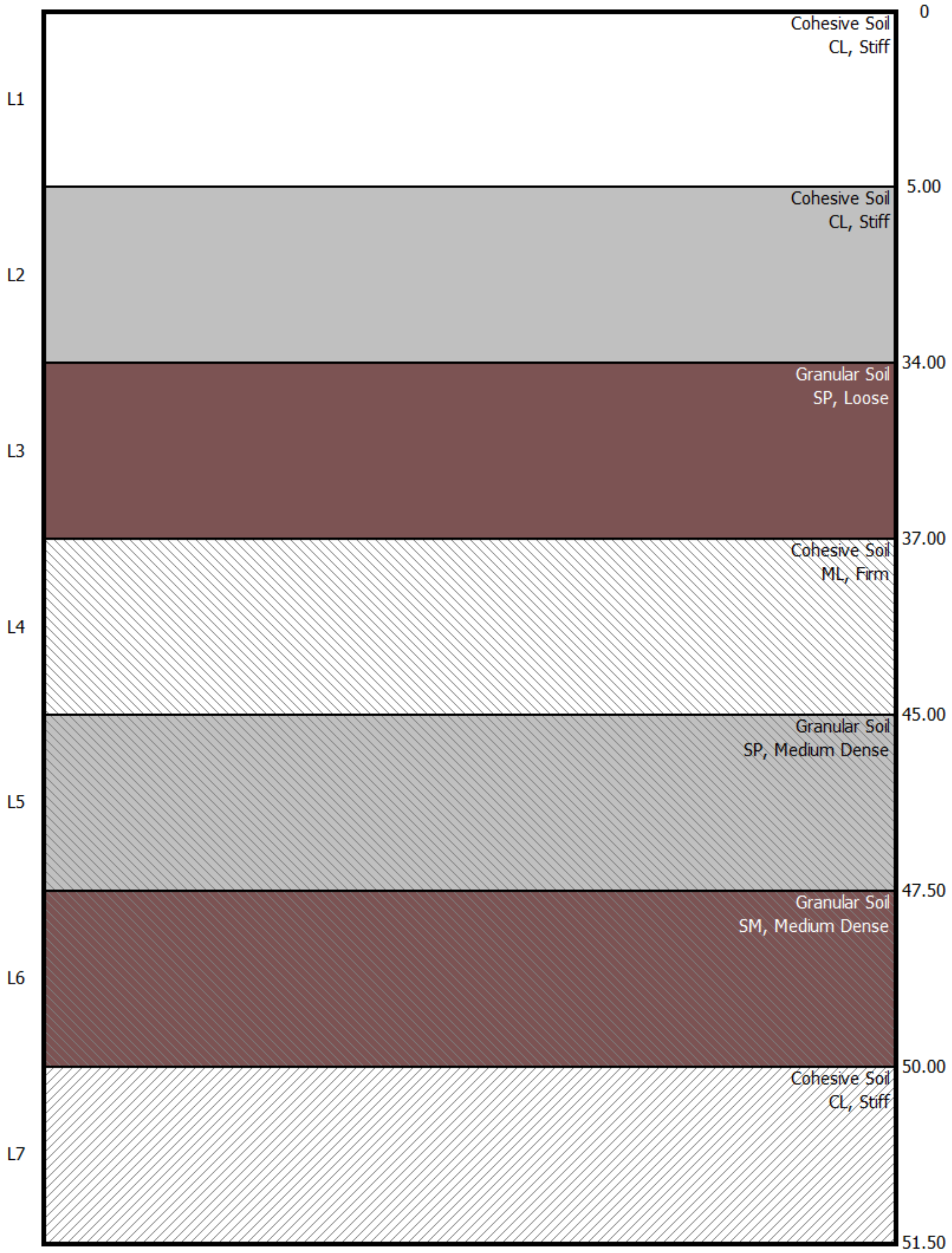


Fig. 1: Subsurface profile

Liquefaction Analysis - Set 1/4

Sample #	Depth, ft	C_E	C_B	C_R	C_S	N_{60}
1	5.00	1.33	1.15	0.75	1.00	23.00
2	34.00	1.33	1.15	1.00	1.00	23.00
3	37.00	1.33	1.15	1.00	1.00	18.40
4	45.00	1.33	1.15	1.00	1.00	18.40
5	47.50	1.33	1.15	1.00	1.00	29.13
6	50.00	1.33	1.15	1.00	1.00	19.93
7	51.50	1.33	1.15	1.00	1.00	18.40

Liquefaction Analysis - Set 2/4

Sample #	Depth, ft	σ V, psf	σ V', psf	C_N	$(N_1)_{60}$
1	5.00	600.0	600.0	1.46	33.67
2	34.00	4225.0	2415.4	0.90	n.a
3	37.00	4600.0	2603.2	0.91	16.66
4	45.00	5600.0	3104.0	0.85	15.58
5	47.50	5912.5	3260.5	0.84	24.43
6	50.00	6225.0	3417.0	0.81	16.07
7	51.50	6412.5	3510.9	0.67	n.a

Liquefaction Analysis - Set 3/4

Sample #	Depth, ft	ΔN-Fines	$(N_1)_{60}$-CS	Stress Reduc.	CSR	MSF-Sand
1	5.00	5.54	39.21	0.989	0.251	1.267
2	34.00	n.a	n.a	0.829	0.368	1.267
3	37.00	0.00	16.67	0.810	0.363	1.267
4	45.00	5.61	21.19	0.759	0.347	1.267
5	47.50	0.00	24.43	0.743	0.342	1.267
6	50.00	3.26	19.33	0.728	0.336	1.267
7	51.50	n.a	n.a	0.719	0.333	1.267

Liquefaction Analysis - Set 4/4

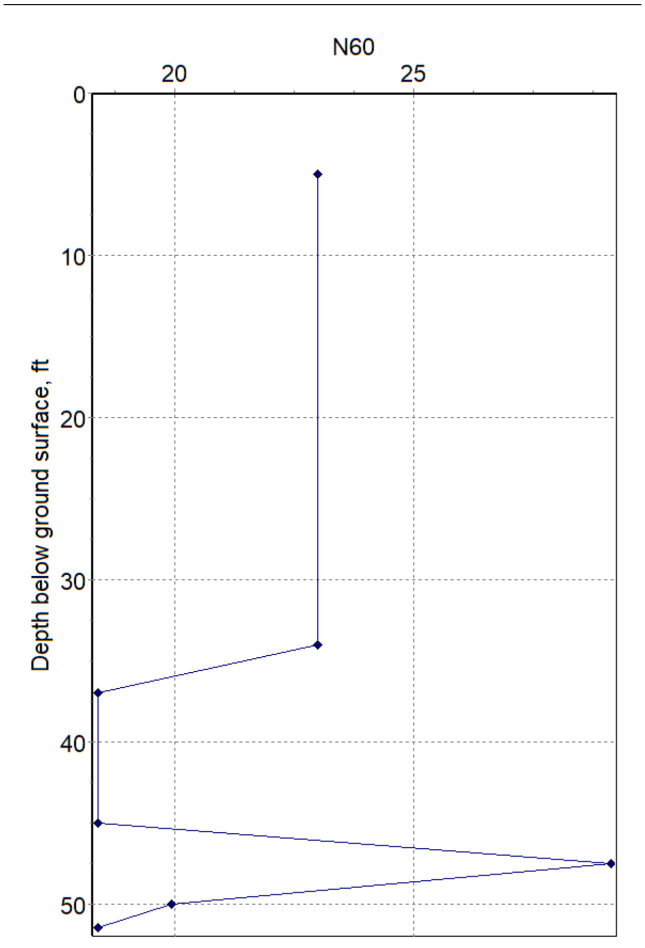
Sample #	Depth, ft	K_σSand	CRR-M=7.5 & σvc=1	CRR	Liq. F.S.
1	5.00	1.100	2.00	n.a	n.a
2	34.00	0.993	n.a	n.a	n.a
3	37.00	0.975	0.17	0.211	0.58
4	45.00	0.946	0.22	0.265	0.76
5	47.50	0.931	0.28	0.327	0.96
6	50.00	0.937	0.20	0.235	0.70
7	51.50	0.973	n.a	n.a	n.a

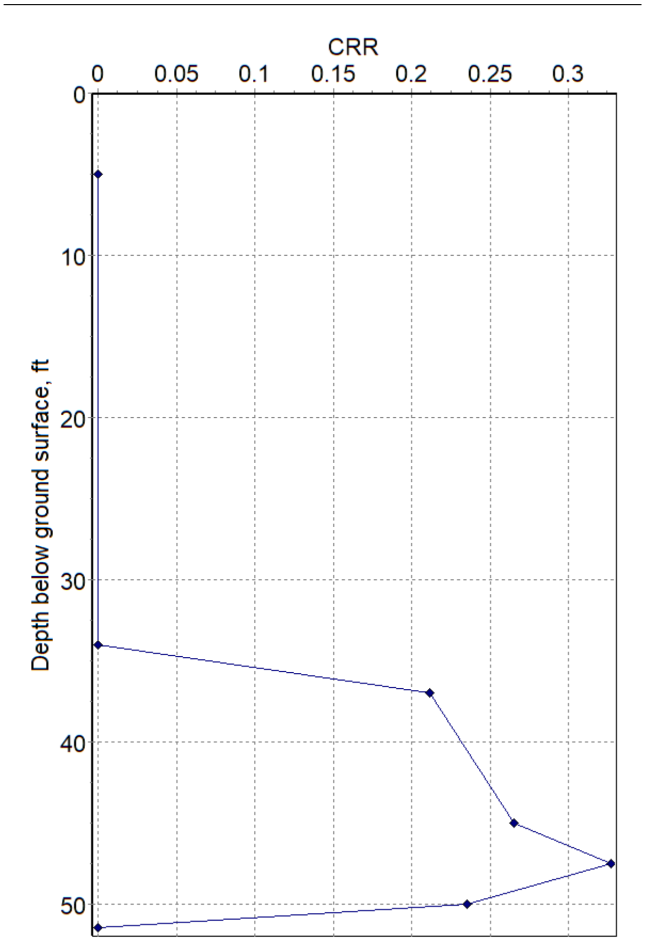
Dynamic Settlement - Set 1/2

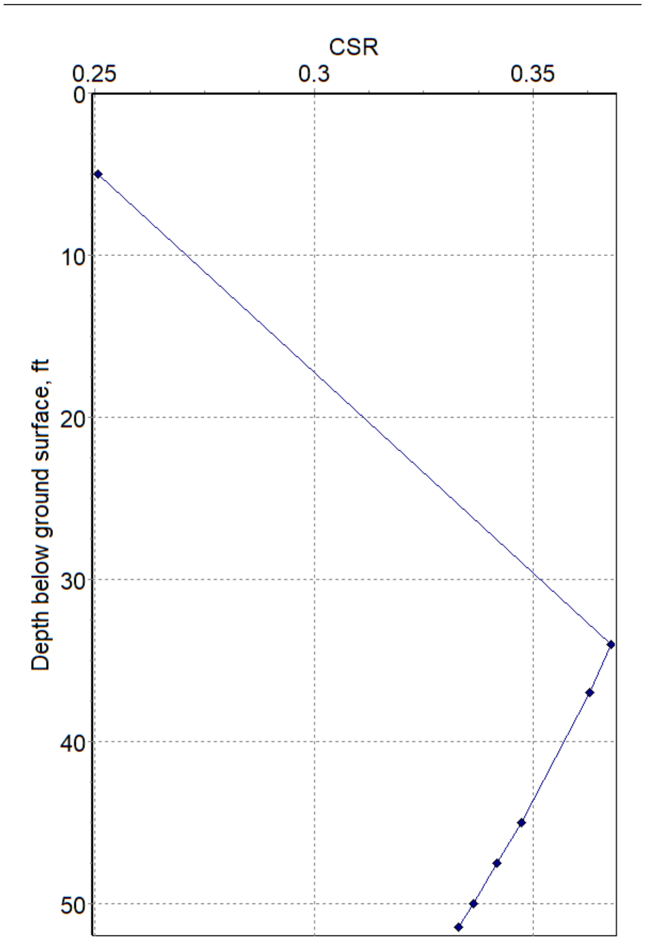
Sample #	Depth, ft	Lim. Shear Strain, γlim	Fα Parameter	Max. Shear Strain, γmax	ΔH I, ft
1	5.00	0.01	-0.745	0.000	5.00
2	34.00	0.00	0.000	0.000	29.00
3	37.00	0.23	0.682	0.230	3.00
4	45.00	0.14	0.453	0.076	8.00
5	47.50	0.10	0.267	0.039	2.50
6	50.00	0.17	0.553	0.139	2.50
7	51.50	0.00	0.000	0.000	1.50

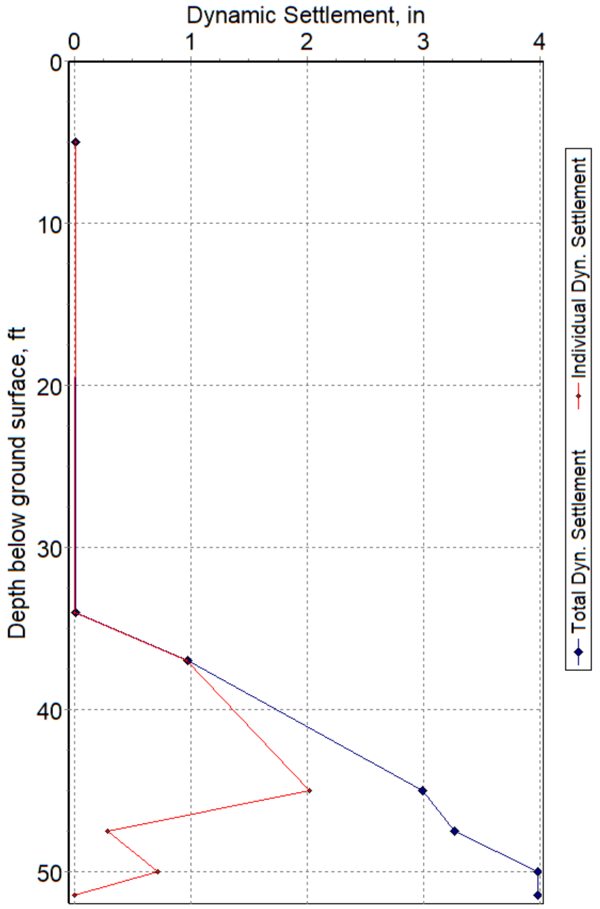
Dynamic Settlement - Set 2/2

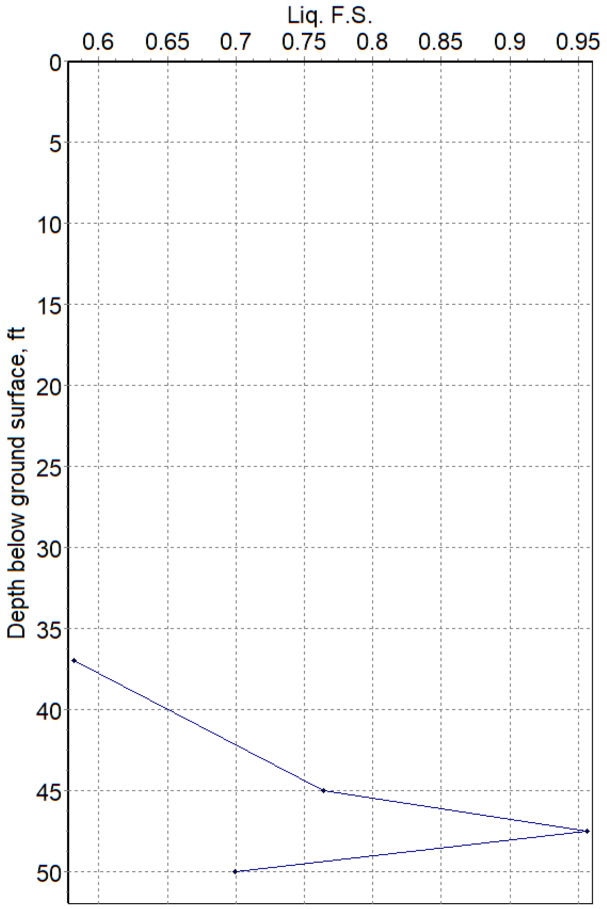
Sample #	Depth, ft	Vert. Consol. Str, εV	Dyn. Sett, in	Accum. Sett, in
1	5.00	0.000	0.009	0.009
2	34.00	0.000	0.000	0.009
3	37.00	0.027	0.960	0.969
4	45.00	0.021	2.018	2.987
5	47.50	0.009	0.283	3.270
6	50.00	0.024	0.712	3.982
7	51.50	0.000	0.000	3.982


N60
20
25
0
10
20
30
40
50
Depth below ground surface, ft


CRR
0
0.05
0.1
0.15
0.2
0.25
0.3
0
10
20
30
40
50
Depth below ground surface, ft


CSR
0.25
0.3
0.35
0
10
20
30
40
50
Depth below ground surface, ft





References:

1. "Soil Liquefaction During Earthquakes",
   I.M. Idriss & R.W. Boulanger, 2008, MNO-12, EERI
2. LiquefactionSPT by SoilStructure.com

Liquefaction SPT Analysis 3.3.1

Organization:	**Stockton Unified School Dist.**
Project Name:	**2111 Quail Lakes Drive B13**
Job #:	**7572D**
Analysis by:	**R. Skaggs**
Date:	**8/10/2018**

Input Parameters

Units: **English**

Variable	Value	Variable	Value
Peak Ground Acceleration	0.390 g	Design GWT (Historical)	5.00 ft
Earthquake Magnitude	6.6 MW	Site GWT	18.0 ft
Bottom Depth	61.50 ft	Average Soil Unit Weight	
Bore Hole Diameter	8.0 in	above GWT	120.0 pcf
Rod Length Height Stick up	3.5 ft	below GWT	125.0 pcf
Correction for Sample Liners	No	Sloping Ground	No

Geotechnical Properties

#	Material Type	USCS	Bottom Depth, ft	Consistency	Flags	SPT field	Fines Content, %	Energy Ratio, %
1	Cohesive Soil	CL	5.00	Stiff	Unsaturated	20	80	80
2	Cohesive Soil	CL	30.00	Stiff	Clay	15	80	80
3	Granular Soil	SM	32.50	Loose		7	36	80
4	Cohesive Soil	CL	37.50	Stiff	Clay	20	80	80
5	Cohesive Soil	ML	42.50	Firm		16	55	80
6	Cohesive Soil	ML	50.00	Soft		6	55	80
7	Granular Soil	SP	52.00	Medium Dense		23	5	80
8	Cohesive Soil		59.00	Stiff	Clay	20	80	80
9	Granular Soil		61.50	Medium Dense		21	5	80

Results

Settlement:	4.38 in
Lateral Displacement:	0.00 ft

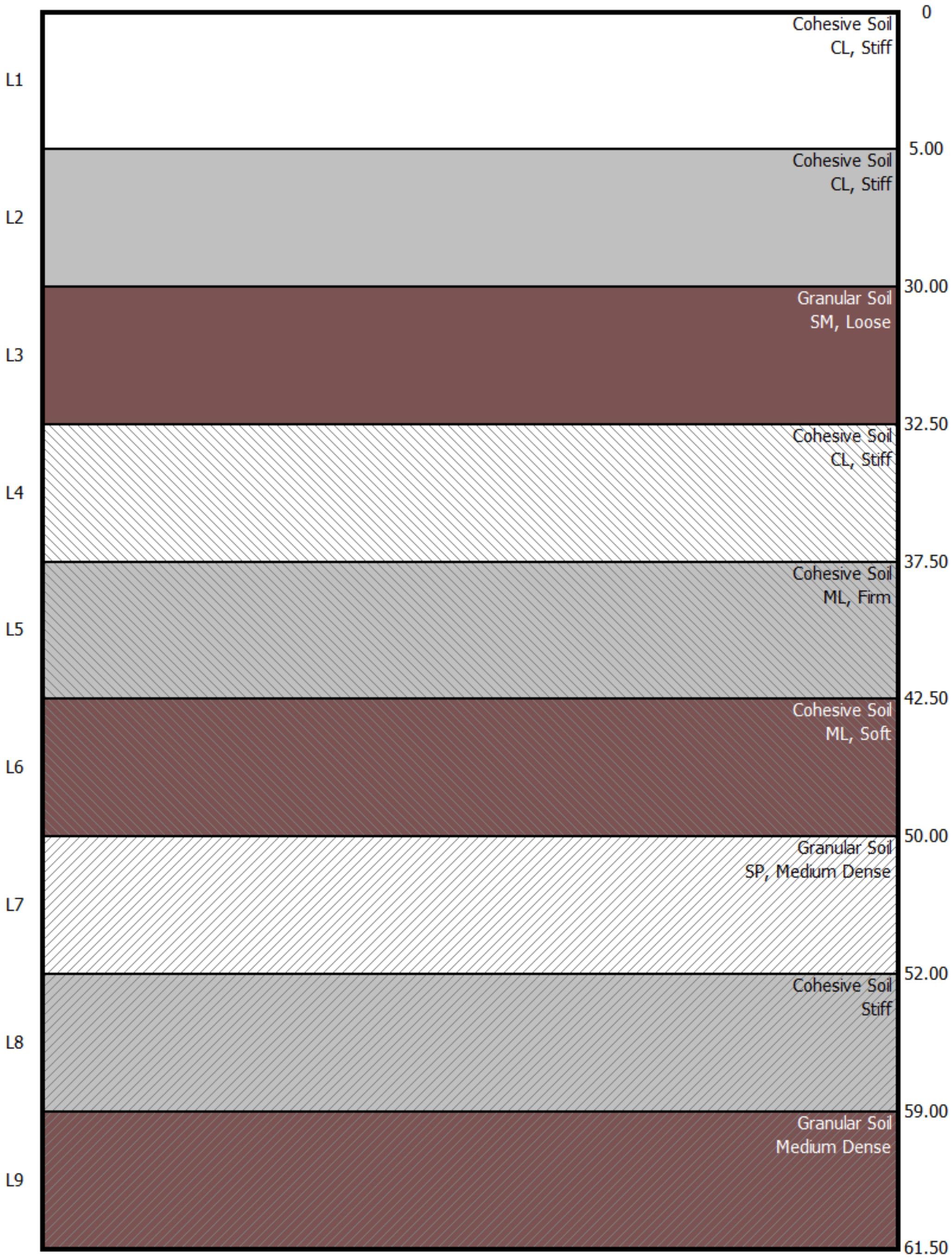


Fig. 1: Subsurface profile

Liquefaction Analysis - Set 1/4

Sample #	Depth, ft	C_E	C_B	C_R	C_S	N_{60}
1	5.00	1.33	1.15	0.75	1.00	23.00
2	30.00	1.33	1.15	1.00	1.00	23.00
3	32.50	1.33	1.15	1.00	1.00	10.73
4	37.50	1.33	1.15	1.00	1.00	30.67
5	42.50	1.33	1.15	1.00	1.00	24.53
6	50.00	1.33	1.15	1.00	1.00	9.20
7	52.00	1.33	1.15	1.00	1.00	35.27
8	59.00	1.33	1.15	1.00	1.00	30.67
9	61.50	1.33	1.15	1.00	1.00	32.20

Liquefaction Analysis - Set 2/4

Sample #	Depth, ft	σ V, psf	σ V', psf	C_N	$(N_1)_{60}$
1	5.00	600.0	600.0	1.46	33.67
2	30.00	3725.0	2165.0	0.98	n.a
3	32.50	4037.5	2321.5	0.96	10.25
4	37.50	4662.5	2634.5	0.84	n.a
5	42.50	5287.5	2947.5	0.88	21.58
6	50.00	6225.0	3417.0	0.78	7.20
7	52.00	6475.0	3542.2	0.83	29.12
8	59.00	7350.0	3980.4	0.61	n.a
9	61.50	7662.5	4136.9	0.76	24.53

Liquefaction Analysis - Set 3/4

Sample #	Depth, ft	ΔN-Fines	$(N_1)_{60}$-CS	Stress Reduc.	CSR	MSF-Sand
1	5.00	5.54	39.21	0.989	0.251	1.267
2	30.00	n.a	n.a	0.854	0.373	1.267
3	32.50	5.52	15.78	0.839	0.370	1.267
4	37.50	n.a	n.a	0.807	0.362	1.267
5	42.50	5.61	27.19	0.775	0.352	1.267
6	50.00	5.61	12.81	0.728	0.336	1.267
7	52.00	0.00	29.12	0.716	0.332	1.267
8	59.00	n.a	n.a	0.676	0.316	1.267
9	61.50	0.00	24.54	0.662	0.311	1.267

Liquefaction Analysis - Set 4/4

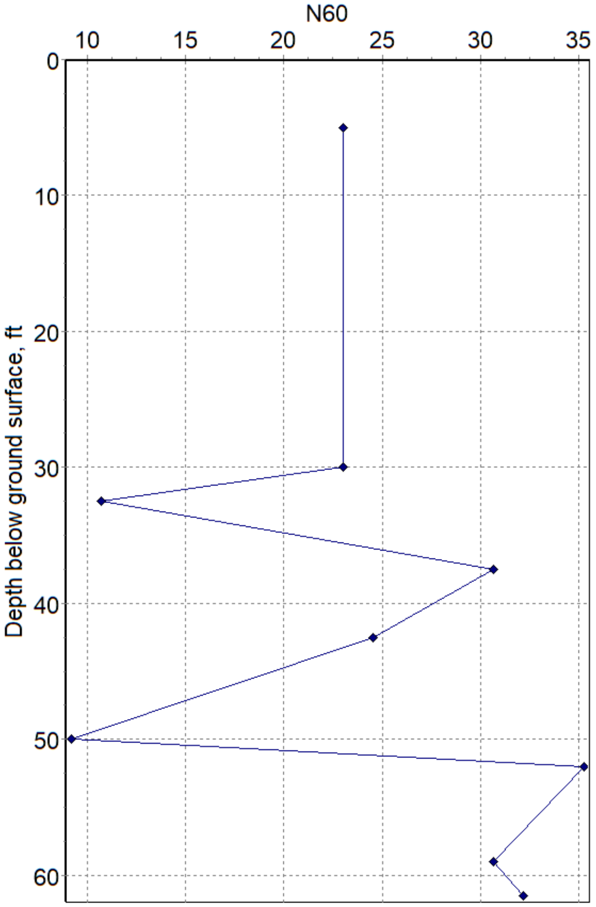
Sample #	Depth, ft	K_σSand	CRR-M=7.5 & σvc=1	CRR	Liq. F.S.
1	5.00	1.100	2.00	n.a	n.a
2	30.00	0.999	n.a	n.a	n.a
3	32.50	0.989	0.16	0.204	0.55
4	37.50	0.988	n.a	n.a	n.a
5	42.50	0.940	0.35	0.421	1.19
6	50.00	0.951	0.14	0.167	0.50
7	52.00	0.899	0.43	0.495	1.49
8	59.00	0.966	n.a	n.a	n.a
9	61.50	0.893	0.28	0.316	1.02

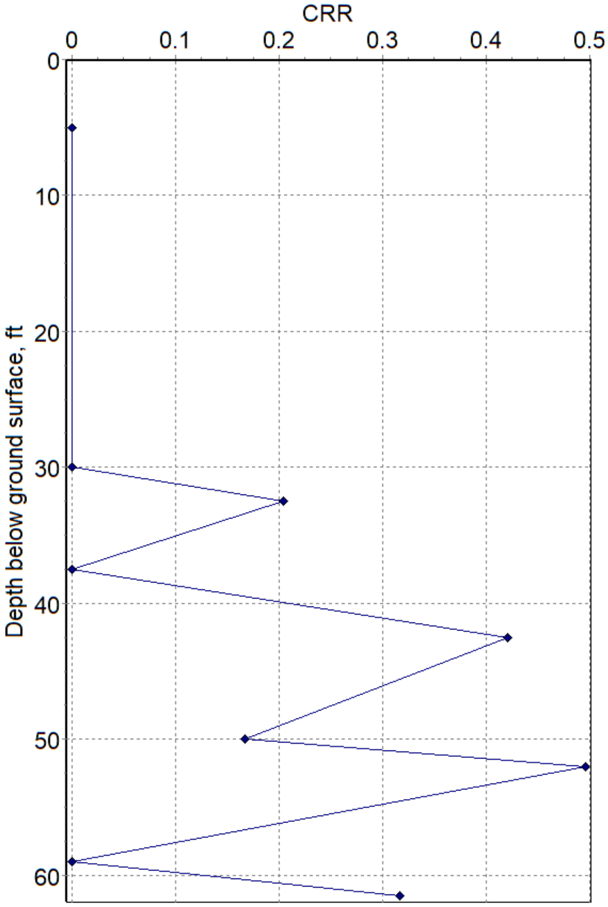
Dynamic Settlement - Set 1/2

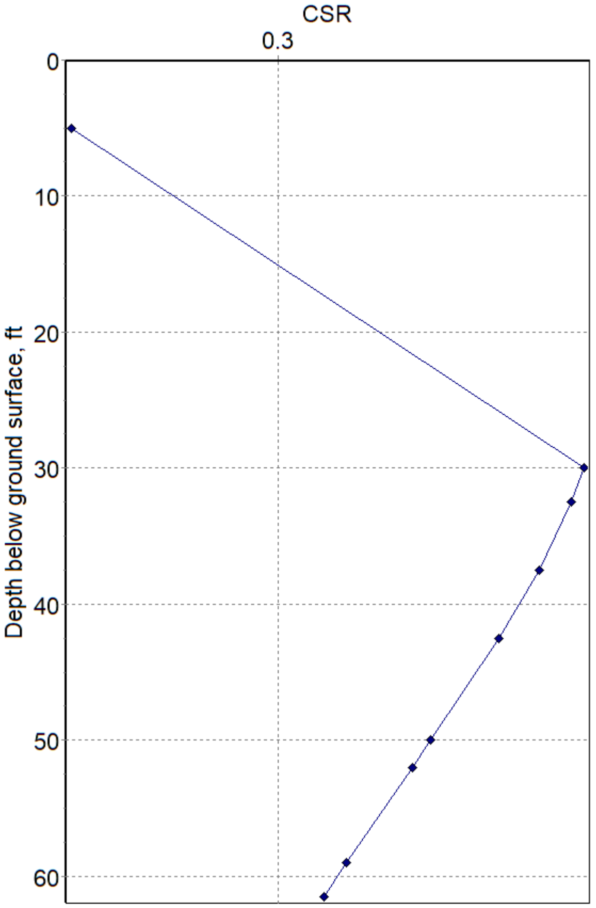
Sample #	Depth, ft	Lim. Shear Strain, γlim	Fα Parameter	Max. Shear Strain, γmax	ΔH I, ft
1	5.00	0.01	-0.745	0.000	5.00
2	30.00	0.00	0.000	0.000	25.00
3	32.50	0.25	0.722	0.253	2.50
4	37.50	0.00	0.000	0.000	5.00
5	42.50	0.07	0.095	0.023	5.00
6	50.00	0.35	0.836	0.349	7.50
7	52.00	0.05	-0.030	0.012	2.00
8	59.00	0.00	0.000	0.000	7.00
9	61.50	0.09	0.260	0.034	2.50

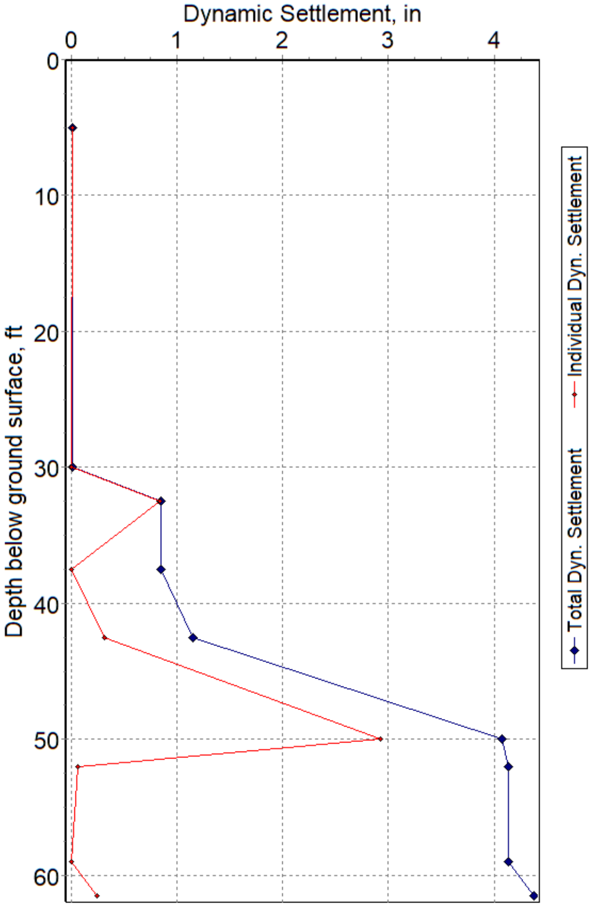
Dynamic Settlement - Set 2/2

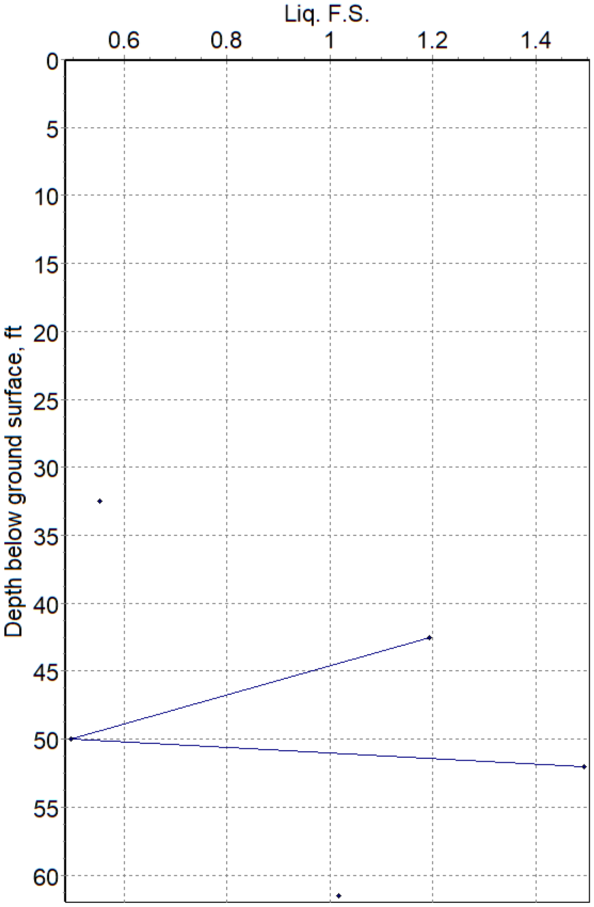
Sample #	Depth, ft	Vert. Consol. Str, εV	Dyn. Sett, in	Accum. Sett, in
1	5.00	0.000	0.009	0.009
2	30.00	0.000	0.000	0.009
3	32.50	0.028	0.835	0.844
4	37.50	0.000	0.000	0.844
5	42.50	0.005	0.309	1.153
6	50.00	0.032	2.922	4.074
7	52.00	0.002	0.059	4.134
8	59.00	0.000	0.000	4.134
9	61.50	0.008	0.244	4.377


N60
10
15
20
25
30
35
0
10
20
30
40
50
60
Depth below ground surface, ft


CRR
0
0.1
0.2
0.3
0.4
0.5
0
10
20
30
40
50
60
Depth below ground surface, ft


CSR
0.3
0
10
20
30
40
50
60
Depth below ground surface, ft





References:

1. "Soil Liquefaction During Earthquakes",
   I.M. Idriss & R.W. Boulanger, 2008, MNO-12, EERI
2. LiquefactionSPT by SoilStructure.com

Liquefaction SPT Analysis 3.3.1

Organization:	**Stockton Unified School Dist.**
Project Name:	**2111 Quail Lakes Drive B13**
Job #:	**7572D**
Analysis by:	**R. Skaggs**
Date:	**8/10/2018**

Input Parameters

Units: **English**

Variable	Value	Variable	Value
Peak Ground Acceleration	0.390 g	Design GWT (Historical)	5.00 ft
Earthquake Magnitude	6.6 MW	Site GWT	18.0 ft
Bottom Depth	61.50 ft	Average Soil Unit Weight	
Bore Hole Diameter	8.0 in	above GWT	120.0 pcf
Rod Length Height Stick up	3.5 ft	below GWT	125.0 pcf
Correction for Sample Liners	No	Sloping Ground	No

Geotechnical Properties

#	Material Type	USCS	Bottom Depth, ft	Consistency	Flags	SPT field	Fines Content, %	Energy Ratio, %
1	Cohesive Soil	CL	5.00	Stiff	Unsaturated	20	80	80
2	Cohesive Soil	CL	30.00	Stiff	Clay	15	80	80
3	Granular Soil	SM	32.50	Loose		7	36	80
4	Cohesive Soil	CL	37.50	Stiff	Clay	20	80	80
5	Cohesive Soil	ML	42.50	Firm		16	55	80
6	Cohesive Soil	ML	50.00	Soft		6	55	80
7	Granular Soil	SP	52.00	Medium Dense		23	5	80
8	Cohesive Soil		59.00	Stiff	Clay	20	80	80
9	Granular Soil		61.50	Medium Dense		21	5	80

Results

Settlement:	4.38 in
Lateral Displacement:	0.00 ft

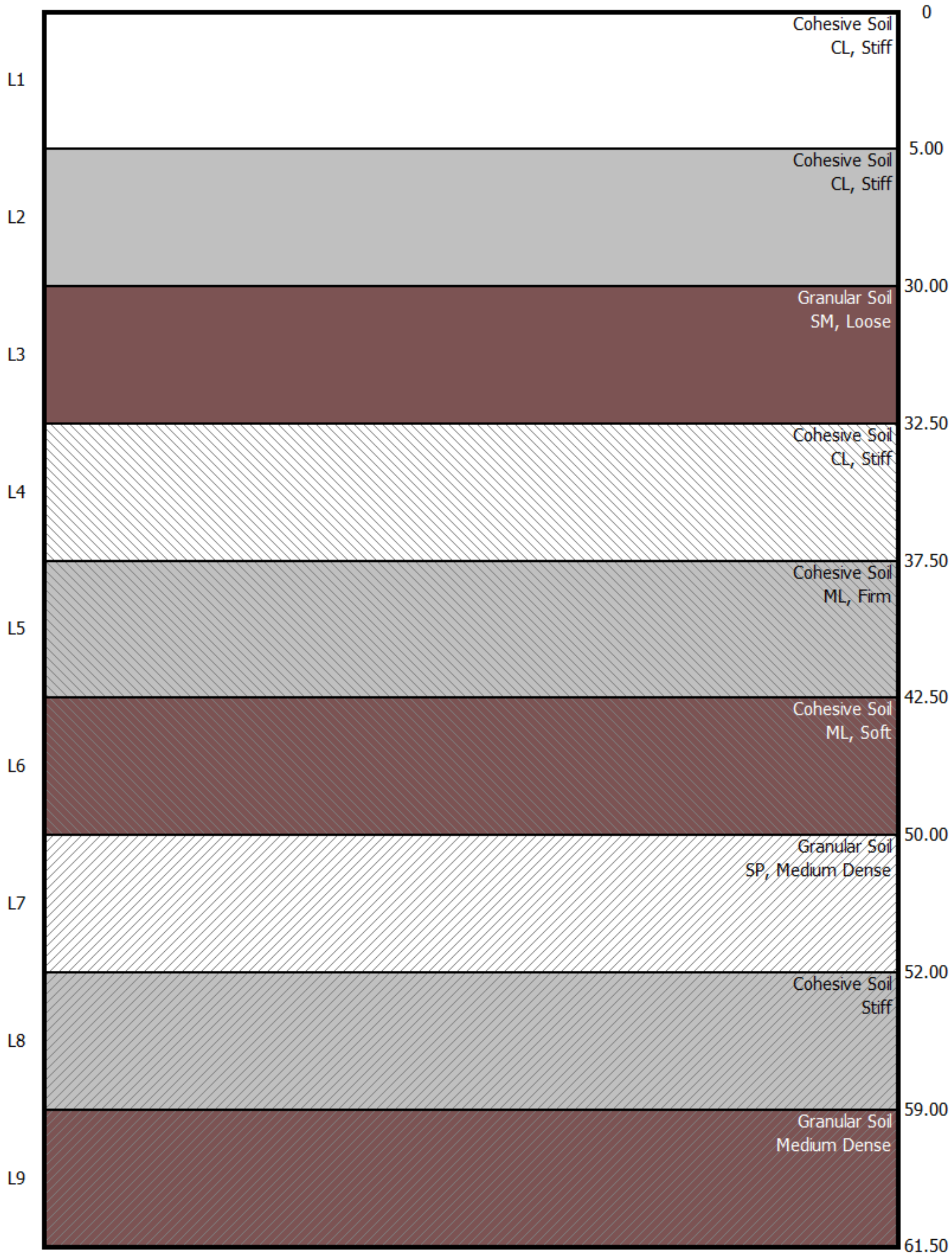


Fig. 1: Subsurface profile

Liquefaction Analysis - Set 1/4

Sample #	Depth, ft	C_E	C_B	C_R	C_S	N_{60}
1	5.00	1.33	1.15	0.75	1.00	23.00
2	30.00	1.33	1.15	1.00	1.00	23.00
3	32.50	1.33	1.15	1.00	1.00	10.73
4	37.50	1.33	1.15	1.00	1.00	30.67
5	42.50	1.33	1.15	1.00	1.00	24.53
6	50.00	1.33	1.15	1.00	1.00	9.20
7	52.00	1.33	1.15	1.00	1.00	35.27
8	59.00	1.33	1.15	1.00	1.00	30.67
9	61.50	1.33	1.15	1.00	1.00	32.20

Liquefaction Analysis - Set 2/4

Sample #	Depth, ft	σ V, psf	σ V', psf	C_N	$(N_1)_{60}$
1	5.00	600.0	600.0	1.46	33.67
2	30.00	3725.0	2165.0	0.98	n.a
3	32.50	4037.5	2321.5	0.96	10.25
4	37.50	4662.5	2634.5	0.84	n.a
5	42.50	5287.5	2947.5	0.88	21.58
6	50.00	6225.0	3417.0	0.78	7.20
7	52.00	6475.0	3542.2	0.83	29.12
8	59.00	7350.0	3980.4	0.61	n.a
9	61.50	7662.5	4136.9	0.76	24.53

Liquefaction Analysis - Set 3/4

Sample #	Depth, ft	ΔN-Fines	$(N_1)_{60}$-CS	Stress Reduc.	CSR	MSF-Sand
1	5.00	5.54	39.21	0.989	0.251	1.267
2	30.00	n.a	n.a	0.854	0.373	1.267
3	32.50	5.52	15.78	0.839	0.370	1.267
4	37.50	n.a	n.a	0.807	0.362	1.267
5	42.50	5.61	27.19	0.775	0.352	1.267
6	50.00	5.61	12.81	0.728	0.336	1.267
7	52.00	0.00	29.12	0.716	0.332	1.267
8	59.00	n.a	n.a	0.676	0.316	1.267
9	61.50	0.00	24.54	0.662	0.311	1.267

Liquefaction Analysis - Set 4/4

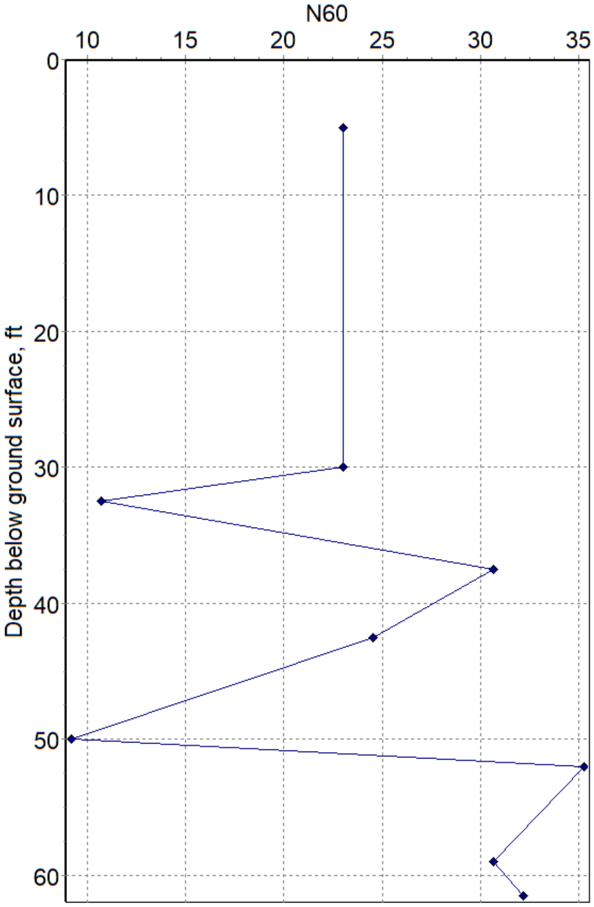
Sample #	Depth, ft	K_σSand	CRR-M=7.5 & σvc=1	CRR	Liq. F.S.
1	5.00	1.100	2.00	n.a	n.a
2	30.00	0.999	n.a	n.a	n.a
3	32.50	0.989	0.16	0.204	0.55
4	37.50	0.988	n.a	n.a	n.a
5	42.50	0.940	0.35	0.421	1.19
6	50.00	0.951	0.14	0.167	0.50
7	52.00	0.899	0.43	0.495	1.49
8	59.00	0.966	n.a	n.a	n.a
9	61.50	0.893	0.28	0.316	1.02

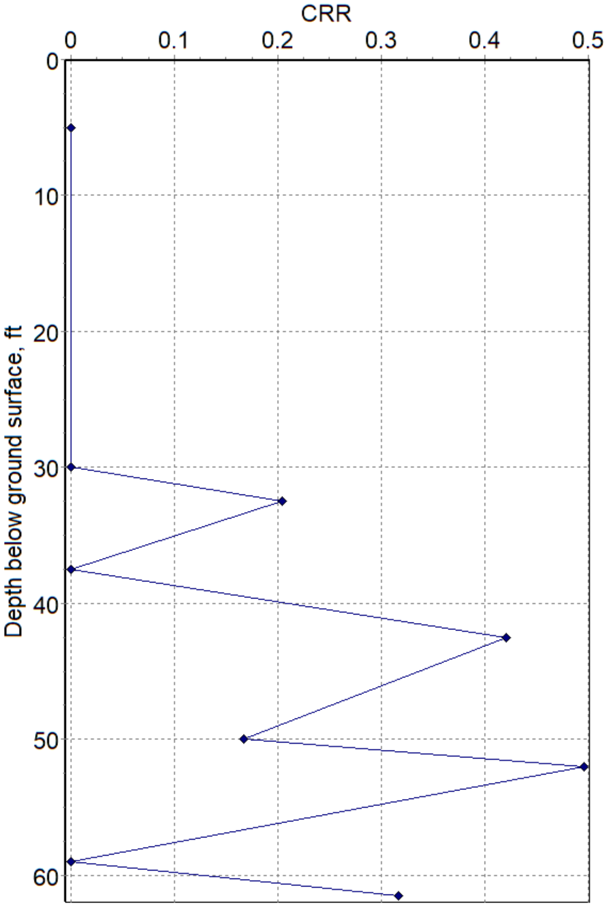
Dynamic Settlement - Set 1/2

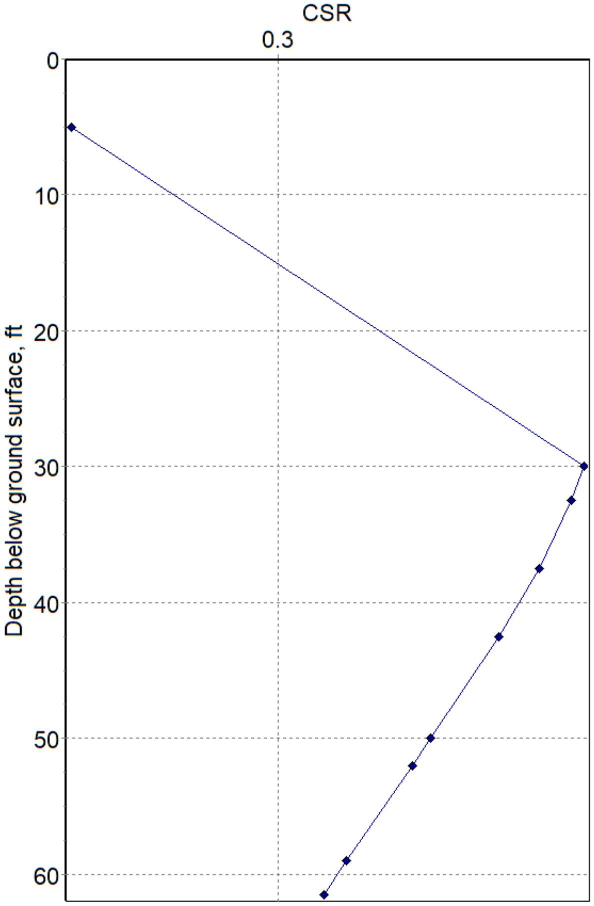
Sample #	Depth, ft	Lim. Shear Strain, γlim	Fα Parameter	Max. Shear Strain, γmax	ΔH I, ft
1	5.00	0.01	-0.745	0.000	5.00
2	30.00	0.00	0.000	0.000	25.00
3	32.50	0.25	0.722	0.253	2.50
4	37.50	0.00	0.000	0.000	5.00
5	42.50	0.07	0.095	0.023	5.00
6	50.00	0.35	0.836	0.349	7.50
7	52.00	0.05	-0.030	0.012	2.00
8	59.00	0.00	0.000	0.000	7.00
9	61.50	0.09	0.260	0.034	2.50

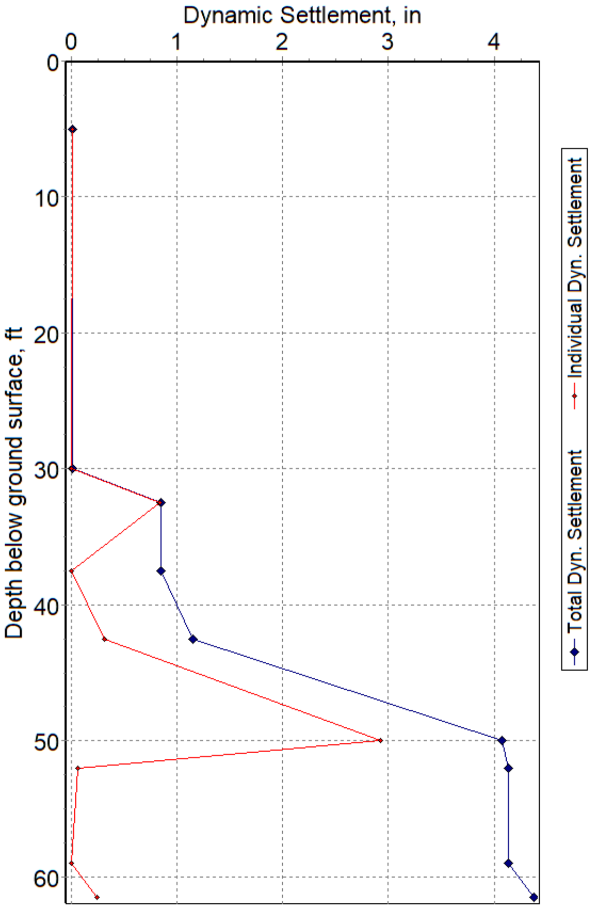
Dynamic Settlement - Set 2/2

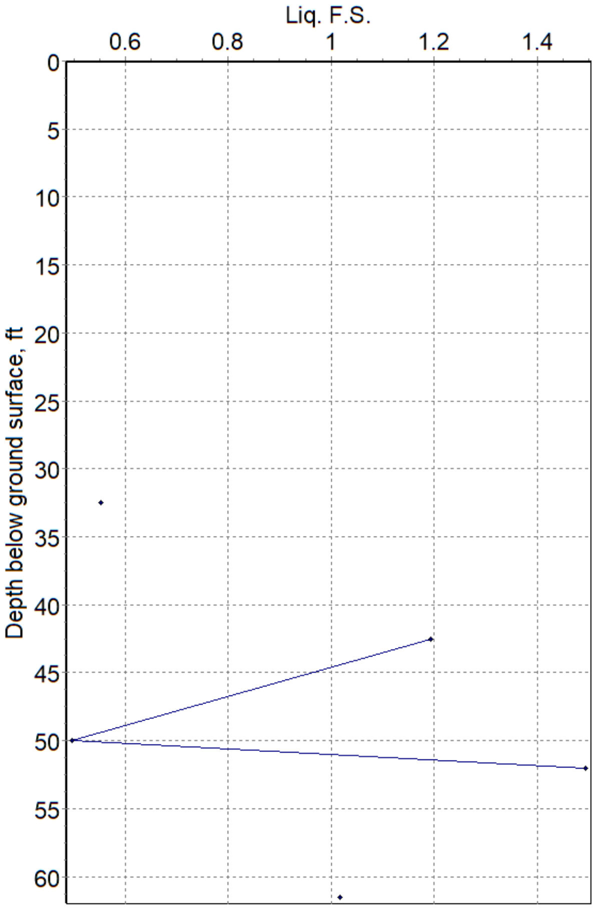
Sample #	Depth, ft	Vert. Consol. Str, εV	Dyn. Sett, in	Accum. Sett, in
1	5.00	0.000	0.009	0.009
2	30.00	0.000	0.000	0.009
3	32.50	0.028	0.835	0.844
4	37.50	0.000	0.000	0.844
5	42.50	0.005	0.309	1.153
6	50.00	0.032	2.922	4.074
7	52.00	0.002	0.059	4.134
8	59.00	0.000	0.000	4.134
9	61.50	0.008	0.244	4.377


N60
10
15
20
25
30
35
0
10
20
30
40
50
60
Depth below ground surface, ft


CRR
0
0.1
0.2
0.3
0.4
0.5
0
10
20
30
40
50
60
Depth below ground surface, ft


CSR
0.3
0
10
20
30
40
50
60
Depth below ground surface, ft





References:

1. "Soil Liquefaction During Earthquakes",
   I.M. Idriss & R.W. Boulanger, 2008, MNO-12, EERI
2. LiquefactionSPT by SoilStructure.com

APPENDIX G
CONSTRUCTION STANDARDS

Designation: E1643 – 11

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 and health practices and determine the applicability of regulatory limitations prior to use.*

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 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 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.

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

---

[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 Oct. 1, 2011. Published October 2011. Originally approved in 1994. Last previous edition approved in 2010 as E1643 – 10. DOI: 10.1520/E1643-11.

[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), P.O. Box 9094, Farmington Hills, MI 48333-9094, http://www.concrete.org.

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 vapor retarder damaged during placement of reinforcing or concrete with vapor barrier material or as instructed by manufacturer.

8.3 Lap beyond damaged areas a minimum of 6 in. (50 mm) and seal as prescribed for sheet joints.

8.4 Avoid the use of non-permanent stakes driven through vapor retarder.

8.5 If non-permanent stakes are driven through vapor retarder, repair as recommended by vapor retarder manufacturer.

8.6 Seal permanent penetrations as recommended by vapor retarder manufacturer.

9. Slab Moisture Content

9.1 *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.

9.2 See ACI 302.2R–06.

10. Keywords

10.1 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.

ASTM International takes no position respecting the validity of any patent rights asserted in connection with any item mentioned in this standard. Users of this standard are expressly advised that determination of the validity of any such patent rights, and the risk of infringement of such rights, are entirely their own responsibility.

This standard is subject to revision at any time by the responsible technical committee and must be reviewed every five years and if not revised, either reapproved or withdrawn. Your comments are invited either for revision of this standard or for additional standards and should be addressed to ASTM International Headquarters. Your comments will receive careful consideration at a meeting of the responsible technical committee, which you may attend. If you feel that your comments have not received a fair hearing you should make your views known to the ASTM Committee on Standards, at the address shown below.

This standard is copyrighted by ASTM International, 100 Barr Harbor Drive, PO Box C700, West Conshohocken, PA 19428-2959, United States. Individual reprints (single or multiple copies) of this standard may be obtained by contacting ASTM at the above address or at 610-832-9585 (phone), 610-832-9555 (fax), or service@astm.org (e-mail); or through the ASTM website (www.astm.org). Permission rights to photocopy the standard may also be secured from the ASTM website (www.astm.org/COPYRIGHT/).

Copyright by ASTM Int'l (all rights reserved); Tue Apr 21 13:01:53 EDT 2015
Downloaded/printed by
Lillian Babcock (Condor Earth Technologies, Inc.) pursuant to License Agreement. No further reproductions authorized.

Designation: E1745 – 11

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 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.

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 (Withdrawn 2009)[3]

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 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 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

---

[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 Oct. 1, 2011. Published October 2011. Originally approved in 1996. Last previous edition approved in 2009 as E1745 – 09. DOI: 10.1520/E1745-11.

[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] The last approved version of this historical standard is referenced on www.astm.org.

surfaces induced by unit vapor pressure difference between the two surfaces under specific temperature and humidity conditions. See *perm.*

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 7.3).

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, 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, Section 8.

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

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

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

7.2 *Tensile Strength of New Material*—Refer to Test Methods E154, 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*[4]—Refer to Test Methods E154, 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, 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, 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.

9.3 When specified in the purchase order or contract, the producer or supplier shall furnish a summary of the test

---

[4] 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, 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, 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.

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

ASTM International takes no position respecting the validity of any patent rights asserted in connection with any item mentioned in this standard. Users of this standard are expressly advised that determination of the validity of any such patent rights, and the risk of infringement of such rights, are entirely their own responsibility.

This standard is subject to revision at any time by the responsible technical committee and must be reviewed every five years and if not revised, either reapproved or withdrawn. Your comments are invited either for revision of this standard or for additional standards and should be addressed to ASTM International Headquarters. Your comments will receive careful consideration at a meeting of the responsible technical committee, which you may attend. If you feel that your comments have not received a fair hearing you should make your views known to the ASTM Committee on Standards, at the address shown below.

This standard is copyrighted by ASTM International, 100 Barr Harbor Drive, PO Box C700, West Conshohocken, PA 19428-2959, United States. Individual reprints (single or multiple copies) of this standard may be obtained by contacting ASTM at the above address or at 610-832-9585 (phone), 610-832-9555 (fax), or service@astm.org (e-mail); or through the ASTM website (www.astm.org). Permission rights to photocopy the standard may also be secured from the ASTM website (www.astm.org/COPYRIGHT/).

Copyright by ASTM Int'l (all rights reserved); Tue Oct 4 13:52:56 EDT 2016
Downloaded/printed by
Laura Arista (Condor Earth) pursuant to License Agreement. No further reproductions authorized.

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.

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.

24-1.01D(2) Quality Control

24-1.01D(2)(a) General

Reserved

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

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

24-1.01D(2)(c) Mixing

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

24-1.01D(2)(d) Compaction

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(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.

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 application rate is ordered 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(1)(c) Test Result Disputes

Work with the Engineer to avoid potential conflicts and resolve disputes regarding test result discrepancies. If you dispute the test result, notify the Engineer within 5 days of receiving the test result.

If you or the Engineer dispute each other's test results, submit written quality control test results and copies of paperwork including worksheets used to determine the disputed test results. An independent third party must perform referee testing. Before the independent third party participates in a dispute resolution, the independent third party must be accredited under the Department's Independent Assurance Program. The independent third party must be independent of the project. By mutual agreement, the independent third party is chosen from:

1. A Department laboratory
2. A Department laboratory in a district or region not in the district or region the project is located
3. The Transportation Laboratory
4. A laboratory not currently employed by you or your lime producer

If split quality control or acceptance samples are not available, the independent third party uses any available material representing the disputed material for evaluation.

If the dispute resolution independent third party determines the Department's test results are correct, the Department deducts the independent third party testing costs from payments and pays the independent third party. If the independent third party determines your test results are correct, the Department pays the independent third party testing costs without a deduction.

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 250 cu yd of lime stabilized soil. Test in 0.50-foot depth intervals.

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.

24-3–24-8 Reserved

APPENDIX D
TRAFFIC IMPACT STUDY

TRAFFIC IMPACT STUDY

FOR

THE QUAIL LAKES SCHOOL PROJECT

Stockton, CA

Prepared For:

BaseCamp Environmental

Prepared By:

KD Anderson & Associates
3853 Taylor Road, Suite G
Loomis, California 95650
(916) 660-1555

December 14, 2018

0780-11
Quail Lakes School TIS 12-14-18.doc

TRAFFIC IMPACT STUDY FOR
THE QUAIL LAKES SCHOOL PROJECT

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

EXECUTIVE SUMMARY

This *Executive Summary* is a brief overview of the analysis presented in this traffic impact study. It is not intended to be a comprehensive description of the analysis. For more details, the reader is referred to the full description presented in the traffic impact study.

This traffic impact study presents an analysis of the traffic-related effects of the Quail Lakes School project. The project site is located in west-central Stockton, in the general area east of Interstate 5 and north of March Lane. The proposed project is a kindergarten through 8th grade school with an enrollment of 558 students.

This traffic impact study includes analysis of 10 study intersections and two study roadway segments under the following five development scenarios:

- Existing Conditions,

- Near-Term Future Existing Plus Approved Projects (EPAP) No Quail Lakes School Project Conditions,

- Near-Term Future EPAP Plus Quail Lakes School Project Conditions,

- Long-Term Future Cumulative No Quail Lakes School Project Conditions, and

- Long-Term Future Cumulative Plus Quail Lakes School Project Conditions.

Under all five development scenarios, all study intersections and roadway segments would operate at acceptable operating conditions. No roadway improvements are necessary.

In addition to presenting an analysis of traffic operating conditions, this traffic impact study also presents analysis of project-related impacts on:

- demand for public transit services,
- demand for bicycle and pedestrian facilities,
- parking, and
- site circulation and access.

Significant impacts are identified for pedestrian crossing of adjacent roadways, and vehicle queuing resulting in blocking of an adjacent intersection. Mitigation measures are identified to reduce these impacts to less than significant levels.

INTRODUCTION

This traffic impact study presents an analysis of the traffic-related effects of the proposed Quail Lakes School project. The following is a description of the project and the overall analysis approach applied in this traffic impact study.

PROJECT DESCRIPTION

An objective of the Quail Lakes School project is to construct a new elementary school in an area that currently does not have a neighborhood school and is home to students who attend other schools in the Stockton Unified School District (SUSD).

Project Location

The Quail Lakes School project site is located in the Quail Lakes development in west-central Stockton in the City of Stockton. The general project location is shown in **Figure 1**. As shown in **Figure 2**, the project site is on the northeast corner of the intersection of Quail Lakes Drive and Alexandria Place. It is bounded on the south by Quail Lakes Drive, on the west by Alexandria Place, and on the north by Cedar Ridge Drive. The project site consists of approximately 6.01 acres. The site currently contains buildings used by a church.

Project Components

The SUSD proposes to construct a new elementary school on the Quail Lakes School project site to accommodate students from kindergarten to 8th grade. **Figure 3** presents a site plan for the proposed project.

One single-story building in the northeast corner of the project site would contain two classrooms that would serve kindergarten students. The building would include a room for a transitional kindergarten program. The building also would contain a work room, storage and utility rooms, and restrooms.

The other classroom building, located south of the kindergarten building, would have two stories. Each story would have nine classrooms, so the building would accommodate 18 classrooms, serving 1st to 8th grade students. This building also would contain a work room, storage and utility rooms, and restrooms.

A multipurpose "cafetorium" building would be located in the northwest corner of the project site. The building would serve as a cafeteria and a gymnasium, with a kitchen area to the side of the main building area. This building also would have a room for physical education and a room for music and visual and performing arts classes. A stage would be at one end of the main building area, and an entry lobby would be at the other end. Storage and custodial rooms would be included.

A combined library and administration building would be south of the multipurpose cafetorium building. The library would occupy approximately half of this building, and it would contain a book stack area, an open area for study, a lobby, and a storage room. The other half of the building would have the offices of the principal and vice principal, a staff work room, an administrative work area, conference room, health facilities, lounge, and a lobby reception area.

The southern portion of the project site would be mostly dedicated to play areas. Play courts for activities such as basketball, volleyball, and tetherball, along with an obstacle course, would be installed adjacent to the library and two-story classroom buildings. Adjacent to Quail Lakes Drive, the project proposes a multipurpose field for baseball, softball, and soccer games. A play area that includes a play structure is proposed adjacent to the kindergarten classroom building.

Circulation and Parking

Circulation and parking proposed for the Quail Lakes School project is shown in the site plan, presented in **Figure 3**.

Access to the Quail Lakes School project site would be provided three driveway connections to Alexandria Place, and three driveway connections to Cedar Ridge Drive. A pick-up/drop-off area for students brought by parents and buses would be provided off Alexandria Place in front of the library/administration building. Another pick-up/drop-off area, for parental vehicles only, would be provided off Cedar Ridge Drive in front of the kindergarten classroom building.

On-site parking areas would be provided off Alexandria Place and Cedar Ridge Drive. A parking lot with 23 spaces, including two spaces for drivers or passengers with disabilities, would be provided in the area west of the library/administration building. Another parking lot with 17 spaces, including one space for disabled drivers/passengers, would be provided southwest of the library/administration building. A third parking lot with 19 spaces, including two spaces for disabled drivers and passengers, would be provided off Cedar Ridge Drive, north of the kindergarten building. A parking area for three vehicles would be located adjacent to the cafetorium building.

Enrollment and Daily Schedule

The Quail Lakes School project is expected to have enrollment of 558 students (Spragg pers comm.). The distribution of students by grade is described below:

- 24 students in transitional kindergarten,
- 48 students in kindergarten,
- 144 students in grades 1 through 3,
- 186 students in grades 4 through 6,
- 128 students in grades 7 and 8, and
- 28 students in special day class.

The daily schedule would include a start time of 7:45 a.m. and a dismissal time of 1:40 p.m. (Spragg pers comm.).

Attendance Area

The attendance area for the proposed Quail Lakes School is shown in **Figure 4**. The area shown in pink color in **Figure 4** would be the attendance area. The area, referred to as Zone J, would include two areas. One area would be south of Fourteen Mile Slough, east of Interstate 5 (I-5), north of March Lane, and west of Pacific Avenue. The second area would be approximately south of Brookside Road, east and north of the San Joaquin River, and west of Kensington Way.

The SUSD intends to transfer students currently enrolled at three elementary schools in Stockton to the Quail Lakes School:

- Tyler Elementary School,
- Hoover Elementary School, and
- Madison Elementary School.

The locations of these three schools are shown in **Figure 4**.

Bus Service

Bus service would be provided to a portion of the students that would attend Quail Lakes School. Students that live over one mile from the Quail Lakes School would be provided bus service. Students that live one mile or less from the site would walk, ride bicycles, or use private transportation.

OVERALL ANALYSIS APPROACH

This traffic impact study presents an analysis of the traffic-related effects of the Quail Lakes School project. This analysis is conducted using near-term background traffic conditions and long-term future background conditions.

Traffic operating conditions under the following five scenarios are presented in this traffic impact study:

- Existing Conditions,
- EPAP No Proposed Project,
- EPAP Plus Proposed Project,
- Cumulative No Proposed Project, and
- Cumulative Plus Proposed Project.

EPAP conditions are a near-term background condition which includes existing traffic levels, and traffic associated with approved land use development projects in the vicinity of the project site.

Cumulative conditions are a long-term background condition with future year traffic forecasts based on development of surrounding land uses and the roadway network. This set of scenarios assumes 2035 conditions with future development consistent with the City of Stockton General Plan.

PROJECT LOCATION

KD Anderson & Associates, Inc.
Transportation Engineers

0780-11 RA 12/10/2018

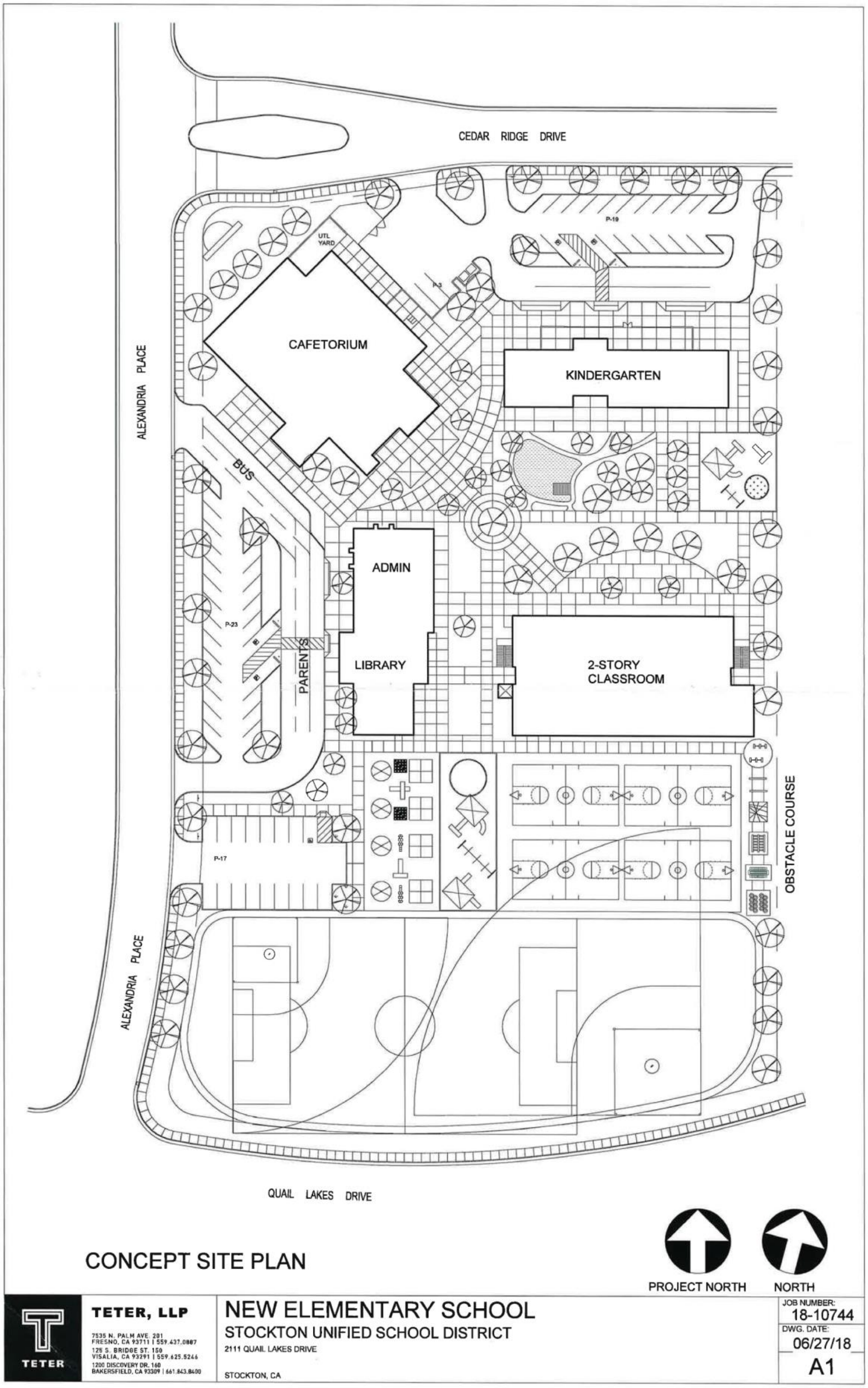
figure 1

STUDY AREA

KD Anderson & Associates, Inc.
Transportation Engineers

0483-010 RA 9/26/2016

figure 2

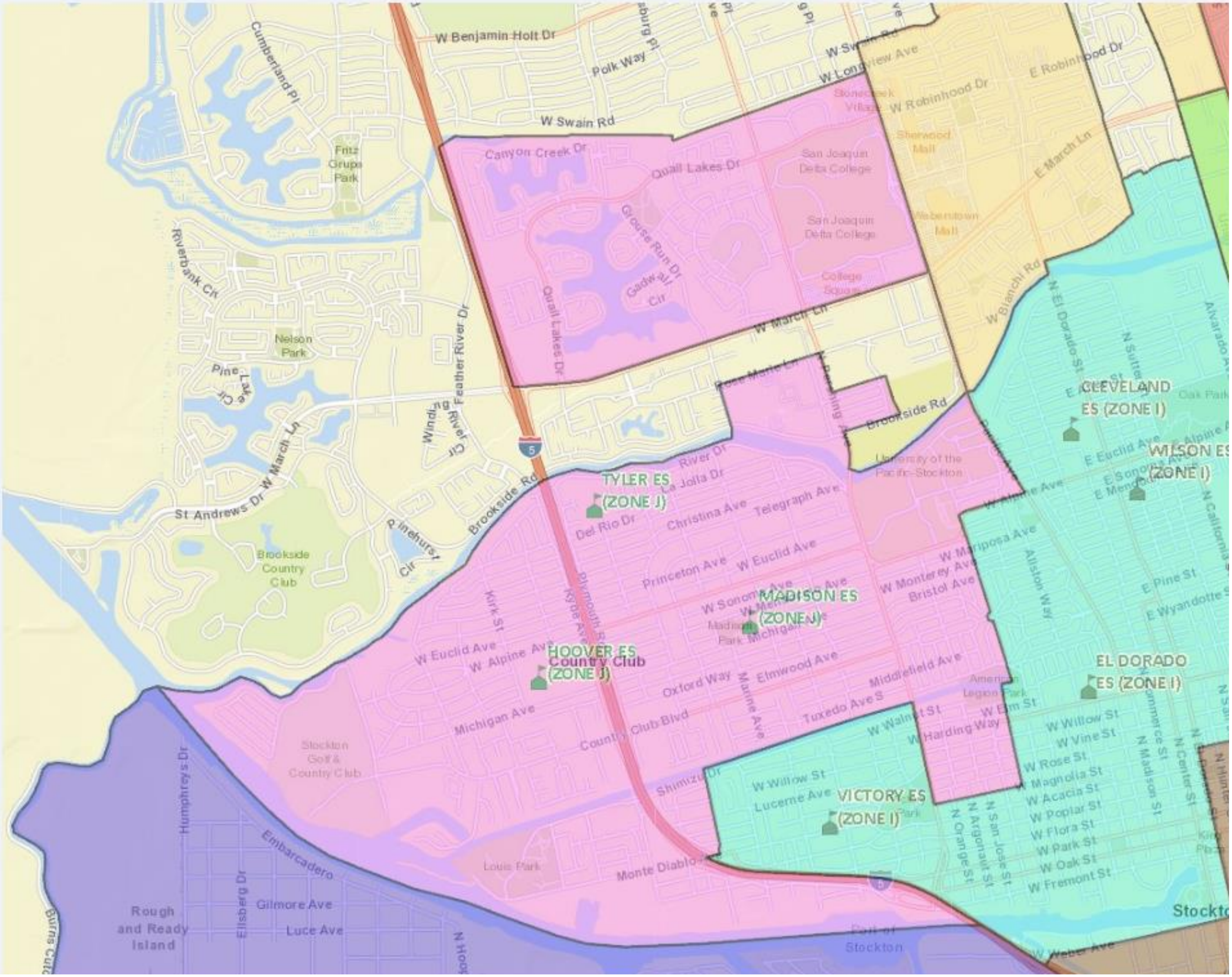


SITE PLAN

KD Anderson & Associates, Inc.
Transportation Engineers

0780-11 RA 12/10/2018

figure 3



ATTENDANCE AREA

KD Anderson & Associates, Inc.
Transportation Engineers

0780-11 RA 12/10/2018

figure 4

EXISTING SETTING

This section of this traffic impact study presents a description of existing conditions in the study area. Information presented in this section of the study is based on on-site field observations, traffic count data collected for this study, and other data available from local and state agencies. Portions of the information presented below are from the *City of Stockton General Plan Background Report* (City of Stockton 2004a). This section of the traffic impact study also describes analysis methods applied for this study, and thresholds used to determine the significance of project-related effects.

STUDY AREA ROADWAYS

This traffic impact study presents analyses of traffic operating conditions at intersections and on roadways in the study area that may be affected by the proposed project. The following is a description of roadways that provide access to the project site. These roadways are shown in **Figure 1** and **Figure 2**.

Interstate 5 (I-5) is a major north-south freeway that traverses the western U.S., originating in southern California and continuing north towards Sacramento and beyond. It is aligned through the western portion of the City, generally providing four travel lanes in each direction in the vicinity of the project site. Twelve interchanges are provided along the 14-mile stretch of I-5 within and adjacent to the City limits. The average daily traffic (ADT) volumes on I-5 in the vicinity of the project site are between 106,000 and 111,000 (California Department of Transportation 2018).

March Lane is an east-west arterial roadway south of the project site. In the vicinity of the project site, the roadway is six lanes wide (three lanes in each direction). March Lane has access to I-5 via an interchange southwest of the project site. The western terminus of March Lane is approximately one and a half miles west of I-5. The eastern terminus is at Holman Road, approximately three and a half miles east of the project site.

Quail Lakes Drive is a collector road located on the southern boundary of the project site. Adjacent to the project site, it is an east-west roadway. Approximately one-quarter mile west of the project site, the roadway curves south and becomes a north-south roadway. The eastern terminus of Quail Lakes Drive is at Pershing Avenue, where the roadway continues east as Robinhood Drive. The southern terminus of Quail Lakes Drive is at March Lane, where it continues south as Da Vinci Drive. In the vicinity of the project site, Quail Lakes Drive is four lanes wide, with a center-two-way left-turn lane (CTWLTL) present along a majority of the roadway.

Cedar Ridge Drive is a two-lane local roadway located on the southern boundary of the project site. The western terminus of the roadway is at the northwest corner of the project site, at an intersection with Alexandria Place. Approximately 200 feet east of the project site, Cedar Ridge Drive curves to the south, and has a southern terminus at Quail Lakes Drive.

Alexandria Place is a two-lane north-south local roadway located on the western boundary of the project site. The southern terminus of the roadway is at the southwest corner of the project site, at an intersection with Quail Lakes Drive.. The portion of Alexandria Place adjacent to the project site has a northern terminus at Fourteen Mile Slough, approximately 700 feet north of the project site. A discontinuous portion of Alexandria Place has a southern terminus at Fourteen Mile Slough, and a northern terminus at Hammer Lane. A bicycle/pedestrian bridge over Fourteen Mile Slough connects the two discontinuous portions of Alexandria Place.

Grouse Run Drive is a two-lane north-south local roadway with a northern terminus at Quail Lakes Drive, near the southeast corner of the project site. The southern terminus of the roadway is at March Lane, where the roadway continues south as McGaw Street.

BICYCLE AND PEDESTRIAN SYSTEMS

The generally level terrain and mild weather make bicycling and walking viable forms of transportation in Stockton. The Stockton area has an extensive network of bicycle facilities, including off-street trails and paths, as well as on-street bicycle lanes and routes. Many of these facilities also support pedestrian travel. According to Caltrans guidelines, bicycle facilities are generally divided into four categories:

- Class I Bikeway (Bike Path). A completely separate facility designated for the exclusive use of bicycles and pedestrians with vehicle and pedestrian cross-flow minimized.

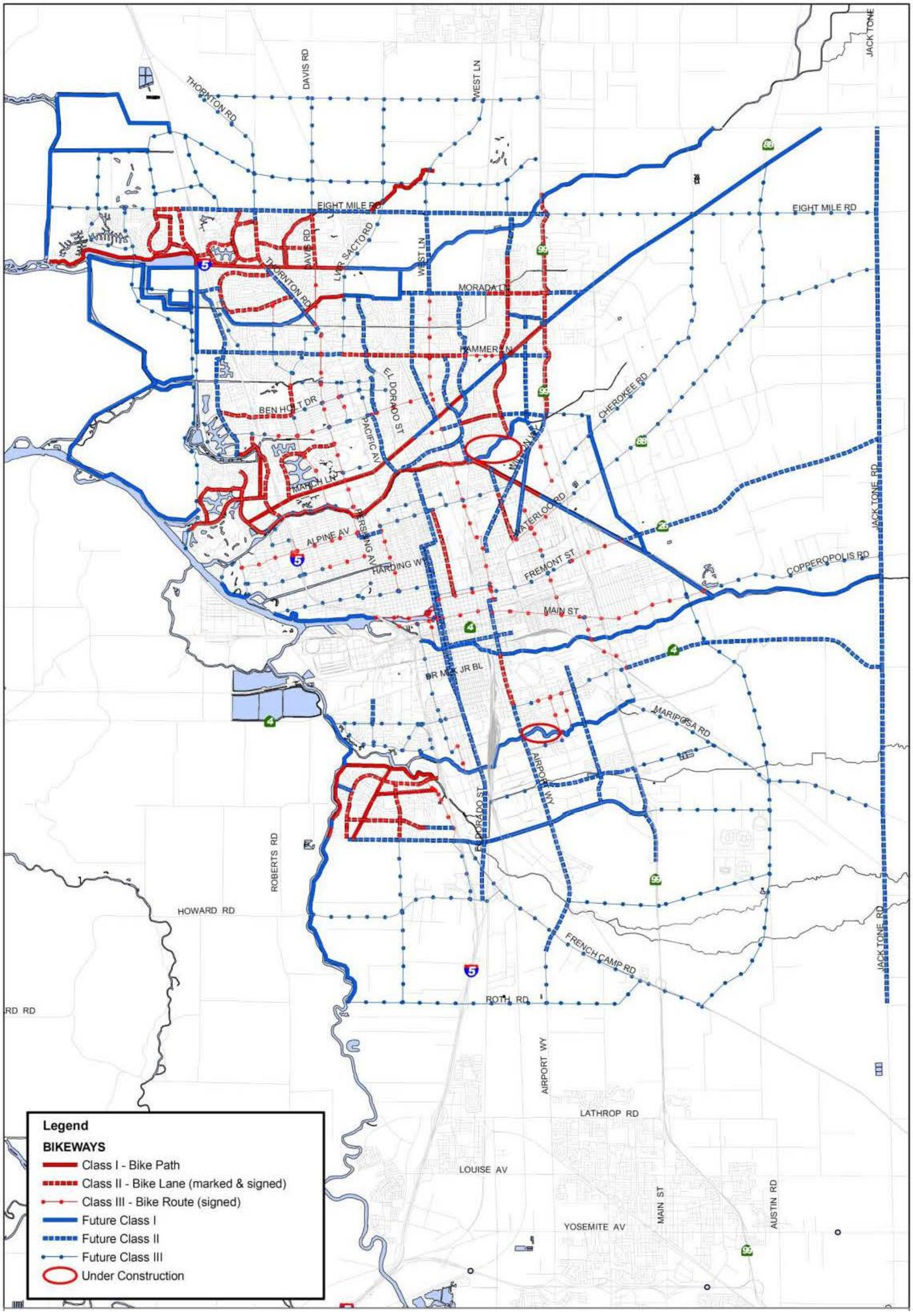
- Class II Bikeway (Bike Lane). A striped lane designated for the use of bicycles on a street or highway. Vehicle parking and vehicle/pedestrian cross-flow are permitted at designated locations.

- Class III Bikeway (Bike Route). A route designated by signs or pavement markings for bicyclists within the vehicular travel lane (i.e., shared use) of a roadway.

- Class IV Bikeway (Separated Bikeway). A bikeway for the exclusive use of bicycles, and includes a separation required between the separated bikeway and the through vehicular traffic. The separation may include, but is not limited to, grade separation, flexible posts, inflexible posts, inflexible barriers, or on-street parking.

In the vicinity of the project site, existing Class II Bikeways are present along both sides of Quail Lakes Drive. Sidewalks are present along all project site frontage with Quail Lakes Drive, Alexandria Place, and Cedar Ridge Drive.

Existing and future bicycle facilities in the Stockton area are shown on **Figure 5**. In the vicinity of the project site, **Figure 5** shows the existing Class II Bikeway along Quail Lakes Drive.



EXISTING AND FUTURE BIKEWAY PLAN
Source: City of Stockton 2010

figure 5

PUBLIC TRANSPORTATION

The San Joaquin Regional Transit District (SJRTD) is the primary provider of public transportation service in San Joaquin County, providing services to the Stockton metropolitan area, as well as inter-city, inter-regional, and rural transit service. SJRTD provides fixed-route, flexible fixed-route, and dial-a-ride services in Stockton (San Joaquin Regional Transit District 2018). Each service is described in more detail below.

- Stockton Metropolitan Area Fixed Route Service operates 40 fixed routes within the Stockton metropolitan area, and seven Saturday and Sunday routes.

- Intercity Fixed Route Service is provided by a route between Stockton and the Lodi Station in downtown Lodi connecting with Lodi Grapeline, Calaveras Transit, Delta Breeze, Sacramento South County Transit (SCT)/LINK buses.

- Interregional Commuter Service is a subscription commuter bus service. A total of eight routes connect San Joaquin County to Sacramento, the San Francisco Bay Area, and the Bay Area Rapid Transit (BART) system.

- SJRTD operates two Dial-a-Ride services. General Public Dial-A-Ride is a curb-to-curb service in areas not currently being served by RTD or other local transportation providers. Passengers are required to use other public transportation options currently available in their area. Stockton Metro Area Dial-A-Ride (SMA-ADA) is a curb-to-curb service operating within the Stockton Metropolitan Area for passengers with an Americans with Disabilities Act (ADA) Certification.

- Hopper Service is a deviated fixed-route service connecting Stockton, Tracy, Lodi, Manteca, Ripon, and Lathrop. The Metro Hopper provides eight routes. The County Hopper provides four routes.

The following is a description of existing SJRTD transit service in the vicinity of the project site (San Joaquin Regional Transit District 2018):

- As shown in **Figure 6**, route number 545 provides weekday service along Quail Lakes Drive, traveling from Sherwood Mall to Country Club Boulevard west of I-5. Approximately one-hour frequency service is provided from 5:30 a.m. to 6:00 p.m.

- As shown in **Figure 7**, route number 745 provides weekend service along Quail Lakes Drive and Grouse Run Drive, traveling from Sherwood Mall to Country Club Boulevard west of I-5. Approximately one-hour frequency service is provided from 9:30 a.m. to 5:20 p.m.

- As shown in **Figure 6**, Metro Hopper route 1 provides weekday service along Quail Lakes Drive. In addition, Metro Hopper route 4 provides weekday service along March Lane between Quail Lakes Drive and Pershing Avenue, and along Pershing Avenue from Robinhood Drive to south of the University of the Pacific.

Figure 8 shows the future transit system presented in the City of Stockton General Plan (City of Stockton 2007). In the vicinity of the project site, **Figure 6** shows future Major Local/Feeder Service along March Lane.

PARK AND RIDE FACILITIES

Park and Ride lots are free parking facilities for commuters to use as a convenient meeting place for carpools, transit, and vanpools. Park and Ride lots in the Stockton area are listed below.

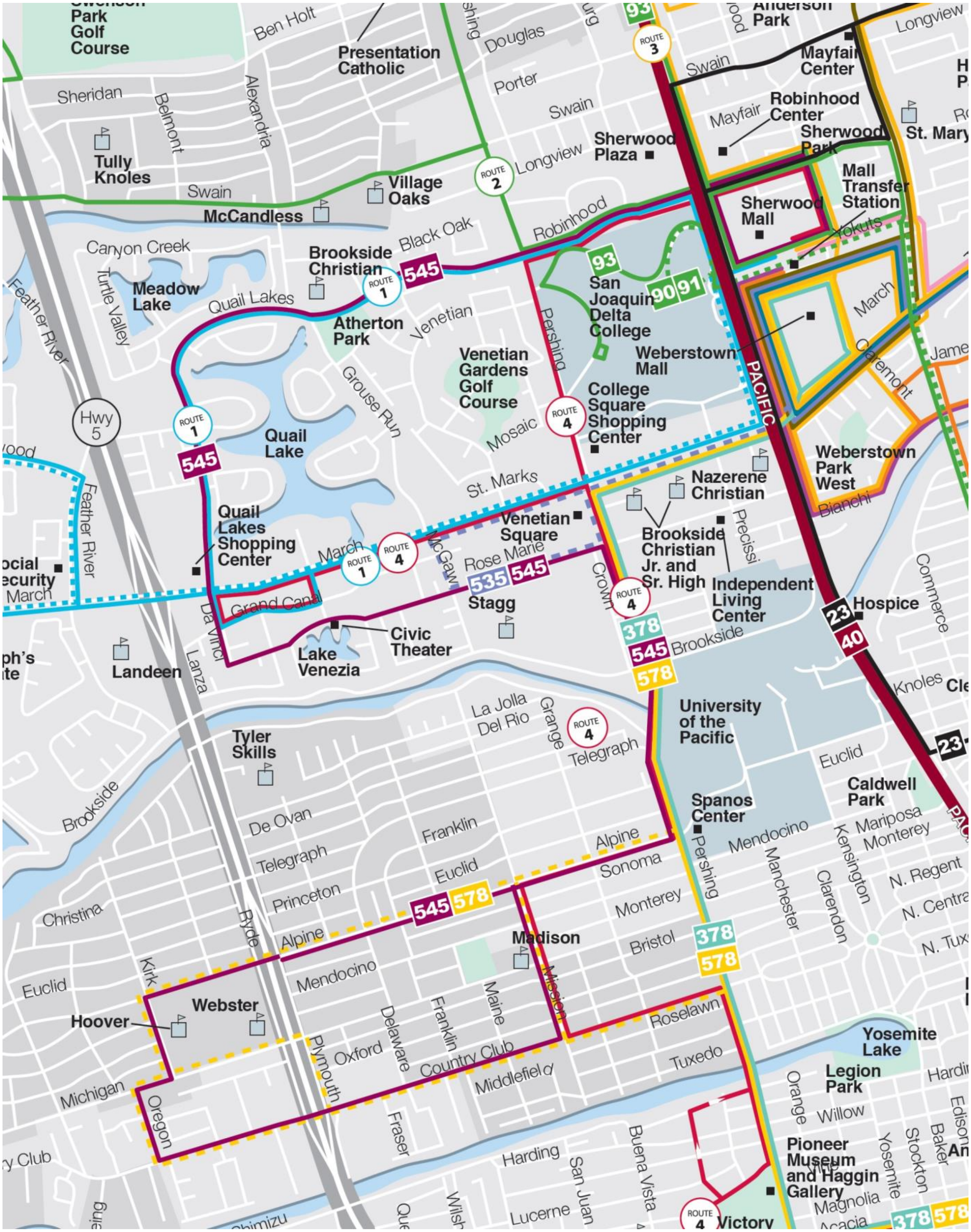
- The Calvary First Church on Kelley Drive north of Hammer Lane lot provides a transit connection to the SJRTD Inter-Regional Bus. The lot provides 40 parking spaces and a bicycle locker.

- The Lifesong Church, 3034 Michigan Avenue lot provides a transit connection to the SJRTD Inter-Regional Bus. The lot provides 45 parking spaces.

- The I-5 at Benjamin Holt Drive; Marina Shopping Center lot provides a transit connection to the SJRTD Inter-Regional Bus. The lot provides 45 parking spaces.

- The Super Walmart Center, Hammer Lane and Sampson Street lot provides 50 parking spaces.

- The Morada Ranch Shopping Center lot is at State Route (SR) 99 and Morada Lane. The lot provides 35 parking spaces.

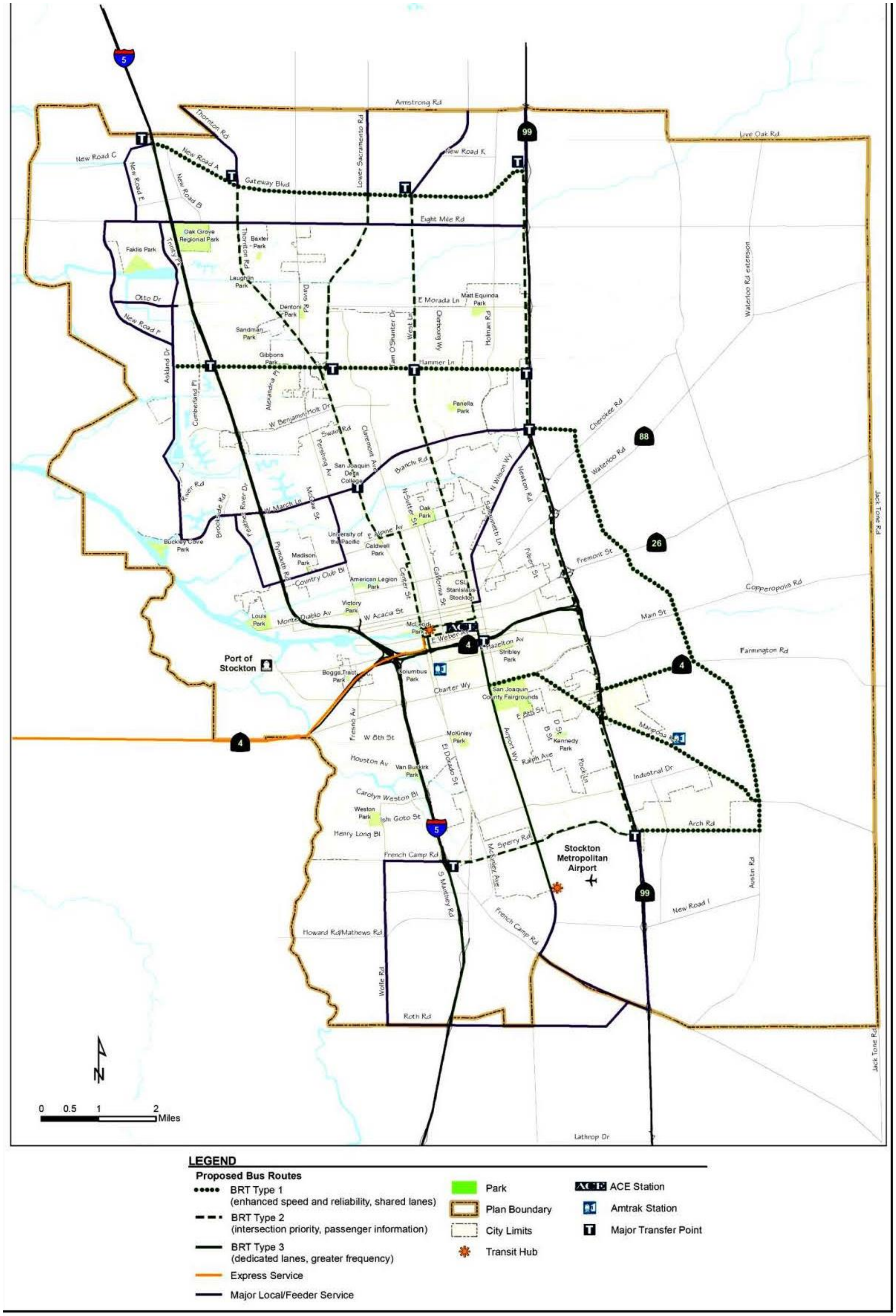


EXISTING WEEKDAY TRANSIT SERVICE

EXISTING WEEKEND TRANSIT SERVICE

KD Anderson & Associates, Inc.
Transportation Engineers
0780-11 RA 12/10/2018

figure 7



2035 STOCKTON GENERAL PLAN
FUTURE TRANSIT NETWORK
Source: City of Stockton 2007a

STUDY AREA INTERSECTIONS

The traffic-related effects of the proposed project were assessed for this traffic impact study by analyzing traffic operations at the following intersections that would serve project-related travel.

1. Alexandria Place & Cedar Ridge Drive
2. Quail Lakes Drive & Cedar Ridge Drive
3. Quail Lakes Drive & Alexandria Place
4. Quail Lakes Drive & Grouse Run Drive
5. Cedar Ridge Drive & Cafetorium Driveway
6. Cedar Ridge Drive & North Inbound Driveway
7. Cedar Ridge Drive & North Outbound Driveway
8. Alexandria Place & West Outbound Driveway
9. Alexandria Place & West Inbound Driveway
10. Alexandria Place & Southwest Driveway

The locations of the study intersections are presented in **Figure 2**. The numbers listed above correspond to the intersection numbers on **Figure 2**.

STUDY AREA ROADWAY SEGMENTS

In addition to analyzing intersections, the traffic-related effects of the proposed project on the following two roadway segments were assessed for this traffic impact study. The following roadway segments were analyzed under all study scenarios:

1 Quail Lakes Drive west of Alexandria Place
2 Quail Lakes Drive east of Grouse Run Drive

METHODOLOGY

The following is a description of the methods used in the analysis presented in this traffic impact study.

Intersection Level of Service Analysis Procedures

Level of service (LOS) analysis provides a basis for describing existing traffic conditions and for evaluating the significance of project-related traffic impacts. Level of service measures the quality of traffic flow and is represented by letter designations from A to F, with a grade of A referring to the best conditions, and F representing the worst conditions. The characteristics associated with the various LOS for intersections are presented in **Table 1**.

Table 1. Level of Service Definitions

Level of Service	Descripton and Delay
A	Little or no delay. Delay ≤ 10 seconds/vehicle
B	Short traffic delays. Delay > 10 seconds/vehicle and ≤ 15 seconds/vehicle
C	Average traffic delays. Delay > 15 seconds/vehicle and ≤ 25 seconds/vehicle
D	Long traffic delays. Delay > 25 seconds/vehicle and ≤ 35 seconds/vehicle
E	Very long traffic delays, failure, extreme congestion. Delay > 35 seconds/vehicle and ≤ 50 seconds/vehicle
F	Intersection blocked by external causes. Delay > 50 seconds/vehicle

Source: Transportation Research Board 2000.

Level of service at intersections was analyzed using methods presented in the *Highway Capacity Manual*. Methods described in the *Highway Capacity Manual* were used to provide a basis for describing traffic conditions and for evaluating the significance of project traffic impacts. As specified by City of Stockton staff, methods from the *Highway Capacity Manual 2000* (Transportation Research Board 2000) were used to analyze intersections. As specified in the *City of Stockton Transportation Impact Analysis Guidelines* (City of Stockton 2003), the Traffix software analysis package was used to analyze intersections.

Worksheets and output reports for the calculation of LOS and vehicles queues are presented in the technical appendix.

Signal Warrants Procedures

Traffic signal warrants are a series of standards which provide guidelines for determining if a traffic signal is appropriate. Signal warrant analyses are typically conducted at intersections of uncontrolled major streets and stop sign-controlled minor streets. If one or more signal warrants are met, signalization of the intersection may be appropriate. However, a signal should not be installed if none of the warrants are met, since the installation of signals would increase delays on the previously-uncontrolled major street, resulting in an undesirable increase in overall vehicle delay at the intersection. Signalization may also increase the occurrence of particular types of accidents. Therefore, if signals are installed where signal warrants are not met, the detriment of increased accidents and overall delay may be greater than the benefit in traffic operating conditions on the single worst movement at the intersection. Signal warrants, then, provide an industry-standard basis for identifying when the adverse effect on the worst movement is substantial enough to warrant signalization.

For the traffic analysis conducted for this traffic impact study, available data are limited to a.m. and p.m. peak hour volumes. Thus, unsignalized intersections operating at poor LOS were evaluated using the Peak Hour Warrant (Warrant Number 3) from the California Department of Transportation document *California Manual on Uniform Traffic Control Devices* (California Department of Transportation 2014). This warrant was applied where the minor street experiences long delays in entering or crossing the major street for at least one hour of the day. The Peak Hour Warrant itself includes several components. Some of the components involve comparison of traffic volumes and vehicle delay to a series of standards. Another component involves comparison of traffic volumes to a nomograph.

Even if the Peak Hour Warrant is met, a more detailed signal warrant study is recommended before a signal is installed. The more detailed study should consider volumes during the eight highest hours of the day, volumes during the four highest hours of the day, pedestrian traffic, and accident histories.

Signal warrant analysis worksheets for all stop sign-controlled intersections are presented in the technical appendix.

Roadway Segment Level of Service Analysis Procedures

Roadway segment LOS was analyzed for this traffic impact study based on methods used in the City of Stockton General Plan analysis (Henry and Morgan pers. comm.). These methods set maximum daily traffic volume thresholds for each LOS designation. The thresholds are shown in **Table 2**.

As shown in **Table 2**, the roadway segment LOS analysis method sets separate thresholds for:

- different types of facilities (i.e., freeways, arterials, and collectors);
- different number of lanes; and
- different area types (i.e., new versus existing).

As described in Henry and Morgan pers. comm.,

> "Thresholds for arterials and collectors were based on Highway Capacity Manual calculations and were developed in conjunction with City staff. The arterial thresholds distinguish between roads in the existing urbanized area and those in new development areas; because arterials in new development areas can be designed to higher standards, with medians, exclusive turn lanes, and controlled access from adjacent uses, the capacities are higher than those in previously-developed areas. Thresholds for freeways were based on Highway Capacity Manual procedures relating levels of service to vehicle density ranges."

As specified in Henry and Morgan pers. comm., the "Existing" area is generally located between I-5 and SR 99, south of Eight Mile Road. Eight Mile Road itself is considered a "New" arterial due to the lack of existing development in the area.

Table 2. City of Stockton General Plan Roadway Segment Level of Service Thresholds

Facility Class	Lanes	Area Type	LOS A	LOS B	LOS C	LOS D	LOS E
Freeway	4	All Areas	27,600	45,200	63,600	77,400	86,400
	6	All Areas	41,400	67,800	95,400	116,100	129,600
	8	All Areas	55,200	90,400	127,200	154,800	172,800
	10	All Areas	69,000	113,000	159,000	193,500	216,000
Arterial	2	Existing	8,400	9,300	11,800	14,700	17,200
	2	New	10,000	11,100	14,000	17,500	20,600
	4	Existing	18,600	20,600	26,000	32,500	38,200
	4	New	23,300	25,800	32,600	40,700	47,900
	6	Existing	28,800	32,000	40,300	50,400	59,300
	6	New	33,300	37,000	46,600	58,300	68,600
	8	Existing	38,100	42,300	53,300	66,600	78,400
	8	New	41,100	45,700	57,600	72,000	84,700
Collector	2	Existing	6,400	7,100	9,000	11,300	13,200
	2	New	6,400	7,100	9,000	11,300	13,200
	4	Existing	17,600	19,600	24,700	30,900	36,300
	4	New	21,100	23,500	29,600	37,000	43,500

Source: Stockton General Plan Draft Environmental Impact Report (City of Stockton 2006).
Note: The Stockton General Plan does not provide thresholds for local roads.

Travel Forecasting

As part of the General Plan Update process, the City of Stockton developed a series of travel demand forecasting simulation models (City of Stockton 2004b). Several different travel models were developed to simulate different background conditions. Travel models of the following two conditions were used to develop forecasts of future year traffic volumes for this traffic impact study:

- Existing Plus Approved Projects (EPAP), and
- 2035 Conditions with the Stockton General Plan.

The travel model for the Stockton General Plan was updated for analysis of the Stockton Public Facility Fee (PFF) Projects program. This updated travel model is the version used in this traffic impact study.

The current version of the City's travel model produces forecasts of daily traffic volumes. The forecasts of daily volumes generated by the City's travel model are adequate for use in the analysis of roadway segment LOS, and are used for daily volume forecasts in this traffic impact study. However, the daily volumes generated by the traffic model are not, by themselves, adequate for use in the peak hour LOS analysis of study intersections.

To develop forecasts of future year peak hour intersection turning movement traffic volumes for this traffic impact study, daily traffic volumes from the travel models were used to generate growth factors. These growth factors were applied to existing peak hour intersection turning movement traffic volumes. The development of future year intersection turning movement traffic volumes requires that the turning movements at each intersection "balance". To achieve the balance, inbound traffic volumes must equal the outbound traffic volumes, and the volumes must be distributed among the various left-turn, through, and right-turn movements at each intersection. The "balancing" of future year intersection turning movement traffic volumes was conducted using methods described in the Transportation Research Board's (TRB's) National Cooperative Highway Research Program (NCHRP) Report 255, *Highway Traffic Data for Urbanized Area Project Planning and Design* (Transportation Research Board 1982). The NCHRP 255 method applies the desired peak hour directional volumes to the intersection turning movement volumes, using an iterative process to balance and adjust the resulting forecasts to match the desired peak hour directional volumes.

LEVEL OF SERVICE SIGNIFICANCE THRESHOLD

In this traffic impact study, the significance of the proposed project's impact on traffic operating conditions is based on a determination of whether resulting intersection or roadway segment LOS is considered acceptable by the City of Stockton. A project's impact on traffic conditions is considered significant if implementation of the project would result in LOS changing from levels considered acceptable to levels considered unacceptable, or if the project would substantially worsen already unacceptable LOS.

As noted in the *City of Stockton Transportation Impact Analysis Guidelines* (City of Stockton 2003),

> "The City of Stockton's General Plan has a LOS 'D' standard for its roadway system. Intersections and roadway segments operating at LOS 'A', 'B', 'C', or 'D' conditions are considered acceptable, while those operating at LOS 'E' or 'F' conditions are considered unacceptable.
>
> "For a City intersection, a transportation impact for a project is considered significant if the addition of project traffic would cause an intersection that would function at LOS 'D' or better without the Project to function at LOS 'E' or 'F'.
>
> "For City intersections with a LOS 'E' or 'F' conditions without the project, a transportation impact for a project is considered significant if the addition of project traffic causes an increase of greater than 5 seconds in the average delay for the intersection."

Portions of the City's guidelines do not specifically address significance thresholds for roadway segments. For this traffic impact study, the City's significance thresholds described above are also applied to roadway segments.

This traffic impact study will be used in the preparation of a California Environmental Quality Act (CEQA) environmental document for the proposed project. In this traffic impact study, a project's impact will be considered significant if:

- the project would result in traffic operating conditions changing from an acceptable LOS to an unacceptable LOS, or

- when LOS without the project is already unacceptable, the project would result in a substantial degradation of traffic operating conditions (e.g., an increase of more than five seconds of delay at an intersection).

EXISTING INTERSECTION TRAFFIC VOLUMES AND LEVELS OF SERVICE

The following is a description of existing traffic operating conditions at the study intersections.

Intersection Traffic Volumes

Intersection turning movement count data at the study intersections were collected on Thursday September 27, 2018. Traffic volume data collection reports are presented in the technical appendix. Data for the a.m. peak hour were collected during the 7:00 a.m. to 9:00 a.m. period. As noted in the *Project Description* section of this traffic impact study, dismissal time at the Quail Lakes School would be at 1:40 p.m. As a result data for the p.m. peak hour period were collect during the 1:00 p.m. to 3:00 p.m. period. Peak hour traffic volume data presented in this traffic impact study are for the highest one-hour period within each two-hour data collection period at each of the following study intersections:

1. Alexandria Place & Cedar Ridge Drive
2. Quail Lakes Drive & Cedar Ridge Drive
3. Quail Lakes Drive & Alexandria Place
4. Quail Lakes Drive & Grouse Run Drive

The Quail Lakes School project would generate few vehicle trips during the 4:00 p.m. to 6:00 p.m. period. As a result, the 4:00 p.m. to 6:00 p.m. period was not analyzed for this traffic impact study.

Figure 9 presents the existing lane configurations and existing a.m. peak hour and p.m. peak hour traffic volumes at the existing study intersections.

Intersection Levels of Service

Table 3 presents a.m. peak hour and p.m. peak hour LOS at the four existing study intersections. The worksheets presenting the calculation of LOS are included in the technical appendix.

All four of the study intersections operate at acceptable LOS A or B during both the a.m. peak hour and the p.m. peak hour under Existing conditions. No improvements are needed at these intersections to achieve acceptable LOS.

EXISTING ROADWAY SEGMENT TRAFFIC VOLUMES AND LEVELS OF SERVICE

The following is a description of existing traffic operating conditions on study roadway segments.

Roadway Segment Traffic Volumes

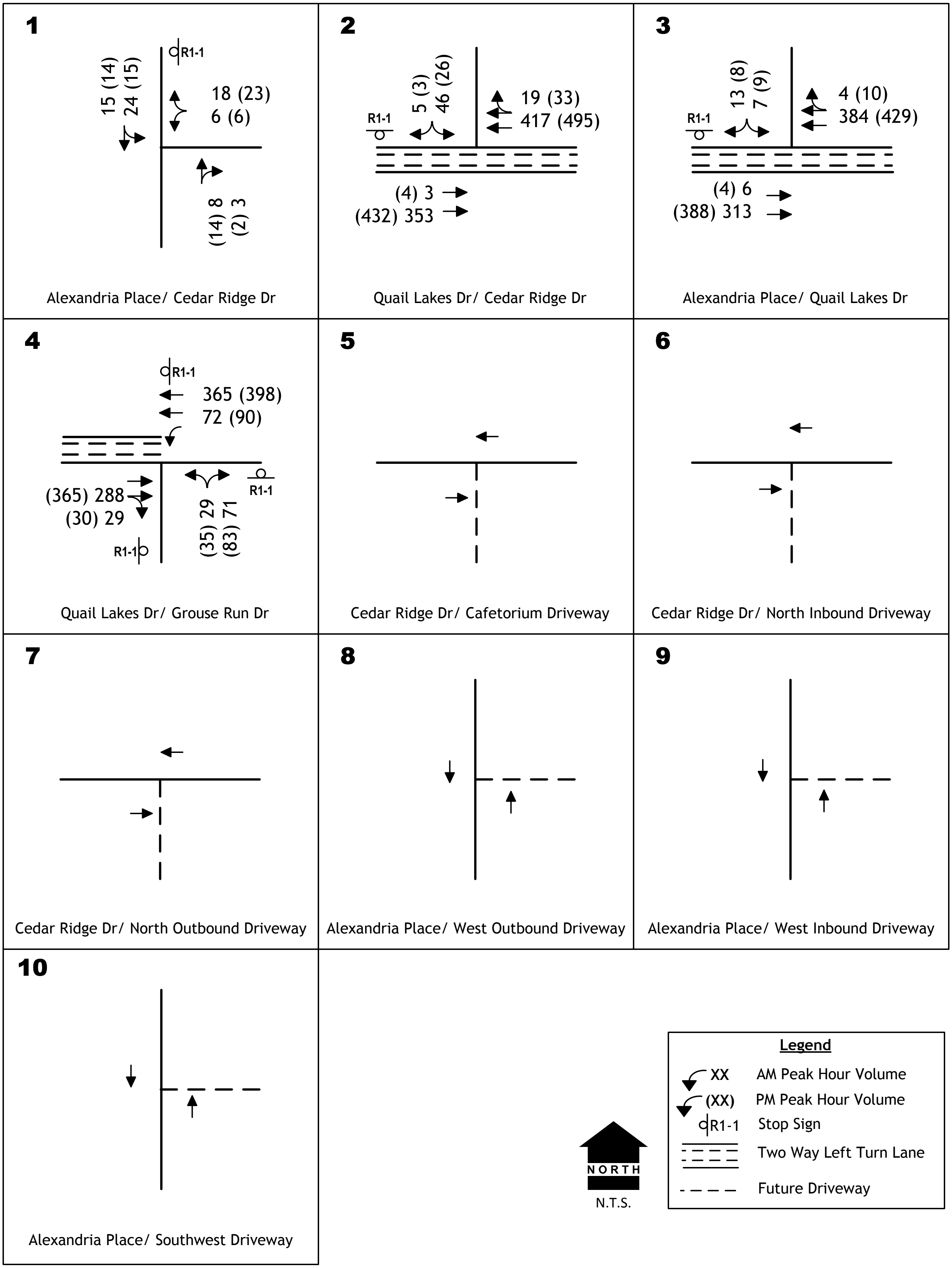
Daily traffic volume count data at the following two study roadway segments were collected for 24-hour periods on Thursday September 27, 2018. Traffic volume data collection reports are presented in the technical appendix.

1. Quail Lakes Drive west of Alexandria Place
2. Quail Lakes Drive east of Grouse Run Drive

Table 4 presents the existing daily traffic volumes for the two study roadway segments.

Roadway Segment Levels of Service

Table 4 presents a summary of existing LOS on the two existing study roadway segments. Both of the study roadway segments operate at acceptable LOS A. No improvements are needed on these roadway segments to achieve acceptable LOS.



EXISTING TRAFFIC VOLUMES AND LANE CONFIGURATIONS

KD Anderson & Associates, Inc.
Transportation Engineers

figure 9

Table 3. Intersection Level of Service - Existing Conditions

	Study Intersections	Inters. Control	Signal Warrant Met?	AM Peak		PM Peak	
				LOS	Delay	LOS	Delay
1	Alexandria Place & Cedar Ridge Drive	Unsig	No	A	5.1	A	4.8
2	Quail Lakes Drive & Cedar Ridge Drive	Unsig	No	A	0.9	A	0.5
3	Quail Lakes Drive & Alexandria Place	Unsig	No	A	0.4	A	0.3
4	Quail Lakes Drive & Grouse Run Drive	AWSC	No	A	9.6	B	10.4
5	Cedar Ridge Drive & Cafetorium Driveway	- -		- -	- -	- -	- -
6	Cedar Ridge Drive & North Inbound Driveway	- -		- -	- -	- -	- -
7	Cedar Ridge Dr. & North Outbound Driveway	- -		- -	- -	- -	- -
8	Alexandria Place & West Outbound Driveway	- -		- -	- -	- -	- -
9	Alexandria Place & West Inbound Driveway	- -		- -	- -	- -	- -
10	Alexandria Place & Southwest Driveway	- -		- -	- -	- -	- -

Notes: LOS = Level of Service. "Inters. Control" = Type of intersection control.
"AWSC" = All-way stop-sign control. "Unsig" = Unsignalized stop-sign control.
Dashes (- -) indicate the intersection would not be present under this scenario.
Delay is measured in seconds per vehicle.
Per City of Stockton guidelines, intersection average delay is reported for all intersections, including unsignalized intersections.

Table 4. Roadway Segment Level of Service - Existing Conditions

Roadway Segment	Number of Lanes	Daily Capacity	Daily Volume	V/C Ratio	Level of Service
1 Quail Lakes Drive - west of Alexandria Place	4	36,300	10,926	0.30	A
2 Quail Lakes Drive - east of Grouse Run Drive	4	36,300	11,975	0.33	A

Notes: "V/C Ratio" = volume-to-capacity ratio.

EXISTING PLUS APPROVED PROJECTS NO PROJECT CONDITIONS

EPAP No Project conditions represent a near-term future background condition. Development of land uses and roadway improvements associated with previously-approved projects are assumed in this condition. The EPAP No Project condition, therefore, serves as the baseline condition used to assess the significance of near-term project-related traffic impacts.

TRAFFIC VOLUME FORECASTS

The City of Stockton Travel Demand Model (City of Stockton 2004b) was used to develop forecasts of background increases in traffic volumes under near-term EPAP conditions. The increases in traffic volumes reflect development of near-term previously-approved projects in Stockton.

A more detailed description of traffic volume forecasting methods is presented in the *Travel Forecasting* section of this traffic impact study. Application of these methods results in the daily traffic volumes presented in **Table 5**, and the a.m. peak hour and p.m. peak hour traffic volumes presented in **Figure 10.**

ROADWAY IMPROVEMENTS

There is very little vacant land in the immediate vicinity of the Quail Lakes School project site. Land uses in the study area are largely built-out, and substantial future land use development is not expected. Consistent with that, no future roadway improvements are expected in the study area. The resulting intersection lane geometrics assumed for EPAP No Project conditions are shown in **Figure 10**.

INTERSECTION LEVELS OF SERVICE

Table 6 presents the a.m. peak hour and p.m. peak hour LOS at each study intersection under EPAP No Project conditions. The worksheets presenting the calculation of LOS are included in the technical appendix.

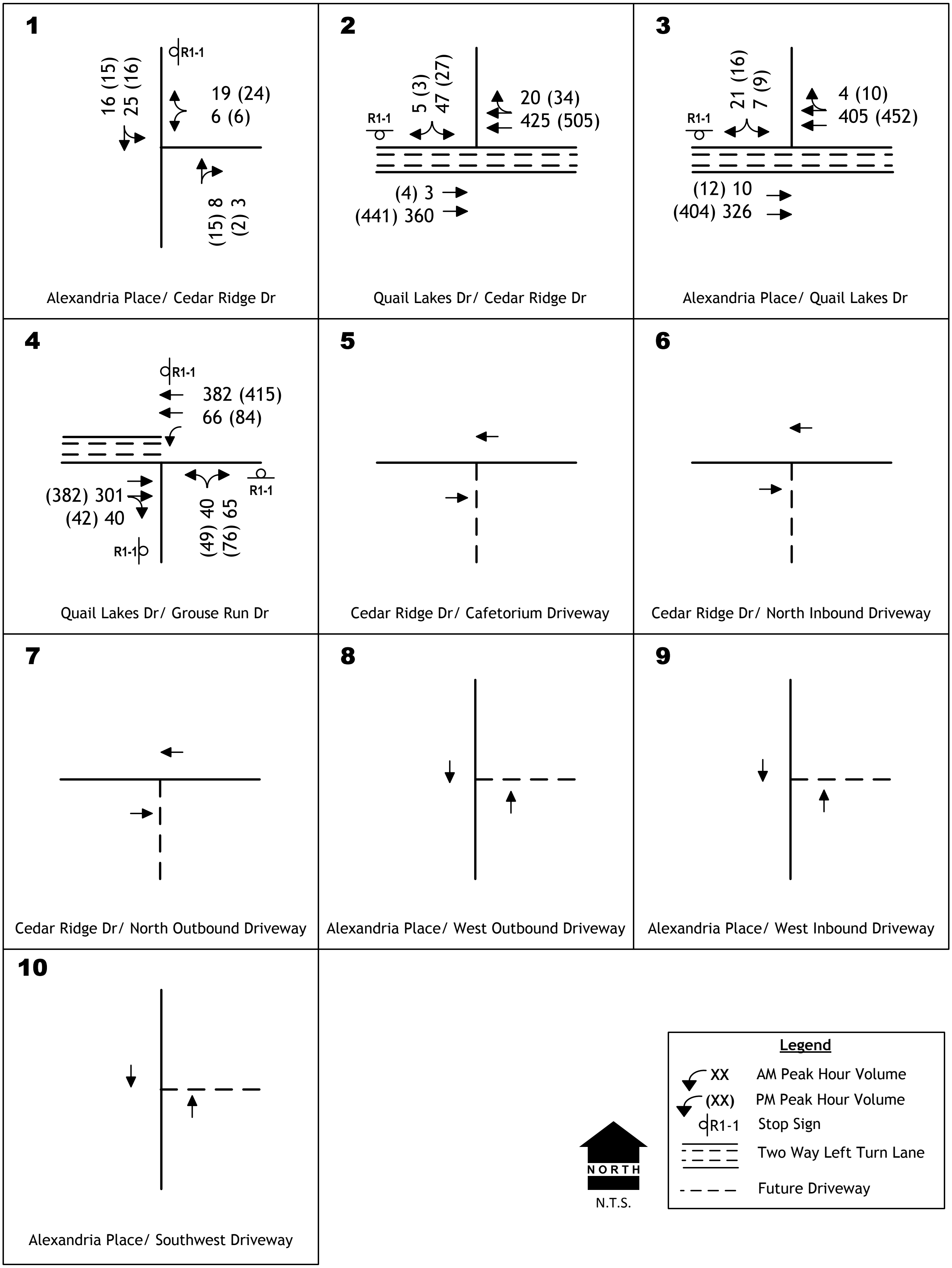
Traffic volumes under EPAP No Project conditions would be slightly higher, but overall similar to, those under Existing conditions and, as a result, vehicle delay at study intersections under EPAP No Project conditions would be slightly higher or similar to delay under Existing conditions.

Under EPAP No Project conditions, LOS at all four study intersections would be at acceptable LOS A or B during both the a.m. peak hour and the p.m. peak hour. No improvements are needed at these four intersections to achieve acceptable LOS.

Table 5. Roadway Segment Level of Service - EPAP No Project Conditions

	Roadway Segment	Number of Lanes	Daily Capacity	Daily Volume	V/C Ratio	Level of Service
1	Quail Lakes Drive - west of Alexandria Place	4	36,300	11,705	0.32	A
2	Quail Lakes Drive - east of Grouse Run Drive	4	36,300	12,219	0.34	A

Notes: "V/C Ratio" = volume-to-capacity ratio.



EPAP WITHOUT PROJECT TRAFFIC VOLUMES AND LANE CONFIGURATIONS

KD Anderson & Associates, Inc.
Transportation Engineers

0780-11 RA 12/10/2018

figure 10

Table 6. Intersection Level of Service - EPAP No Project Conditions

Study Intersections	Inters. Control	Signal Warrant Met?	AM Peak		PM Peak	
			LOS	Delay	LOS	Delay
1 Alexandria Place & Cedar Ridge Drive	Unsig	No	A	5.2	A	4.8
2 Quail Lakes Drive & Cedar Ridge Drive	Unsig	No	A	1.0	A	0.5
3 Quail Lakes Drive & Alexandria Place	Unsig	No	A	0.5	A	0.4
4 Quail Lakes Drive & Grouse Run Drive	AWSC	No	A	9.9	B	10.7
5 Cedar Ridge Drive & Cafetorium Driveway	- -		- -	- -	- -	- -
6 Cedar Ridge Drive & North Inbound Driveway	- -		- -	- -	- -	- -
7 Cedar Ridge Dr. & North Outbound Driveway	- -		- -	- -	- -	- -
8 Alexandria Place & West Outbound Driveway	- -		- -	- -	- -	- -
9 Alexandria Place & West Inbound Driveway	- -		- -	- -	- -	- -
10 Alexandria Place & Southwest Driveway	- -		- -	- -	- -	- -

Notes: LOS = Level of Service. "Inters. Control" = Type of intersection control.
"AWSC" = All-way stop-sign control. "Unsig" = Unsignalized stop-sign control.
Dashes (- -) indicate the intersection would not be present under this scenario.
Delay is measured in seconds per vehicle.
Per City of Stockton guidelines, intersection average delay is reported for all intersections, including unsignalized intersections.

ROADWAY SEGMENT LEVELS OF SERVICE

Table 5 presents a summary of LOS on the two study roadway segments under EPAP No Project conditions. Both roadway segments would operate at acceptable LOS A. No improvements are needed on these two roadway segments to achieve acceptable LOS.

EXISTING PLUS APPROVED PROJECTS PLUS QUAIL LAKES SCHOOL PROJECT IMPACTS

The development of the Quail Lakes School project would result in vehicle traffic to and from the project site. The amount of additional traffic on a particular section of the street network depends on three factors:

- Trip Generation, the number of new trips generated by the project,
- Trip Distribution, the direction of travel for the new traffic, and
- Trip Assignment, the specific routes used by the new traffic.

TRIP GENERATION

Development of the Quail Lakes School project would generate new vehicle trips and potentially affect traffic operations at the study facilities. The number of vehicle trips that are expected to be generated by development of the proposed project has been estimated using typical trip generation rates that have been developed based on the nature and size of project land uses.

Data compiled by the Institute of Transportation Engineers (ITE) and presented in the publication *Trip Generation, 10th Edition* (Institute of Transportation Engineers 2017) is the primary source of trip generation rates.

The trip generation rates used in this traffic impact study are presented in **Table 7**. The trip generation rates are applied to the amount of project-related land uses. The resulting trip generation estimates are presented in **Table 8**. As shown in **Table 8**, the proposed project would generate an estimated 1,086 vehicle trips per day, with 362 trips during the a.m. peak hour and 191 trips during the p.m. peak hour of the generator.

TRIP DISTRIBUTION

Project-related trips were geographically distributed over the study area roadway network. The distribution of trips is based on the relative attractiveness or utility of possible destinations. Trip distribution percentages applied in this traffic impact study are presented in **Table 9**.

The City's travel demand model (City of Stockton 2004b) was one source used to estimate trip distribution percentages. The travel demand model is considered to be a valid source for the trip distribution percentages because it directly addresses:

- the location of destinations of project-related trips,
- the magnitude of land uses that would attract project-related trips, and
- the quality of access to the destinations via the roadway network.

Table 7. Trip Generation Rates for the Quail Lakes School Project

		Vehicle Trip Rates						
			AM Peak Hour			PM Peak Hour of Generator		
Land Use Category and ITE Land Use Code	Independent Variable	Daily	In	Out	Total	In	Out	Total
Elementary School (520)	Students	1.89	0.36	0.31	0.67	0.15	0.19	0.34
Middle School/Junior High School (522)	Students	2.13	0.31	0.27	0.58	0.16	0.19	0.35

Note: Totals may not equal the sum of the components due to rounding.
Source: Institute of Transportation Engineers 2017.

Table 8. Trip Generation Estimates for the Quail Lakes School Project

Land Use Category and ITE Land Use Code	Amount of Land Use	Vehicle Trips						
			AM Peak Hour			PM Peak Hour of Generator		
		Daily	In	Out	Total	In	Out	Total
Elementary School (520)	430 Students	813	155	133	288	65	82	146
Middle School/Junior High School (522)	128 Students	273	40	35	74	20	24	45
Total		1,086	195	168	362	85	106	191

Note: Totals may not equal the sum of the components due to rounding.
Source: Institute of Transportation Engineers 2017, and Spragg pers. comm.

Table 9. Trip Distribution Percentages

Direction of Travel	Percent of Project Trips
North on Alexandria Place	5
West on Quail Lakes Drive	50
East on Quail Lakes Drive	15
South on Grouse Run Drive	30
TOTAL	100

Source: City of Stockton 2004, and Spragg pers comm.
Note: All values rounded to the nearest whole percentage.

A "select link" analysis was conducted using the travel demand model to determine the geographic distribution of project-related travel. The select link analysis identifies vehicle trips associated with the project site, and identifies the direction of travel to and from the project site.

Development of the trip distribution percentages shown in **Table 9** also considered to location of where potential Quail Lakes School students live. The attendance area is shown in **Figure 4**.

TRIP ASSIGNMENT

Traffic that would be generated by the proposed project was added to EPAP No Project traffic volumes. **Figure 11** displays the project-related-only traffic volumes for each study intersection in the a.m. peak hour and p.m. peak hour. **Figure 12** displays the resulting EPAP Plus Quail Lakes School project traffic volumes anticipated for each study intersection in the peak hours.

Table 10 displays daily traffic volumes for study roadway segments under EPAP Plus Quail Lakes School project conditions.

INTERSECTION LEVELS OF SERVICE

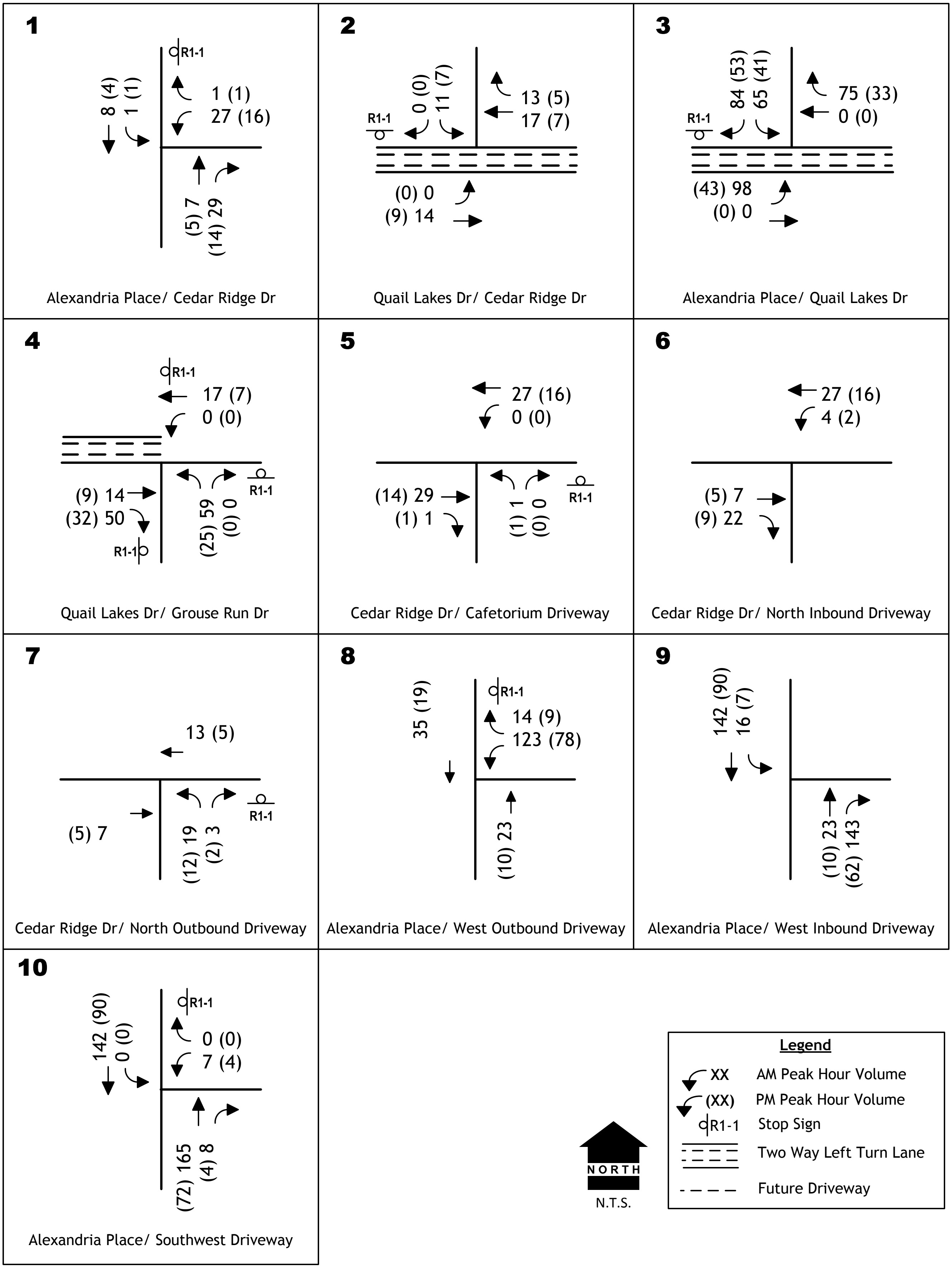
Table 11 presents the a.m. peak hour and p.m. peak hour LOS at each study intersection under EPAP Plus Quail Lakes School project conditions. The worksheets presenting the calculation of LOS are included in the technical appendix.

Traffic volumes under EPAP Plus Project conditions would be generally higher than under EPAP No Project conditions and, as a result, vehicle delay at study intersections under EPAP Plus Project conditions would be higher than under EPAP No Project conditions.

Under EPAP Plus Project conditions, LOS at all 10 study intersections would be at acceptable LOS A or B during both the a.m. peak hour and the p.m. peak hour. This impact is considered to be less than significant. No mitigation measures are required.

ROADWAY SEGMENT LEVELS OF SERVICE

Table 10 presents a summary of LOS on the two study roadway segments under EPAP Plus Project conditions. Both of the roadway segments would operate at acceptable LOS A. The impact of the proposed project on these two roadway segments is considered to be less than significant. No mitigation measures are required.

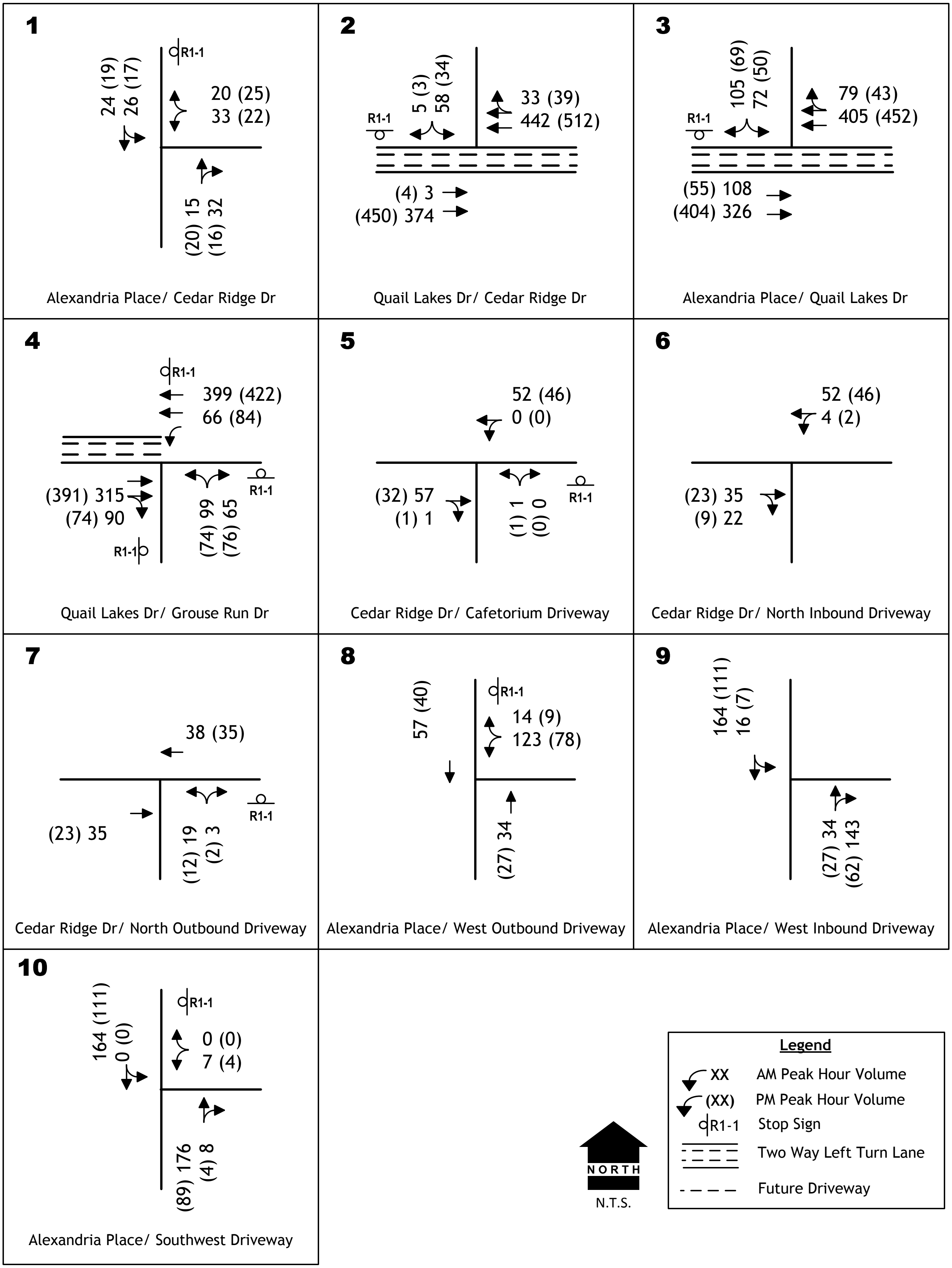


KD Anderson & Associates, Inc.
Transportation Engineers

PROJECT-RELATED TRAFFIC VOLUMES

0780-11 RA 12/10/2018

figure 11



EPAP PLUS PROJECT TRAFFIC VOLUMES AND LANE CONFIGURATIONS

KD Anderson & Associates, Inc.
Transportation Engineers

0780-11 RA 12/10/2018

figure 12

Table 10. Roadway Segment Level of Service - EPAP Plus Project Conditions

Roadway Segment	Number of Lanes	Daily Capacity	Daily Volume	V/C Ratio	Level of Service
1 Quail Lakes Drive - west of Alexandria Place	4	36,300	12,249	0.34	A
2 Quail Lakes Drive - east of Grouse Run Drive	4	36,300	12,313	0.34	A

Notes: "V/C Ratio" = volume-to-capacity ratio.

Table 11. Intersection Level of Service - EPAP Plus Project Conditions

Study Intersections		Inters. Control	Signal Warrant Met?	AM Peak		PM Peak	
				LOS	Delay	LOS	Delay
1	Alexandria Place & Cedar Ridge Drive	Unsig	No	A	4.5	A	4.6
2	Quail Lakes Drive & Cedar Ridge Drive	Unsig	No	A	1.2	A	0.7
3	Quail Lakes Drive & Alexandria Place	Unsig	No	A	4.2	A	2.3
4	Quail Lakes Drive & Grouse Run Drive	AWSC	No	B	10.8	B	11.3
5	Cedar Ridge Drive & Cafetorium Driveway	Unsig	No	A	0.1	A	0.1
6	Cedar Ridge Drive & North Inbound Driveway	Unsig	No	A	0.3	A	0.2
7	Cedar Ridge Dr. & North Outbound Driveway	Unsig	No	A	2.1	A	1.7
8	Alexandria Place & West Outbound Driveway	Unsig	No	A	5.8	A	5.2
9	Alexandria Place & West Inbound Driveway	Unsig	No	A	0.3	A	0.3
10	Alexandria Place & Southwest Driveway	Unsig	No	A	0.2	A	0.2

Notes: LOS = Level of Service. "Inters. Control" = Type of intersection control.
"AWSC" = All-way stop-sign control. "Unsig" = Unsignalized stop-sign control.
Dashes (- -) indicate the intersection would not be present under this scenario.
Delay is measured in seconds per vehicle.
Per City of Stockton guidelines, intersection average delay is reported for all intersections, including unsignalized intersections.

INCREASE IN DEMAND FOR TRANSIT

Implementation of the proposed Quail Lakes School project would result in an increase in demand for public transit service. As previously described in the *Public Transportation* section of this traffic impact study, direct public transit service is currently provided to the project site. SJRTD routes 545 and 745 providing service adjacent to the project site, and Metro Hopper routes 1 and 4operate in the vicinity of the project site. While development of project-related uses would result in an increase in demand, the frequency and proximity of future transit service is not known at this time and, as a result, demand for transit cannot be quantified. However, it is expected that SJRTD can accommodate the additional passengers the project would generate. This is considered a less-than-significant impact. No mitigation measures are required.

INCREASE IN DEMAND FOR BICYCLE AND PEDESTRIAN FACILITIES

Implementation of the Quail Lakes School project would result in an increase in demand for bicycle and pedestrian facilities. As noted in the *Bicycle and Pedestrian Systems* section of this traffic impact study, a Class II Bikeway is present along the project site frontage on Quail Lakes Drive. Also, sidewalks are present on the project site frontage along Quail Lakes Drive, Alexandria Place, and Cedar Ridge Drive. The Class II Bikeway and sidewalks would provide safe facilities for bicycle and pedestrian travel to and from the Quail Lakes School project site. Therefore, the increase in demand for facilities is considered a less-than-significant impact. No mitigation measures would be required.

ON-SITE PARKING REQUIREMENT

Stockton Municipal Code section 16.64.040, *Number of parking spaces required*, presents parking requirements. Table 3-9 of this section of the Code, *Parking Requirements by Land Use*, specifies that “Public and private elementary and secondary schools” provide two parking spaces per classroom.

As described in the *Project Description* section of this traffic impact study, the Quail Lakes School project would include 21 classrooms. Application of the requirements presented in Stockton Municipal Code section 16.64.040 would result in 42 parking spaces being required (21 classrooms x two spaces per classroom = 42 spaces). As also described in the *Project Description* section of this traffic impact study, the Quail Lakes School project would include 62 on-site parking spaces. The proposed 62 parking spaces would exceed the required 42 parking spaces. Therefore, this impact is considered less than significant, and no mitigation measures are required.

SITE CIRCULATION AND ACCESS

The peak periods for vehicle circulation in the vicinity of school sites occur immediately before classes begin and class dismissal time. This includes vehicles using pick-up and drop-off facilities, and also parents parking vehicles to pick-up and drop-off students. While there is a mix of these activities during both the beginning of classes and dismissal time, on-site observations at elementary schools indicate the following peak activities:

- Generally, peak demand for pick-up and drop off facilities occurs in the morning before classes begin.
- Rather than using pick-up and drop-off facilities, parents of kindergarten student are especially prone to park and walk with the student, both to class in the morning and away from class in the afternoon.
- Peak demand for parking occurs immediately before, and at the time of class dismissal, as parents drive to the school, park, and wait for dismissal time.

Each of these three activities is addressed below.

Morning Drop-Off

Morning drop-off activity will be divided between parents who use the designated drop-off zones to unload students without leaving their vehicle, and parents who park their vehicle and walk with the student into the school. Some parents would park regardless of the efficiency of the drop-off areas. The share of parents choosing each option generally depends on the age of the student. Parents of younger students (e.g., kindergarten through 2nd grade) have been observed to often park, while parents of older students more often use the drop-off zone. As shown in **Figure 3**, the kindergarten has its own designated drop-off area, although many parents of kindergartners would choose to park.

Each of the two pick-up and drop-off areas shown in **Figure 3** is approximately 125 feet long. The pick-up and drop-off areas also have driveway areas either approaching or departing the pick-up and drop-off area. These driveway areas would likely be used by some parents dropping off students. Assuming 25 feet per vehicle, each pick-up and drop-off area could serve five vehicles at a single time, for a total of 10 for both pick-up and drop-off areas. Assuming an average of 20 seconds for each drop-off maneuver (i.e., three maneuvers per minute), the two pick-up and drop-off areas could serve 30 vehicles per minute (10 spaces x 3 vehicles per minute per space = 30 vehicles per minute).

As shown in **Table 8**, the Quail Lakes School project would generate 195 inbound vehicle trips in the a.m. peak hour. Hypothetically, if all the inbound vehicle trips used pick-up and drop-off areas, all the vehicles could be served in seven minutes (195 vehicles ÷ 30 vehicles per minute = 6.5 minutes). In reality, some parents would park and walk with the student into the school, reducing demand on the pick-up and drop-off areas. Offsetting this, however, is the above calculation assumes an even distribution of activity between the two pick-up and drop-off areas. In reality, more students (i.e., those in 1st through 8th grades) would be dropped off primarily in the pick-up and drop-off area adjacent to Alexandria Place. As a result, it is expected that some portion of students would be dropped off at an off-site location, primarily curbside along Alexandria Place and

Cedar Ridge Drive. With demand for drop-off expected to be relatively higher for 1st through 8th grades along Alexandria Place, some portion of these students would be expected to walk along Alexandria Place. It is expected that parents would prefer to drop-off students along the east side of Alexandria Place. However, it is also expected some students would be dropped off along the west side of Alexandria Place, and walk across the street.

Kindergarten Pick-Up and Drop-Off

As shown in **Figure 3**, the kindergarten has its own designated pick-up and drop-off area. Nevertheless, kindergarten parents are especially prone to park and pick up students. As noted in the *Project Description* section of this traffic impact study, Quail Lakes School would include 24 transitional kindergarten students and 48 kindergarten students, for a total of 72 students. As shown in **Figure 3**, 19 parking spaces would be provided in the area north of the kindergarten building.

Some parents of kindergarten students would use the pick-up and drop-off area. However, during the time before the beginning of class and dismissal time, it is expected the 19 parking spaces would be full. As a result, some portion of parents would be expected to park along Cedar Ridge Drive and walk with their student to or from the school. It is expected that parents would prefer to park along the south side of Cedar Ridge Drive. However, it is also expected some parents would park along the north side of Cedar Ridge Drive, and parents and students would walk across the street.

Peak Parking Demand

On-site observations at schools indicate peak parking demand occurs during a short period of time in the afternoon as classes are dismissed. Parents driving vehicles to pick up students accumulate immediately before, and at the time of, class dismissal.

Peak parking demand has been estimated for this traffic impact study using rates from the ITE document *Parking Generation, 4th Edition* (Institute of Transportation Engineers 2010). The peak parking demand rates and estimates are presented in **Table 12**. To estimate demand during the peak period, the 85th percentile parking demand rates from *Parking Generation, 4th Edition* were used in **Table 12**.

As shown in **Table 12**, the ITE document *Parking Generation, 4th Edition* estimates elementary schools generate peak parking demand at a rate of 0.21 vehicles per student, and middle schools or junior high schools generate peak parking demand at a rate of 0.10 vehicles per student. Independent research on peak parking demand at schools has been conducted by KD Anderson & Associates. This research included elementary schools in suburban areas of the Central Valley. KD Anderson & Associates has found that suburban elementary schools with both bus service and pedestrian access generate a peak demand for parking of 0.16 spaces per student. With pedestrian access and no bus service, suburban elementary schools generate a peak demand for 0.21 spaces per student. The research conducted by KD Anderson & Associates result in peak parking generation rates generally consistent with the rates presented by ITE *Parking Generation, 4th Edition*.

As shown in **Table 12**, peak parking demand at Quail Lakes School would be 103 vehicles. As shown in **Figure 3**, 62 parking spaces would be provided in on-site facilities. As a result, it is expected that approximately 41 vehicles (103 vehicles – 62 vehicles = 41 vehicles) would park off-site during a relatively short period of time at the dismissal of classes.

Table 12. Parking Generation

Land Use Type and ITE Land Use Code	**Variable**	**Amount**	
<u>Parking Generation Rates</u>			
Elementary School (520)	Students	0.21	Vehicles per Student
Middle School / Junior High School (522)	Students	0.10	Vehicles per Student
<u>Parking Generation Estimates</u>			
Elementary School (520)	430 Students	90	Vehicles
Middle School / Junior High School (522)	128 Students	13	Vehicles
TOTAL		103	Vehicles

Sources: Institute of Transportation Engineers 2010, and Spragg pers. comm.
Note: Values shown are for 85th percentile.

No parking is allowed along Quail Lakes Drive in the vicinity of the Quail Lakes School project site. As a result, the project-related vehicles parking off-site would be located along Alexandria Place and Cedar Ridge Drive. Single family detached residential land use is located across Alexandria Place from the Quail Lakes School project site, and multiple-family residential land use is located across Cedar Ridge Drive. While these residential uses are adjacent to Alexandria Place and Cedar Ridge Drive, the front of these residences face away from Alexandria Place and Cedar Ridge Drive. The backs of these residences and associated back-fencing face Alexandria Place and Cedar Ridge Drive, and direct access to these residences is not provided by Alexandria Place and Cedar Ridge Drive. As a result, on-street parking associated with the Quail Lakes School project is not expected to adversely affect access to the nearby residences, and is not considered to be substantially intrusive.

Assuming 25 feet per vehicle, the amount of on-street parking is estimated to be approximately:

- 24 spaces along the west side of Alexandria Place,
- 15 spaces along the east side of Alexandria Place,
- 16 spaces along the north side of Cedar Ridge Drive, and
- 12 spaces along the south side of Cedar Ridge Drive.

A total of 67 off-site parking spaces would be available along Alexandria Place and Cedar Ridge Drive. Added to the 62 parking spaces provided on-site at the Quail Lakes School project site, there would be a total of 129 spaces available (67 spaces + 62 spaces = 129 spaces). The 129 spaces is expected to be adequate to meet the peak demand of 103 spaces.

Based on the assessment of pick-up and drop-off areas, and the peak parking generation estimates presented above, it is likely the Quail Lakes School project would result in students and parents walking along and across both Alexandria Place and Cedar Ridge Drive. While the number of students and parents walking across Alexandria Place and Cedar Ridge Drive cannot be quantified, this is considered to be a potential safety concern, and is considered to be significant impact. This impact would be reduced to a less than significant level with implementation of the following mitigation measure:

> **Mitigation Measure – Develop and Implement a Pedestrian Safety Crossing Plan.** The SUSD will, in consultation with City of Stockton staff, develop and implement a pedestrian safety crossing plan. The objective of the plan will be to provide pedestrians with safe access between the Quail Lakes School project site, and the west side of Alexandria Place and the north side of Cedar Ridge Drive. Various marking, signing, street surface treatments, including mid-block crosswalks may be considered. The number, location, and type of features shall be to the satisfaction of City of Stockton staff. Potential designs and features are presented in the *City of Stockton Traffic Calming Guidelines* (City of Stockton 2008).

Intersection Blocking

As shown in **Figure 3**, the West Inbound Driveway and the Southwest Driveway are located along the east side of Alexandria Place, approximately 150 to 200 feet north of Quail Lakes Drive. As northbound vehicles approach the Quail Lakes School project site from Quail Lakes Drive along Alexandria Place, vehicle queues may form at these two driveways, especially the West Inbound Driveway. Vehicles parked along the east side of Alexandria Place between Quail Lakes Drive and the West Inbound Driveway would exacerbate the potential queuing. Excessive queuing along northbound Alexandria Place at this location could result in vehicle queues extending into the intersection of Quail Lakes Drive & Alexandria Place. Queues extending into the intersection would interfere with the operation of this intersection, and could result in a potential safety conflict with through traffic on Quail Lakes Drive. This potential safety conflict is considered to be a significant impact. This impact would be reduced to a less than significant level with implementation of the following mitigation measure:

> **Mitigation Measure – Prohibit Parking on the East Side of Alexandria Place Between Quail Lakes Drive and the West Inbound Driveway.** Install signs prohibiting parking along the east side of Alexandria Place between Quail Lakes Drive and the West Inbound Driveway. In the vicinity of schools, compliance with parking prohibitions sometimes vary. The degree of compliance at the Quail Lakes School project site cannot be known at this time. However, it is possible enforcement of the prohibition may become necessary in the future

CUMULATIVE NO PROJECT CONDITIONS

Cumulative No Project conditions represent a long-term future background condition. Development of land uses and roadway improvements associated with the City of Stockton General Plan in the year 2035 are assumed in this condition. This scenario does not include development of the Quail Lakes School project. The Cumulative No Project condition, therefore, serves as the baseline condition used to assess the significance of long-term project-related traffic impacts.

The Cumulative No Project condition assumes implementation of the City of Stockton General Plan. The source of information on the land use and roadway improvements assumed in the analysis of Cumulative No Project condition is documentation of the City's travel demand model, in particular the General Plan Update Preferred Alternative 2035 model (City of Stockton 2004b).

TRAFFIC VOLUME FORECASTS

As previously described in the *Travel Forecasting* section of this traffic impact study, the City of Stockton Travel Demand Model (City of Stockton 2004b) was used to develop forecasts of background increases in traffic volumes under Cumulative No Project conditions. The increases in traffic volumes reflect development of land uses consistent with the City of Stockton General Plan.

Application of the methods described in the *Travel Forecasting* section results in the a.m. peak hour and p.m. peak hour traffic volumes presented in **Figure 13**, and the daily traffic volumes presented in **Table 13**.

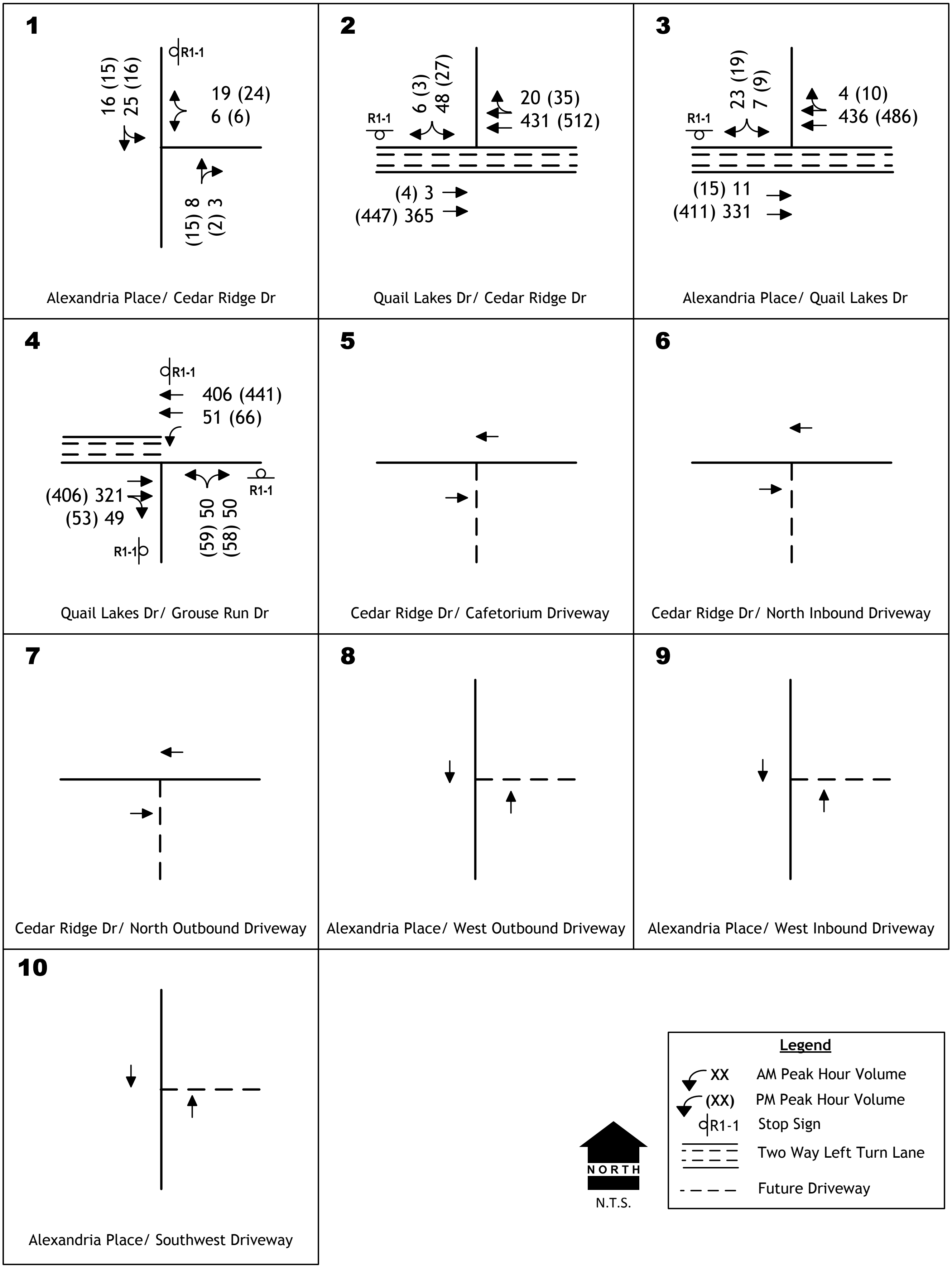
ROADWAY IMPROVEMENTS

There is very little vacant land in the immediate vicinity of the Quail Lakes School project site. Land uses in the study area are largely built-out, and substantial future land use development is not expected. Consistent with that, no future roadway improvements are expected in the study area. The resulting intersection lane geometrics assumed for Cumulative No Project conditions are shown in **Figure 13**.

Table 13. Roadway Segment Level of Service - Cumulative No Project Conditions

Roadway Segment	Number of Lanes	Daily Capacity	Daily Volume	V/C Ratio	Level of Service
1 Quail Lakes Drive - west of Alexandria Place	4	36,300	12,637	0.35	A
2 Quail Lakes Drive - east of Grouse Run Drive	4	36,300	12,390	0.34	A

Notes: "V/C Ratio" = volume-to-capacity ratio.



CUMULATIVE WITHOUT PROJECT
TRAFFIC VOLUMES AND LANE CONFIGURATIONS

KD Anderson & Associates, Inc.
Transportation Engineers

figure 13

INTERSECTION LEVELS OF SERVICE

Table 14 presents the a.m. peak hour and p.m. peak hour LOS at each study intersection under Cumulative No Project conditions. The worksheets presenting the calculation of LOS are included in the technical appendix.

Traffic volumes under Cumulative No Project conditions would be slightly higher than under Existing conditions and, as a result, vehicle delay at study intersections under Cumulative No Project conditions would be slightly higher than under Existing conditions.

Under Cumulative No Project condition, LOS at all four study intersections would be at acceptable LOS A or B during both the a.m. peak hour and the p.m. peak hour. No improvements are needed at these intersections.

ROADWAY SEGMENT LEVELS OF SERVICE

Table 13 presents a summary of LOS on the two study roadway segments under Cumulative No Project conditions. Both roadway segments would operate at acceptable LOS A. No improvements are needed on these two roadway segments to achieve acceptable LOS.

Table 14. Intersection Level of Service - Cumulative No Project Conditions

	Study Intersections	Inters. Control	Signal Warrant Met?	AM Peak		PM Peak	
				LOS	**Delay**	**LOS**	**Delay**
1	Alexandria Place & Cedar Ridge Drive	Unsig	No	A	5.2	A	4.8
2	Quail Lakes Drive & Cedar Ridge Drive	Unsig	No	A	1.0	A	0.5
3	Quail Lakes Drive & Alexandria Place	Unsig	No	A	0.5	A	0.5
4	Quail Lakes Drive & Grouse Run Drive	AWSC	No	B	10.1	B	11.0
5	Cedar Ridge Drive & Cafetorium Driveway	- -		- -	- -	- -	- -
6	Cedar Ridge Drive & North Inbound Driveway	- -		- -	- -	- -	- -
7	Cedar Ridge Dr. & North Outbound Driveway	- -		- -	- -	- -	- -
8	Alexandria Place & West Outbound Driveway	- -		- -	- -	- -	- -
9	Alexandria Place & West Inbound Driveway	- -		- -	- -	- -	- -
10	Alexandria Place & Southwest Driveway	- -		- -	- -	- -	- -

Notes: LOS = Level of Service. "Inters. Control" = Type of intersection control.
"AWSC" = All-way stop-sign control. "Unsig" = Unsignalized stop-sign control.
Dashes (- -) indicate the intersection would not be present under this scenario.
Delay is measured in seconds per vehicle.
Per City of Stockton guidelines, intersection average delay is reported for all intersections, including unsignalized intersections.

CUMULATIVE PLUS QUAIL LAKES SCHOOL PROJECT IMPACTS

The analysis of the Cumulative Plus Quail Lakes School project development condition describes long-term traffic operations assuming implementation of both the City of Stockton General Plan and the proposed project. Comparing traffic operations under this condition to traffic operations under Cumulative No Project conditions allows an identification of the long-term project-related effects of the proposed project.

The development of the Quail Lakes School project would result in vehicle traffic to and from the project site. Methods used to estimate project-related travel have been previously described in the *Existing Plus Approved Projects Plus Quail Lakes School Project Impacts* section of this traffic impact study. **Figure 11** displays the project-related-only traffic volumes for each study intersection in the a.m. peak hour and p.m. peak hour. **Figure 14** displays the resulting Cumulative Plus Project traffic volumes anticipated for each study intersection in the peak hours. **Table 15** displays the resulting Cumulative Plus Project roadway segment daily traffic volumes.

Development of forecasts of future year background traffic volumes has been previously described in the *Cumulative No Project Conditions* section of this traffic impact study.

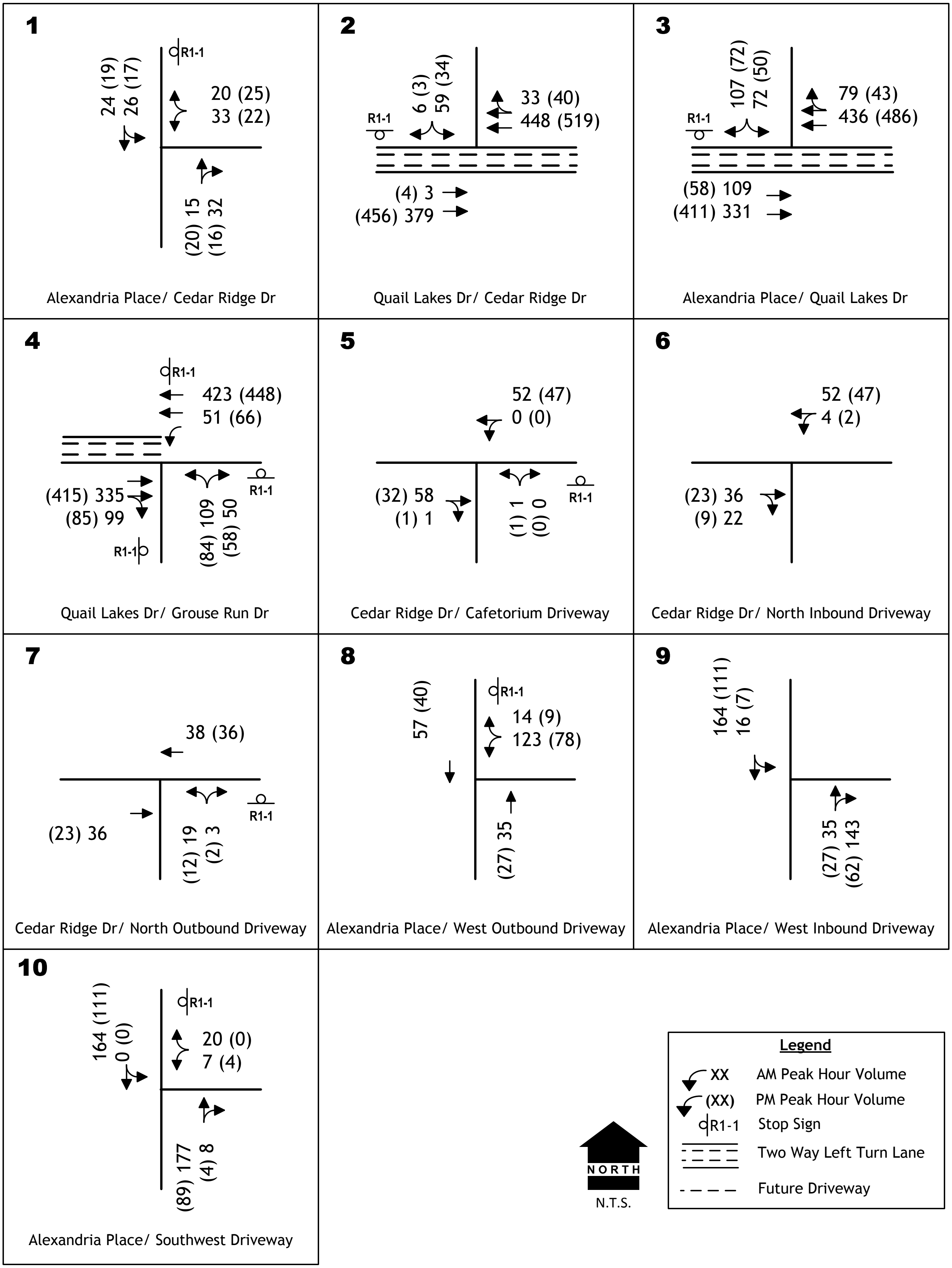
Future year background roadway improvements assumed in this analysis have been previously described in the *Cumulative No Project Conditions* sections of this traffic impact study.

INTERSECTION LEVELS OF SERVICE

Table 16 presents the a.m. peak hour and p.m. peak hour LOS at each study intersection under Cumulative Plus Quail Lakes School project conditions. The worksheets presenting the calculation of LOS are included in the technical appendix.

Traffic volumes under Cumulative Plus Quail Lakes School project conditions would be generally higher than under Cumulative No Project conditions and, as a result, vehicle delay at study intersections under Cumulative Plus Project conditions would be higher than under Cumulative No Project conditions.

Under Cumulative Plus Project conditions, LOS at all 10 study intersections would be at acceptable LOS A or B during both the a.m. peak hour and the p.m. peak hour. No improvements are needed at these 10 intersections to achieve acceptable LOS.



CUMULATIVE PLUS PROJECT
TRAFFIC VOLUMES AND LANE CONFIGURATIONS

figure 14

KD Anderson & Associates, Inc.
Transportation Engineers
0780-11 RA 12/10/2018

Table 15. Roadway Segment Level of Service - Cumulative Plus Project Conditions

Roadway Segment	Number of Lanes	Daily Capacity	Daily Volume	V/C Ratio	Level of Service
1 Quail Lakes Drive - west of Alexandria Place	4	36,300	13,181	0.36	A
2 Quail Lakes Drive - east of Grouse Run Drive	4	36,300	12,484	0.34	A

Notes: "V/C Ratio" = volume-to-capacity ratio.

Table 16. Intersection Level of Service - Cumulative Plus Project Conditions

	Study Intersections	Inters. Control	Signal Warrant Met?	AM Peak		PM Peak	
				LOS	Delay	LOS	Delay
1	Alexandria Place & Cedar Ridge Drive	Unsig	No	A	4.5	A	4.6
2	Quail Lakes Drive & Cedar Ridge Drive	Unsig	No	A	1.2	A	0.7
3	Quail Lakes Drive & Alexandria Place	Unsig	No	A	4.4	A	2.4
4	Quail Lakes Drive & Grouse Run Drive	AWSC	No	B	11.1	B	11.6
5	Cedar Ridge Drive & Cafetorium Driveway	Unsig	No	A	0.1	A	0.1
6	Cedar Ridge Drive & North Inbound Driveway	Unsig	No	A	0.3	A	0.2
7	Cedar Ridge Dr. & North Outbound Driveway	Unsig	No	A	2.1	A	1.7
8	Alexandria Place & West Outbound Driveway	Unsig	No	A	5.8	A	5.2
9	Alexandria Place & West Inbound Driveway	Unsig	No	A	0.3	A	0.3
10	Alexandria Place & Southwest Driveway	Unsig	No	A	0.2	A	0.2

Notes: LOS = Level of Service. "Inters. Control" = Type of intersection control.
"AWSC" = All-way stop-sign control. "Unsig" = Unsignalized stop-sign control.
Dashes (- -) indicate the intersection would not be present under this scenario.
Delay is measured in seconds per vehicle.
Per City of Stockton guidelines, intersection average delay is reported for all intersections, including unsignalized intersections.

ROADWAY SEGMENT LEVELS OF SERVICE

Table 15 presents a summary of LOS on the two study roadway segments under Cumulative Plus Project conditions. Both study roadway segments would operate at acceptable LOS A. Therefore, the impact on these roadway segments is considered to be less than significant. No mitigation measures are needed at these roadway segments.

REFERENCES

DOCUMENTS CITED

California Department of Transportation. 2014. California Manual on Uniform Traffic Control Devices 2014 Edition. Sacramento CA.

California Department of Transportation. 2018. Caltrans Traffic Census Program Internet Webpage. http://www.dot.ca.gov/trafficops/census/

Institute of Transportation Engineers. 2010. Parking Generation, 4th Edition. Washington, D.C.

Institute of Transportation Engineers. 2017. Trip Generation Manual, 10th Edition. Washington, D.C.

San Joaquin Regional Transit District. 2018. San Joaquin Regional Transit District Internet Webpage. http://www.sanjoaquinrtd.com/. Stockton, CA.

Stockton, City of. 2003. City of Stockton Transportation Impact Analysis Guidelines. Stockton, CA.

Stockton, City of. 2004a. City of Stockton General Plan Background Report. Stockton, CA.

Stockton, City of. 2004b. Travel Demand Model Development Report October 2004. Stockton, CA. (Detailed technical modeling information is available at ftp://ftp.fehrandpeers.com, Login username: stockton@fehrandpeers.com, Login password: 405m0Del).

Stockton, City of. 2006. City of Stockton General Plan Update Draft Environmental Impact Report. Stockton, CA.

Stockton, City of. 2007. Goals & Policies Report – Stockton General Plan 2035. Stockton, CA.

Stockton, City of. 2008. City of Stockton Traffic Calming Guidelines – Revised April 2008. Stockton, CA.

Stockton, City of. 2010. Existing and Future Bikeway Plan. Stockton, CA.

Transportation Research Board. 2000. Special Report 209, Highway Capacity Manual 2000. Washington, D.C.

Transportation Research Board. 1982. National Cooperative Highway Research Program (NCHRP) Report 255, Highway Traffic Data for Urbanized Area Project Planning and Design. Washington, D.C.

PERSONAL COMMUNICATIONS

Henry, Matt and Julie Morgan. Fehr & Peers. January 19, 2005 Draft Technical Memorandum to Steve Escobar and Gregg Meissner, City of Stockton. Stockton General Plan – Revised Alternatives Analysis

Spragg, Michelle. Facilities Planner, Stockton Unified School District. August 28, 2018 and October 5, 2018 E-mail messages to Christopher Beamon, Stockton Unified School District; and Terry Farmer, BaseCamp Environmental. September 18, 2018 E-mail message to Charlie Simpson, BaseCamp Environmental; Wayne Shijo, KD Anderson & Associates; and Christopher Beamon, Stockton Unified School District.

APPENDICES

(see Electronic Files)