July 2023 | Initial Study/Mitigated Negative Declaration

LOS ALAMITOS HIGH SCHOOL GYMNASIUM PROJECT

Los Alamitos Unified School District

Lead Agency:

Los Alamitos Unified School District
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Abbreviations and Acronyms

AAQS	ambient air quality standards
AB	Assembly Bill
afy	acre-feet per year
APN	Assessor's Parcel Number
bgs	below ground surface
BMP	best management practices
CAFE	corporate average fuel economy
CalEEMod	California Emission Estimator Model
CAL FIRE	California Department of Forestry and Fire Protection
CALGreen	California Green Building Standards Code
Cal/OSHA	California Occupational Safety and Health Administration
Caltrans	California Department of Transportation
CAP	climate action plan
CARB	California Air Resources Board
CBC	California Building Code
CCA	Community Choice Aggregation
CDE	California Department of Education
CDFW	California Department of Fish and Wildlife
CEQA	California Environmental Quality Act
CGP	construction general permit
CGS	California Geologic Survey
CH_4	methane
CIP	capital improvement program
CMP	congestion management program
CNEL	community noise equivalent level
CO	carbon monoxide
CO_2	carbon dioxide
dB	decibel
dBA	A-weighted decibel
DPM	diesel particulate matter
DSA	Division of the State Architect
DTSC	Department of Toxic Substances Control
EDR	Electronic Database Review

Abbreviations and Acronyms

EIR	environmental impact report
EOP	emergency operations plan
EPA	United States Environmental Protection Agency
EV	electric vehicle
FEMA	Federal Emergency Management Agency
FHSZ	fire hazard severity zone
FTA	Federal Transit Administration
GEHA	geological and environmental hazards assessment
GHG	greenhouse gases
gpd	gallons per day
GWh	gigawatt hours
HCP	habitat conservation plan
HI	hazard index
HRA	health risk assessment
IPCC	Intergovernmental Panel on Climate Change
IS	initial study
L_{dn}	day-night noise level
L_{eq}	equivalent continuous noise level
LCFS	low-carbon fuel standard
LOS	level of service
LRA	local responsibility area
MBTA	Migratory Bird Treaty Act
MEIR	maximum exposed individual receptor
mgd	million gallons per day
MMRP	mitigation monitoring reporting program
MND	mitigated negative declaration
MS4	municipal separate storm sewer systems
MTC	Metropolitan Transportation Commission
N_2O	nitrogen dioxide
NAHC	Native American Heritage Commission
NCCP	natural community conservation plan
NO_X	nitrogen oxides
NPDES	National Pollution Discharge Elimination System

Abbreviations and Acronyms

NWIC	Northwest Information Center
O_3	ozone
OCP	organochloride pesticides
OEHHA	Office of Environmental Health Hazard Assessment
OHP	Office of Historic Preservation
OPR	Office of Planning and Research
OSHA	United States Occupational Safety and Health Administration
Pb	lead
PDA	priority development area
PEA	preliminary environmental assessment
PG&E	Pacific Gas and Electric
PM	particulate matter
PRD	permit registration documents
PS	Public and Semi-Public
PPD	pounds per day
ppm	parts per million
PPV	peak particle velocity
RMS	root mean square
ROG	reactive organic gas
RPS	renewable portfolio standard
RTP/SCS	regional transportation plan / sustainable communities strategy
SAB	State Allocation Board
SB	Senate Bill
SF_6	sulfur hexafloride
SO_2	sulfur dioxide
SR	state route
SRA	or state responsibility area
SSMP	sewer system management plan
SWPPP	Storm Water Pollution Prevention Plan
SWRCB	State Water Resources Control Board
TAC	toxic air contaminants
USDOT	United States Department of Transportation
USGS	United States Geological Survey

Abbreviations and Acronyms

UWMP	urban water management plan
VDECS	verified diesel emissions control strategy
VHFHSZ	very high fire hazard severity zone
VMT	vehicle miles traveled
VOC	volatile organic compound

1. Introduction

1.1 PROJECT OVERVIEW

The Los Alamitos Unified School District (District) proposes to develop a new gymnasium on the Los Alamitos High School (LAHS) campus (proposed project). The proposed project would renovate a portion of the high school's existing campus by removing fifteen storage containers and relocating eight portable classroom buildings, currently situated in the northern portion of the campus between the track and field, pool, and current gymnasium building, to behind the tennis courts on the LAHS campus. LAHS is a public school that is located at 3591 West Cerritos Ave in Los Alamitos, California. The campus is bounded by Fenley Drive to the north, Humboldt Street to the east, West Cerritos Avenue to the south, and Norwalk Boulevard to the west. The project site encompasses approximately 1.4 acres on the 50-acre campus.

The proposed project involves the construction of a gymnasium that would be 32,000 gross square feet and would include ornamental landscaping at the proposed gymnasium entrance, hardscape and softscape areas, and utility upgrades. No new classrooms are proposed as part of this project. The classrooms that used to operate in the portable buildings would be accommodated by the new STEM building on the southwest side of campus fronting W. Cerritos Avenue that was completed in 2022. Therefore, the proposed project would not increase or decrease the student capacity of the school. All new facilities would meet current State building standards. The proposed project, including all proposed facilities, supporting improvements, and associated discretionary actions, is considered in this Initial Study.

As owner of the property, the District will serve as the lead agency for requirements relating to the California Environmental Quality Act (CEQA).

1.2 PURPOSE OF CEQA AND THE INITIAL STUDY

CEQA (California Environmental Quality Act; Public Resources Code Section 21000 et seq.) requires that before a lead agency[1] makes a decision to approve a project that could have one or more adverse effects on the physical environment, the agency must inform itself about and consider the project's potential environmental impacts, inform the public about the project's potential environmental impacts and provide them an opportunity to comment on the environmental issues, and take feasible measures to avoid or reduce potential harm to the physical environment.

Los Alamitos Unified School District—in its capacity as lead agency pursuant to CEQA Guidelines Section 15050—is responsible for preparing environmental documentation in accordance with CEQA to determine if approval of the discretionary actions and subsequent development associated with the proposed project would have a significant impact on the environment. As part of the project's environmental review, the District

[1] Pursuant to Public Resources Code Section 21067, lead agency refers to the public agency that has the principal responsibility for carrying out or approving a project that may have a significant effect on the environment.

1. Introduction

authorized preparation of this Initial Study in accordance with the provisions of CEQA Guidelines Section 15063. Pursuant to Section 15063, purposes of an Initial Study are to:

- Provide the lead agency information to use as the basis for deciding whether to prepare an environmental impact report (EIR) or negative declaration.
- Enable an applicant or lead agency to modify a project, mitigating adverse impacts before an EIR is prepared, thereby enabling the project to qualify for a negative declaration.
- Assist in the preparation of an EIR if one is required.
- Facilitate environmental assessment early in the design of a project.
- Provide documentation of the factual basis for the finding in a negative declaration that a project will not have a significant effect on the environment.
- Eliminate unnecessary EIRs.
- Determine whether a previously prepared EIR could be used with the project.

As further defined by Section 15063, an Initial Study is prepared to provide the District with information to use as the basis for determining whether an environmental impact report (EIR), negative declaration, or mitigated negative declaration (MND) would be appropriate for providing the necessary environmental documentation and clearance for the proposed project.

In its preparation of this Initial Study, the District determined that the Initial Study has been prepared to support the adoption of an MND. An MND is a written statement by the lead agency that briefly describes the reasons why a project that is not exempt from the requirements of CEQA will not have a significant effect on the environment and, therefore, does not require preparation of an EIR (CEQA Guidelines Section 15371). The CEQA Guidelines require preparation of an MND if the Initial Study prepared for a project identifies potentially significant effects, but: 1) revisions in the project plans or proposals made by or agreed to by the applicant before a proposed MND and Initial Study are released for public review would avoid the effects or mitigate the effects to a point where clearly no significant effects would occur; and 2) there is no substantial evidence, in light of the whole record before the Lead Agency, that the project may have a significant effect on the environment (CEQA Guidelines Section 15070[b]).

The District has considered the information in this Initial Study in its decision-making processes. Although the Initial Study was prepared with consultant support, the analysis, conclusions, and findings made as part of its preparation fully represent the independent judgment and analysis of the District.

1.3 PROJECT LOCATION

The project site is at 3591 West Cerritos Ave in the northern portion of the City of Los Alamitos in Orange County. Los Alamitos is adjacent to the San Gabriel River, Interstate 405 (I-405), and I-605. It is approximately 40 miles southeast of Los Angeles and approximately 20 miles west of Anaheim (See Figure 1, *Regional Location*).

As shown on Figure 2, *Local Vicinity,* the project site is approximately 8 miles north of California 91 (SR-91), approximately 5 miles east of State Route 39 (SR-39), approximately 2.2 miles south of I-405, and approximately 1.5 miles west of I-605. The campus is bounded by Fenley Drive to the north, Humboldt Street to the east, West Cerritos Avenue to the south, and Norwalk Boulevard to the west. The project site encompasses approximately 1.4 acres on the 50-acre LAHS campus. The project site and LAHS campus are within two parcels—the 42-acre Assessor Parcel Number (APN) 242-262-02 and the 5.69-acre APN 242-262-07.[2] Regional access to the project site is from CA-91, SR-39, I-405, and I-605, and local access is by the surrounding streets and street grid.

1.4 ENVIRONMENTAL SETTING

1.4.1 Existing Land Use

The project site is on the LAHS campus—a public high school in the Los Alamitos Unified School District. LAHS has the capacity to serve up to 3,200 high school students. The project site is currently occupied by fifteen storage containers, which would be removed, and eight portable classrooms that would be relocated behind the tennis courts on the LAHS campus as part of the proposed project. As shown in Figure 4, *Site Plan,* on the LAHS campus north of the project site are the baseball fields, east of the project site is the track and field stadium, south of the project site is the east parking lot, and west of the project site are the existing gymnasium and pool facility.

1.4.2 Surrounding Land Use

As shown in Figure 3, *Aerial Photograph*, the project site is surrounded by commercial, office, and residential uses. Single-family residential neighborhoods and the District's office are to the north, single-family residential neighborhoods are to the east, light industrial and commercial uses are to the south, and light industrial spaces are to the west. McAuliffe Middle School and Lexington Park are, respectively, 0.5 mile and 1 mile east of the project site along Cerritos Avenue.

1.4.3 Existing Zoning and General Plan Land Use Designations

The project site is currently zoned "Community Facilities" (C-F) with a corresponding General Plan land use designation of Community and Institutional. Generally, properties north and east of the project site are zoned for Single-Family Residential, properties south of the project site are zoned Planned Light Industrial and General Commercial, and properties to the east of the project site are zoned for Community Facilities and

2 Orange County Landbase, https://www.ocgis.com/ocpw/landrecords/, accessed on April 14, 2023.

Open Area.[3] The surrounding properties have General Plan land use designations of Single Family Residential;[4] Open Area;[5] Community and Institutional;[6] Planned Industrial;[7] and Retail Business.[8,9]

1.5 PROJECT DESCRIPTION

1.5.1 Proposed Project

Los Alamitos High School is a public school in Los Alamitos and in the Los Alamitos Unified School District. The project site is owned by the District, and funding for the proposed project is through a Measure G Bond and General Funds from the District.

The proposed project would remove the fifteen storage containers off-site and relocate the existing eight portable classroom buildings on campus (approximately 21,000 square feet). The eight portable buildings have capacity for 12 classrooms that accommodate approximately 300 students. The proposed project would include construction of a 40-foot-high 32,000-square-foot gymnasium with seating capacity for 2,000 people. Site improvements associated with construction of the proposed gymnasium would also include ornamental landscaping at the proposed gymnasium entrance, hardscape and softscape areas, and utility upgrades. All new facilities would meet current state building standards.

As shown on Figure 5, *Enlarged Site Plan,* the project site would be between the existing track and field stadium, the pool facility, and the gymnasium. As shown in Figure 6, *Exterior Building Elevations*, and Figure 7, *Gymnasium Rendering*, the gymnasium would be 40 feet tall and have the logo and name of the building, Griffin Center, on its exterior. The area outside of the building would be hardscaped with concrete and rubberized track surfaces in the outdoor fitness sections. As shown in Figure 8, *Floor Plan*, the new gymnasium would include a gym floor, four team rooms, a guest team room, sports storage, a weight room, a concessions area, restrooms, and support services. No locker rooms or showers would be built because the existing gym on campus would be utilized for these functions.

A newly constructed STEM building was completed in 2022. There would be no increase in student capacity at the school as a result of the proposed project. LAHS has a maximum capacity of approximately 3,200 students and a current enrollment of approximately 2,900 students.

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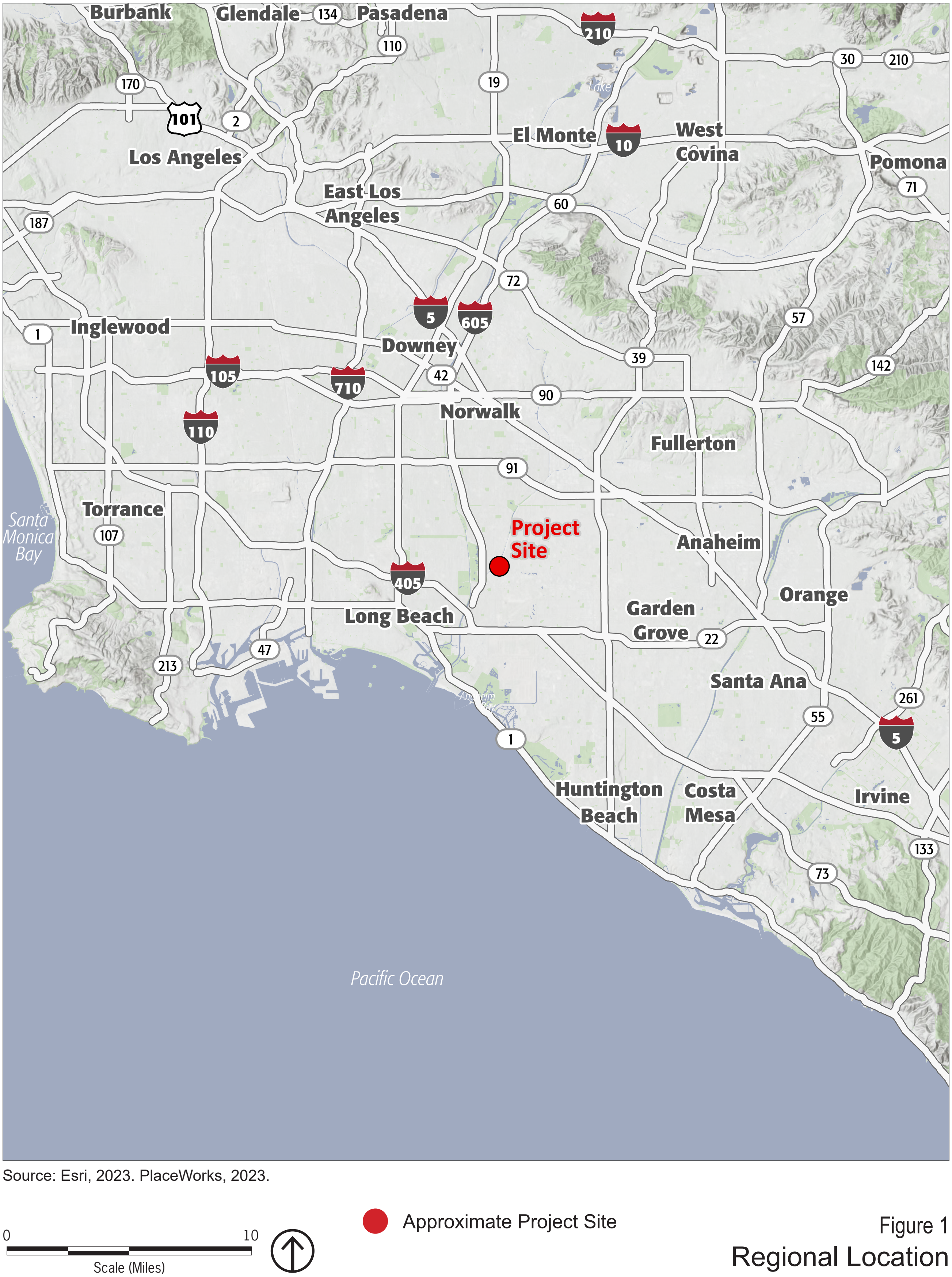
3 City of Los Alamitos Zoning Map, revised March 2020, http://cityoflosalamitos.org/DocumentCenter/View/439/2020-Zoning-Map-PDF accessed on April 13, 2023.
4 The Single Family Residential designation corresponds with the properties zoned Single-Family Residential.
5 The Open Area designation corresponds with the properties zoned Open Area
6 The Community and Institutional designation corresponds with the properties zoned Community Facilities.
7 The Planned Industrial designation corresponds with the properties zoned Planned Light Industrial.
8 The Retail Business designation corresponds with the properties zoned General Commercial.
9 Los Alamitos Genera Plan 2035, http://cityoflosalamitos.org/DocumentCenter/View/436/2035-General-Plan-PDF, accessed on April 13, 2023.



Source: Esri, 2023. PlaceWorks, 2023.

Figure 1
Regional Location

1. Introduction

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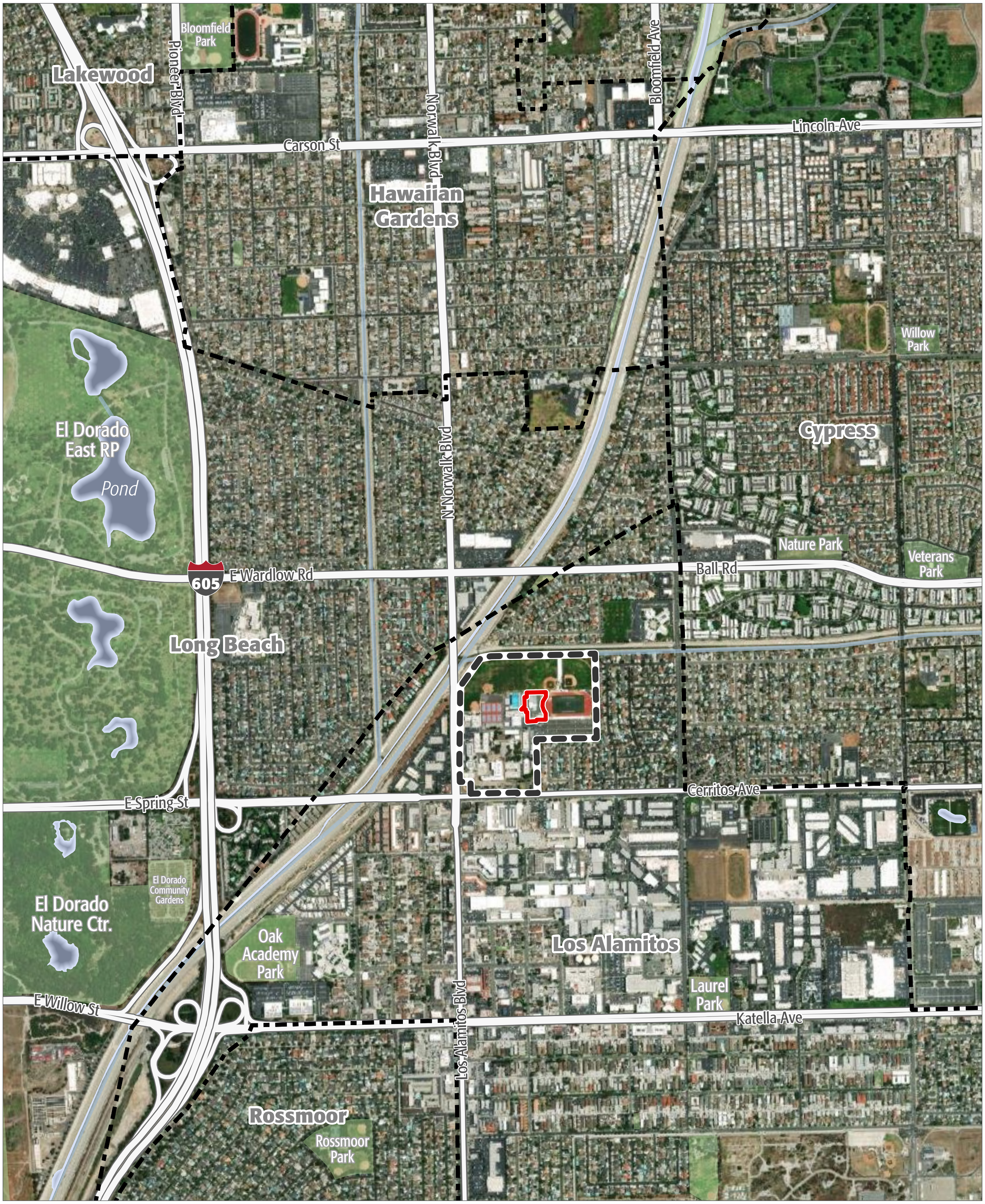

Source: Los Angeles County. 2023. PlaceWorks, 2023.

Figure 2
Local Vicinity

1. Introduction

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Source: © Google Earth Professional, 2023. PlaceWorks, 2023. City of Los Alamitos Zoning Map, 2015.

Approximate Project Site Limit of Work Boundary

0 600 Scale (Feet)

Figure 3
Aerial Photograph

1. Introduction

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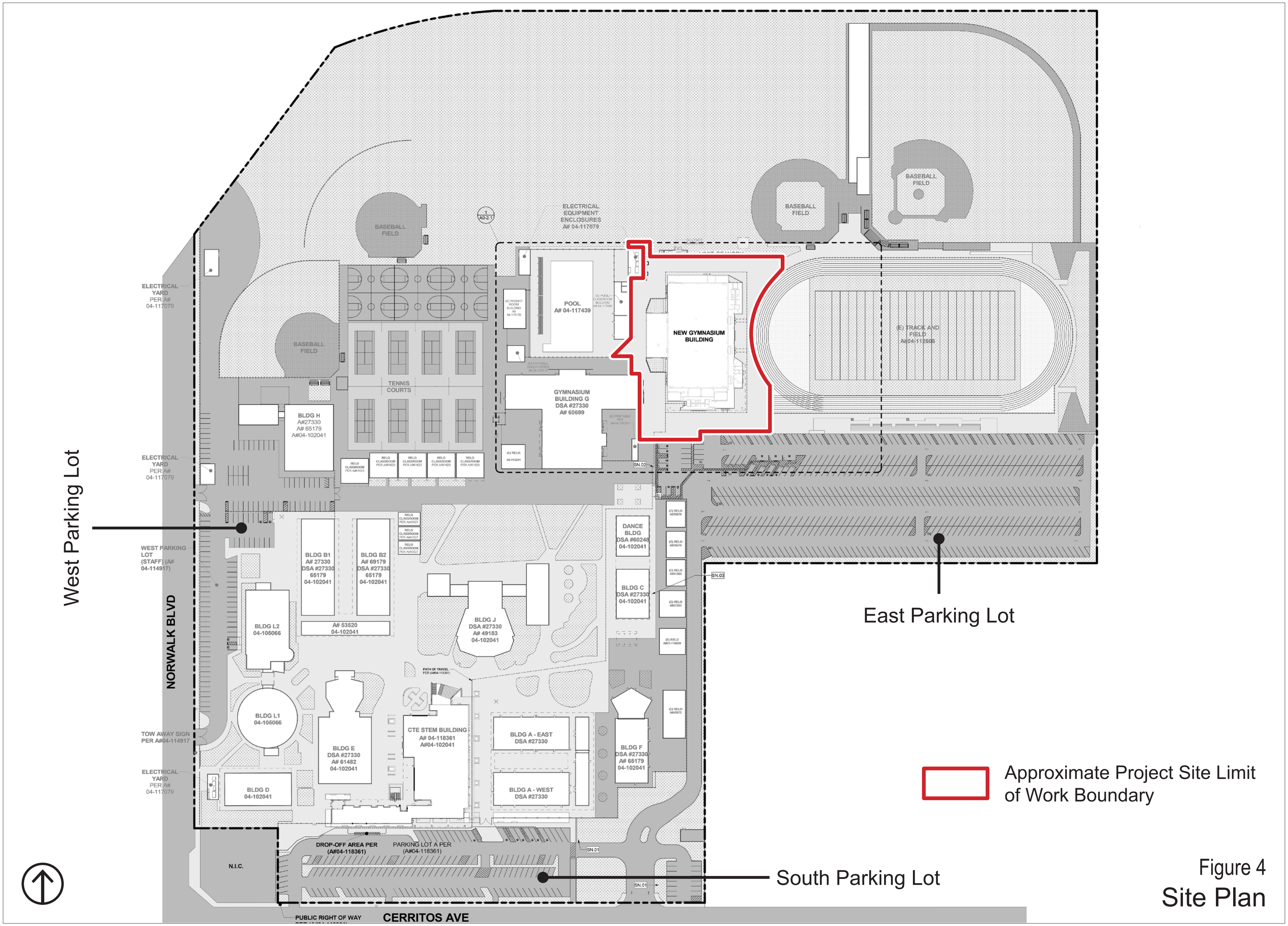

Figure 4
Site Plan

Source: Westgroup Designs, 2022.

1. Introduction

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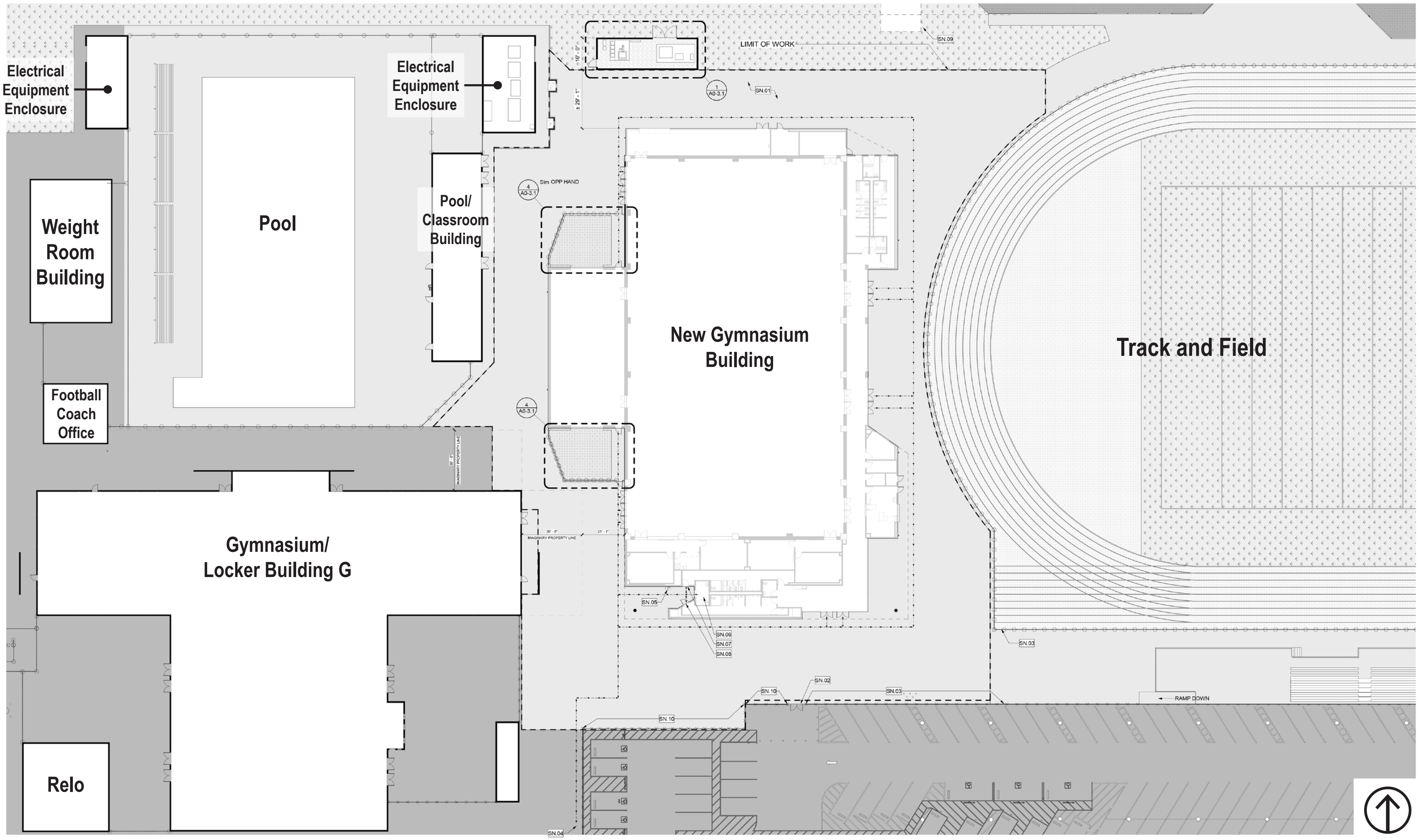

PATH OF TRAVEL
SOFTSCAPE - GRASS
SOFTSCAPE - RUBBERIZED TRACK SURFACE
HARDSCAPE - ASPHALT
HARDSCAPE - CONCRETE
CHAIN LINK FENCING
ORNAMENTAL FENCING

Source: Westgroup Designs, 2022.

Figure 5
Enlarged Site Plan

1. Introduction

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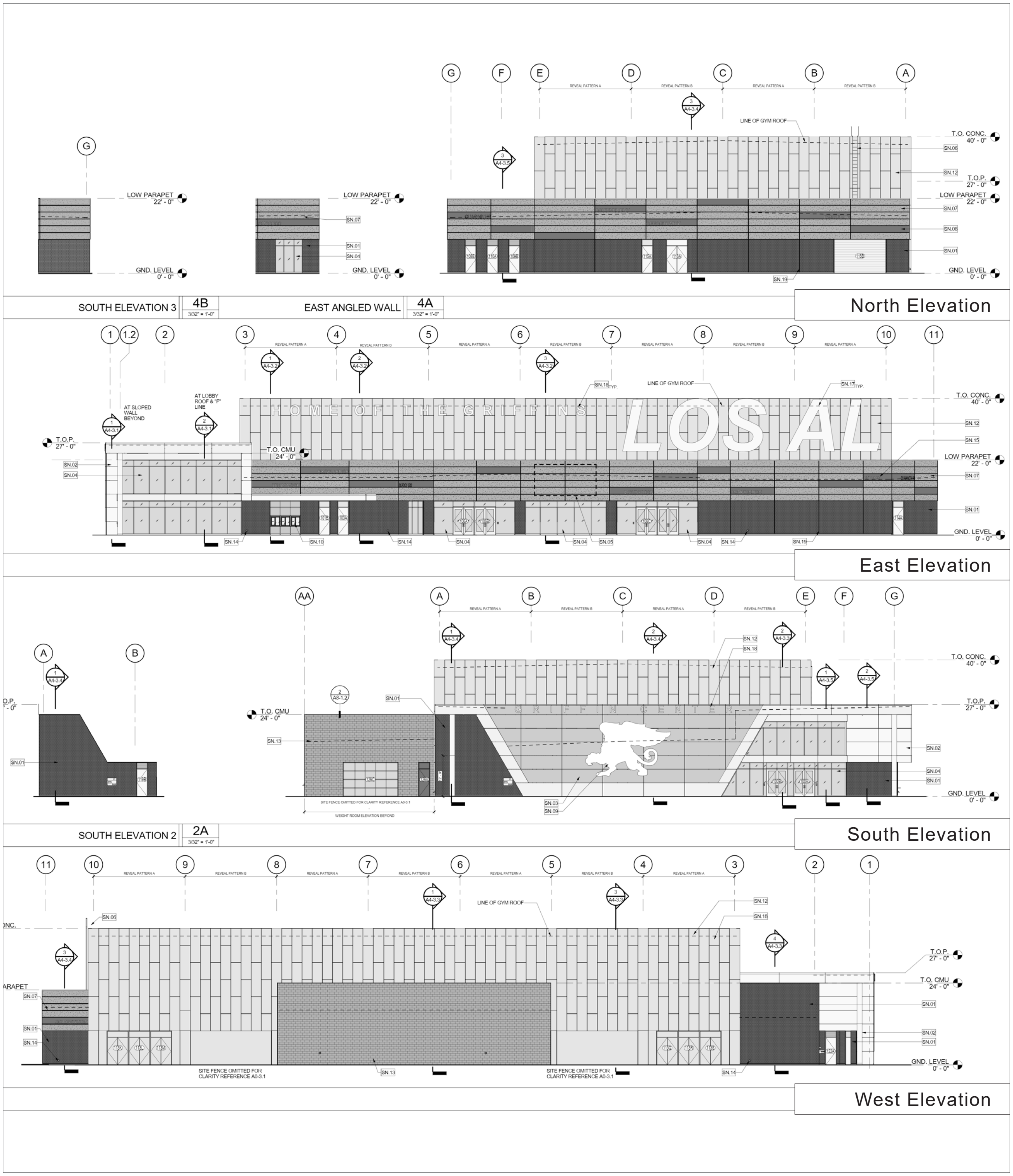

Source: Westgroup Designs, 2022.

Figure 6
Exterior Building Elevations

1. Introduction

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Source: Westgroup Designs, 2022.

Perspective View (Gym Southwest Corner)

Figure 7
Gymnasium Rendering

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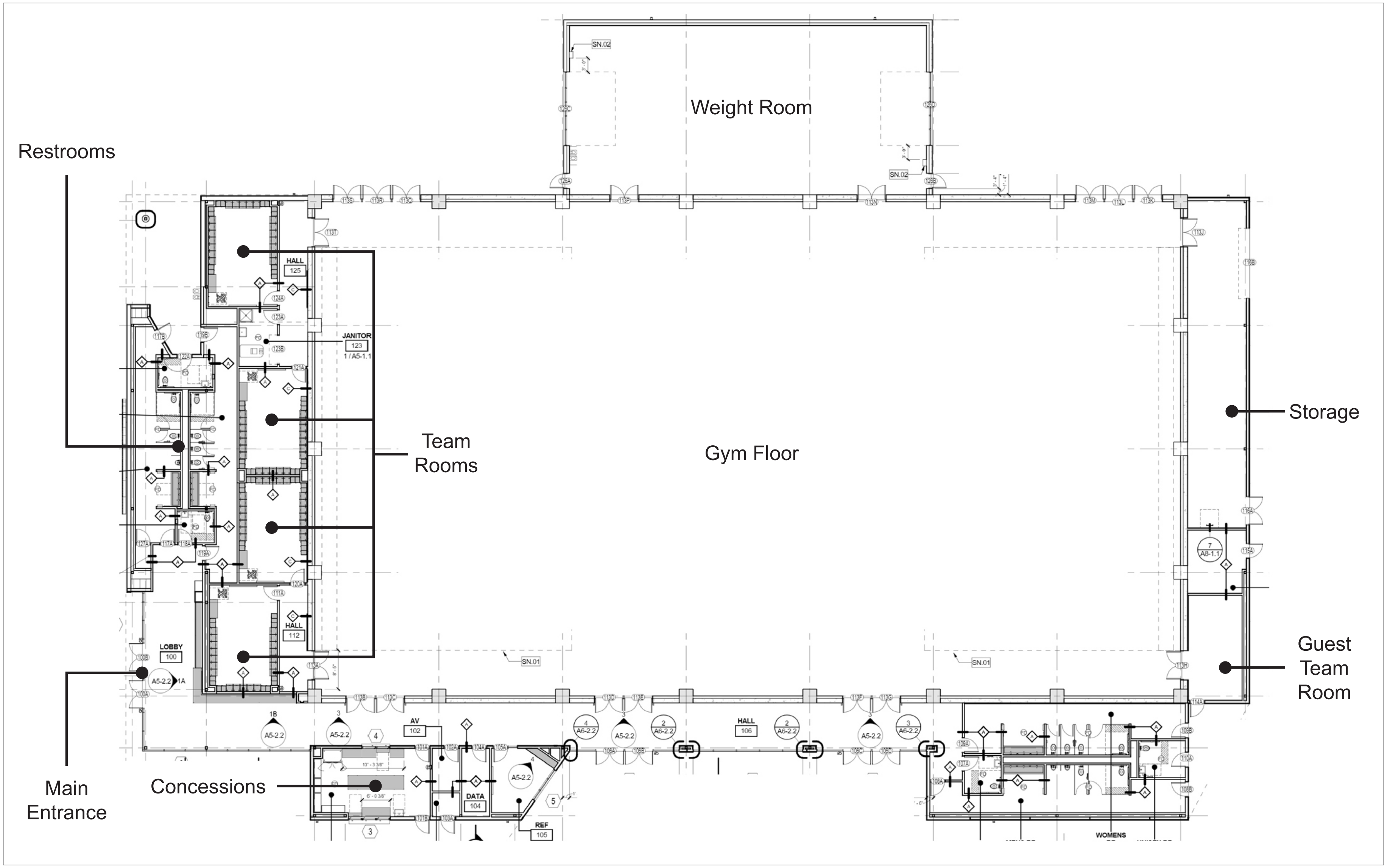

Source: Westgroup Designs, 2022.

0 40 Scale (Feet)

Figure 8
Floor Plan

1. Introduction

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The proposed project is planned to operate from the hours of 7 am to 10 pm and may be used concurrently with the existing 1,200-seat gymnasium on campus. The proposed project is expected to hold events all year and is intended to host all competitions, with the existing gym used for practices and small Junior Varsity (JV) games. However, events that would occur in the new gymnasium would not coincide with other major events at the school. In addition, the development of the new gymnasium would not result in an increase in events on campus; instead, it would allocate new gymnasium space to events that already take place at the existing gymnasium directly west of the project site, as described above.

1.5.1.1 ACCESS AND CIRCULATION

As shown in Figure 4, *Site Plan*, the LAHS campus is served by three parking lots at the east, south, and west edges of the campus grounds. The south parking lot and the west parking lot are bordered by West Cerritos Avenue and Norwalk Boulevard. The east parking lot is the largest and is closer to the middle of campus, not near a major arterial. To access this parking lot, a road runs from Cerritos Avenue to the east parking lot.

The west parking lot is for staff, and the south and east parking lots are for students. The south parking lot is Parking Lot A, and the east parking lot is Parking Lot B. In parking lot B are 493 stalls, 10 ADA standard parking spaces, and 3 ADA van parking spaces. No improvements to the parking areas would occur as part of the proposed project.

In addition to the existing on-site access routes, a fire lane would be provided on all sides of the new gymnasium. This fire lane would connect to an existing fire lane that runs east-west between the new gymnasium site and the driveway on Los Alamitos Boulevard.

1.5.1.2 PROJECT PHASING AND CONSTRUCTION

The project is preliminarily scheduled to start in September 2023 and be completed in April 2024. The project would be constructed in one development phase and, after completion, would cover 0.73 acre of the 1.4-acre project site.

Construction activities would include building and asphalt demolition and excavation, site preparation and rough grading, fine grading, utility trenching, building construction, architectural coating, asphalt paving, finishing, and landscaping. Construction is proposed to take place during the hours of 7 am to 8 pm, Monday through Friday, and Saturdays, as allowed by the Los Alamitos Municipal Code, Section 17.20.020, *Exemptions*. A construction worksite traffic control plan would be prepared and implemented by the District. The plan would identify haul routes, hours of construction, protective devices, warning signs, and access. The active construction and staging areas would be located on the project site.

1.5.2 DISCRETIONARY ACTION REQUESTED

A discretionary action is an action taken by a government agency (for the project, the government agency is the Los Alamitos Unified School District) that calls for an exercise of judgment in deciding whether to approve a project. The District is the lead agency under CEQA and has the principal approval authority over the project. Following is a list of the discretionary actions and approvals required for project implementation.

- Adoption of a Mitigated Negative Declaration and Mitigation Monitoring and Reporting Program, Los Alamitos Unified School District
- Plan Approval, California Department of Education
- Approval of Plans and Specifications, California Division of the State Architect (DSA)

1.5.2.1 MITIGATED NEGATIVE DECLARATION AND MITIGATION MONITORING AND REPORTING PROGRAM

As stated in Section 1.2, *Purpose of CEQA and the Initial Study*, the District determined that this Initial Study supports the adoption of an MND. The MND and accompanying Initial Study are appropriate for providing the necessary environmental documentation and clearance for the proposed project and all related subsequent activities.

The Mitigation Monitoring and Reporting Program (MMRP) includes all mitigation measures imposed on the project to ensure that effects to the environment are reduced to less-than-significant. The MMRP also indicates the required timing for the implementation of each mitigation measure and identifies the parties responsible for implementing and monitoring each mitigation measure.

1.6 INCORPORATED BY REFERENCE

The information in this Initial Study is based, in part, on the following documents that include the project site or provide information addressing the general project area or use:

- **Los Alamitos General Plan 2035.** General Plan 2035 provides a comprehensive, long-range vision for the city's land use policies and is the primary tool to guide physical change within the city limits.
- **Los Alamitos General Plan 2035 Revised Final Environmental Impact Report.** The EIR addresses the potential impacts of implementing the General Plan through the year 2035. The EIR found significant and unavoidable impacts related to air quality, greenhouse gas emissions, noise, and transportation.
- **City of Los Alamitos Municipal Code**. The municipal code regulates activities in the city, including building and construction (Title 15), subdivisions (Title 16), and zoning (Title 17).

2. Environmental Checklist

2.1 PROJECT INFORMATION

1. Project Title: Los Alamitos High School Gymnasium Project

2. Lead Agency Name and Address:
Los Alamitos Unified School District
10293 Bloomfield Street
Los Alamitos, CA 90720

3. Contact Person and Phone Number:
CJ Knowland, Director of Facilities, Maintenance, Operations & Transportation
(562) 799-4592 x 81116

4. Project Location: The project site is at 3591 West Cerritos Ave in the northern portion of Los Alamitos in Orange County. The campus is bounded by Fenley Drive to the north, Humboldt Street to the east, West Cerritos Avenue to the south, and Norwalk Boulevard to the west. The project site encompasses approximately 1.4 acres on the 50-acre campus.

5. Project Sponsor's Name and Address:
Los Alamitos Unified School District
10293 Bloomfield Street
Los Alamitos, CA 90720

6. General Plan Designation: Community and Institutional

7. Zoning: Community Facilities (C-F)

8. Description of Project:
Los Alamitos High School is a public school in the Los Alamitos Unified School District. The proposed project would remove fifteen storage containers and relocate eight existing portable classroom buildings (approximately 21,000 square feet). The eight portable buildings provide 12 classrooms that accommodate approximately 300 students. The proposed project would include construction of a 40-foot-high, 32,000-square-foot gymnasium with seating capacity for 2,000 people. Site improvements associated with construction of the proposed gymnasium would include ornamental landscaping at the proposed gymnasium entrance, hardscape and softscape areas, and utility upgrades. All new facilities would meet current state building standards.

2. Environmental Checklist

9. Surrounding Land Uses and Setting:

The project site is surrounded by commercial, office, and residential uses. Single-family residential neighborhoods and the District's office are to the north; single-family residential neighborhoods are to the east; commercial uses and multiple-family residential are to the south; and office and commercial spaces are to the west. McAuliffe Middle School and Lexington Park are, respectively, 0.5 mile and 1 mile east of the project site along Cerritos Avenue.

10. Other Public Agencies Whose Approval Is Required (e.g., permits, financing approval, or participating agreement):

California Geological Survey
Division of State Architects
Santa Ana Regional Water Quality Control Board

11. Have California Native American tribes traditionally and culturally affiliated with the project area requested consultation pursuant to Public Resources Code section 21080.3.1? If so, is there a plan for consultation that includes, for example, the determination of significance of impacts to tribal cultural resources, procedures regarding confidentiality, etc.?

> Note: Conducting consultation early in the CEQA process allows tribal governments, lead agencies, and project proponents to discuss the level of environmental review, identify and address potential adverse impacts to tribal cultural resources, and reduce the potential for delay and conflict in the environmental review process. (See Public Resources Code section 21080.3.2.) Information may also be available from the California Native American Heritage Commission's Sacred Lands File per Public Resources Code section 5097.94 and the California Historical Resources Information System administered by the California Office of Historic Preservation. Please also note that Public Resources Code section 21082.3(c) contains provisions specific to confidentiality.

The proposed project would be subject to AB 52, which requires that tribes who are interested in consulting submit or have submitted a general request letter to the lead agency to consult on projects requiring the preparation of a negative declaration, mitigated negative declaration, or environmental impact report. The area of potential effect (APE) identified in the Cultural Resources Study for the Los Alamitos High School Multistory STEM Classroom Building IS/MND included the project site within its boundary. Therefore, AB 52 was previously conducted for the proposed project under the Los Alamitos High School Multistory STEM Classroom Building IS/MND, and an overview of the report's findings are provided in Section 3.18, *Tribal Cultural Resources*, of this IS/MND.

2.2 ENVIRONMENTAL FACTORS POTENTIALLY AFFECTED

The environmental factors checked below would be potentially affected by this project, involving at least one impact that is a "Potentially Significant Impact," as indicated by the checklist on the following pages.

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

2.3 DETERMINATION (TO BE COMPLETED BY THE LEAD AGENCY)

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 have been made by or agreed to by the project proponent. A MITIGATED NEGATIVE DECLARATION will be prepared.

☐ 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.

[signature]	7/6/23
Signature	*Date*

2.4 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 would 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 particular 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.

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. 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) I**mpacts 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 Measures 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. This 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.

2. Environmental Checklist

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3. Environmental Analysis

This section provides an evaluation of the impact categories and questions contained in the checklist and identifies mitigation measures, if applicable.

3.1 AESTHETICS

Issues		Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
I. AESTHETICS. Except as provided in Public Resources Code Section 21099, would the project:					
a)	Have a substantial adverse effect on a scenic vista?			X	
b)	Substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings within a state scenic highway?				X
c)	In nonurbanized areas, substantially degrade the existing visual character or quality of public views of the site and its surroundings? (Public views are those that are experienced from publicly accessible vantage point). If the project is in an urbanized area, would the project conflict with applicable zoning and other regulations governing scenic quality?			X	
d)	Create a new source of substantial light or glare which would adversely affect day or nighttime views in the area?			X	

Except as provided in Public Resources Code Section 21099, would the project:

a) Have a substantial adverse effect on a scenic vista?

Less Than Significant Impact. The City of Los Alamitos offers scenic views of the San Gabriel, San Bernardino, and San Jacinto Mountains. Within the city, Katella Avenue (0.8 mile south of the project site) and Los Alamitos Boulevard (0.2 mile southeast of the project site) serve as the community's primary scenic corridors. However, neither corridors are State-designated scenic highways; nor are they considered eligible for that distinction by the California Scenic Highway Program.[10]

The General Plan has policies in place that address community character and context-sensitive development. Policy 4.2 of the Land Use Element states that buildings and related improvements along the city's arterial streets should exhibit authentic and enduring design. Although no specific architectural style is required, the City prefers that designs stay true to a single architectural style and discourage franchise architecture.[11]

[10] City of Alamitos General Plan EIR, Page 5.1-2
[11] Los Alamitos General Plan, 2015, Page 25

3. Environmental Analysis

Furthermore, the City has established Standards of Design and General Performance Standards in municipal code, Chapters 16.12 and 17.14. These standards focus on consistency with other local plans and state regulations as well as promoting compatibility with surrounding areas and land uses.

The project site is in a developed area, and views within the project site vicinity are largely constrained by existing development (generally ranging between one and two stories), landscaping, and vegetation. Additionally, existing buildings on-site range between one and three stories. Intermittent and partial views of mountains can be seen in the distance looking north and east along public rights-of-way near the project site (including along Norwalk Boulevard, Bloomfield Street, and Ball Road) and from the project site. No significant or unobstructed views of the mountains exist in the vicinity of the project site.

Additionally, the project site is approximately 8 miles north of CA-91, approximately 5 miles east of SR-39, approximately 2.2 miles south of I-405, and approximately 1.5 miles west of I-605. Due to the project site's distance from I-605 and existing development and vegetation in between, no views of the project site can be seen from I-605.

Development of the proposed project would construct a gymnasium and associated site improvements such as landscaping, walkways, and other amenities. The gymnasium would be 40 feet in height and development of the project site would be similar to and consistent with the height, scale, and massing of surrounding developments. While construction of a new, 40-foot building on-site may further constrain views of the hillsides to the north and east along public rights-of-way near the project site, as discussed above, no significant or unobstructed viewsheds of the hillsides exist in the vicinity of the project site, and development of the proposed project would not hinder significant views.

Since the proposed project would be similar to the existing developments in the vicinity of the project site and would not substantially create an adverse effect on scenic vistas, impacts would be less than significant.

b) Substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings within a state scenic highway?

No Impact. The California State Scenic Roadways Program, established in 1963 by the state legislature, identifies key roadways in California that contribute to the state's scenic resources by providing viewsheds with aesthetic value. The program establishes the state's responsibility for the protection and enhancement of California's natural scenic beauty through regulations pertaining to scenic roadways and their function. The City of Los Alamitos does not contain an Officially Designated State Scenic Highway, Officially Designated County Scenic Highway, or Eligible State Scenic Highway.[12]

Katella Avenue and Los Alamitos Boulevard serve as the city's primary scenic corridors. Katella Avenue is one mile south from the project site, and no views of the project site can be seen from Katella Avenue. Meanwhile, Los Alamitos Boulevard borders the project site and views of the project site can be clearly seen. However as described in Section 3.1 (a), development of the project site would be similar to and consistent with the height, scale, and massing of surrounding developments and would contribute to the urban views that characterize the

[12] General Plan Initial Study Los Alamitos, Page 37.

city. Therefore, no scenic resources along Los Alamitos Boulevard will be damaged as part of the proposed project and no impacts relating to scenic highways would occur upon implementation of the proposed project.

c) In nonurbanized areas, substantially degrade the existing visual character or quality of public views of the site and its surroundings? (Public views are those that are experienced from publicly accessible vantage point). If the project is in an urbanized area, would the project conflict with applicable zoning and other regulations governing scenic quality?

No Impact. For an incorporated city, "urbanized area" means the city that either by itself or, in combination with two contiguous incorporated cities, has a population of at least 100,000 persons. The City of Los Alamitos has a population of approximately 11,780 persons.[13] Therefore, the project site is in a nonurbanized area as defined by CEQA Guidelines 15191(m)(1).

The proposed project is on a public school within the jurisdiction of the Los Alamitos Unified School District and is subject to local regulations. The City's General Plan and Zoning Code provide regulations that guide scenic quality. The project site is located in an urbanized area on a site that is currently zoned "Community Facilities" (C-F) with a corresponding General Plan land use designation of Community and Institutional. The proposed project would be consistent with the existing zoning and General Plan land use designations on-site and would not conflict with applicable zoning policies.

The project site is also currently developed with the Los Alamitos High School and the proposed project would redevelop a section of the existing school. As shown in Table 1, *Consistency with General Plan Goals and Policies*, the proposed project would be consistent with applicable General Plan goals and policies related to aesthetics.

Table 1 Consistency with General Plan Goals and Policies

Policy	Consistency Discussion
Goal LU-3. Commercial, office, and industrial opportunities that maintain compatibility with surrounding neighborhoods, businesses, and public facilities.	
Policy LU-3.1. Compatibility. Require that new nonresidential development is located, scaled, and designed to be compatible with existing adjacent neighborhoods and uses.	**Consistent.** The proposed project would develop a gymnasium on the existing school site. Development of the proposed project would be visually similar to existing development onsite and existing adjacent neighborhoods and uses.
Policy LU-3.2. Mitigation Measures. Require buffers and feasible mitigation measures to reduce impacts of new or expanded uses on existing neighborhoods, businesses, and public facilities.	**Consistent.** The proposed project will require feasible mitigation measures for any impacts that are identified.
Goal LU-4. Neighborhoods and buildings that are well maintained and demonstrate a sense of pride and identity.	
Policy LU-4.1. Pride and identity. Enhance the sense of identity and increase the feeling of pride among Los Alamitos residents, business owners, employees, and visitors through excellent physical design and continual property maintenance and improvements.	**Consistent.** The proposed project would develop a gymnasium on an existing high school campus. By providing a top-of-the-line gym, the proposed project will enhance Los Alamitos High School's faculty, students, and staff's pride in the campus.

[13] US Census Data, 2021, https://data.census.gov/table?q=Los+Alamitos+city,+California&tid=ACSST5Y2021.S0101, accessed on April 18, 2023.

3. Environmental Analysis

Table 1 Consistency with General Plan Goals and Policies

Policy	Consistency Discussion
Policy LU-4.2. Corridor design. Buildings and related improvements along the City's arterial streets should exhibit authentic and enduring design. Although no specific architectural style is required, the City prefers that designs for individual buildings stay true to a single architectural style and discourage franchise architecture.	**Consistent.** The proposed project would develop a gymnasium on an existing high school campus. The proposed project will stay true to a single architectural style and will not demonstrate franchise architecture.
Policy LU-4.5. Substandard parcels. Encourage improvement of existing buildings and property to comply with current standards and present an attractive and well-maintained appearance. When improvements are not feasible, support the consolidation of substandard parcels for reuse.	**Consistent.** The proposed project would provide a new, top-of-the-line gymnasium that will be well maintained and follow existing building code standards.

Source: Los Alamitos General Plan, 2015.

As discussed in this section, the proposed project would not conflict with the zoning designation on site and would be consistent with regulations governing scenic quality. Therefore, no impact would occur.

d) Create a new source of substantial light or glare, which would adversely affect day or nighttime views in the area?

Less Than Significant Impact. Nighttime illumination and glare impacts are the effects of a development's exterior lighting upon adjoining uses and areas. Light reflecting off passing cars and large expanses of glazing (i.e., glass windows) or other reflective surfaces can also generate glare. Excessive light and/or glare can impair vision, cause annoyance, affect sleep patterns, and generate safety hazards for drivers. Daytime glare is caused by sunlight reflecting off reflective surfaces such as parked cars and cars traveling on adjacent roadways, light-colored building material, and windows.

Existing sources of light on-site include typical uses associated with a school campus including security/building lighting, parking lot lights, field lighting, and light emanating from windows. Existing sources of glare onsite include existing buildings onsite, parked cars, and cars traveling along adjacent roadways. Existing sources of light in the surrounding community include vehicle headlights, streetlights, security lights, and residential lighting (both exterior lighting and light emanating from windows). Existing sources of daytime glare in the surrounding community include vehicles parking and traveling on existing roadways, light-colored building material, and windows.

The proposed project would replace the existing portable classroom buildings at the project site and would construct a new gymnasium facility, new outdoor spaces and walkways which would introduce new sources of light and glare. Although the proposed project would introduce new light and glare sources to the area, the new light and glare sources would be similar to existing conditions and to neighboring uses.

The proposed project would also comply with Chapter 8.48, Lighting Performance Standards, and Section 17.24.040, Light and Glare, of the Los Alamitos Municipal Code.[14,15] Both areas of the municipal code outline how light sources need to be shielded when visible outside the project boundary and how glare shall be controlled.

Considering the existing sources of light and glare in the surrounding area and currently on-site, and compliance with the Los Alamitos Municipal Code; the amount and intensity of lighting proposed on-site would not be substantially greater or different from existing lighting in the surrounding area. Therefore, the light and glare from the proposed project would be less than significant.

3.1.1 Cumulative Impact Discussion

A cumulative impact would be considered significant if, taken together with past, present, and reasonably foreseeable projects in the area, it would result in a substantial contribution to an adverse effect with respect to any environmental standard. The nature of the visual influence of physical development is such that multiple projects would contribute to a cumulative aesthetic impact only when located proximate to one another.

Similar to the proposed project, cumulative projects' contribution to light and glare would be evaluated, and the project would implement any required mitigation measures to reduce its light and glare impacts. Since both the proposed project and any cumulative project would be required to be consistent with policies and regulations regarding aesthetics, the proposed project and cumulative projects would not combine to create a cumulative impact. Therefore, cumulative impacts would be less than significant.

3.2 AGRICULTURE AND FORESTRY RESOURCES

Issues	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
II. AGRICULTURE AND FORESTRY RESOURCES. In determining whether impacts to agricultural resources are significant environmental effects, lead agencies may refer to the California Agricultural Land Evaluation and Site Assessment Model (1997) prepared by the California Dept. of Conservation as an optional model to use in assessing impacts on agriculture and farmland. In determining whether impacts to forest resources, including timberland, are significant environmental effects, lead agencies may refer to information compiled by the California Department of Forestry and Fire Protection regarding the state's inventory of forest land, including the Forest and Range Assessment Project and the Forest Legacy Assessment project; and forest carbon measurement methodology provided in Forest Protocols adopted by the California Air Resources Board. Would the project:				
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?				X

[14] Los Alamitos Municipal Code, Chapter 8.48.080 Lighting guidelines, https://library.qcode.us/lib/los_alamitos_ca/pub/municipal_code/item/title_8-chapter_8_48-8_48_080, accessed on May 23, 2023.

[15] Los Alamitos Municipal Code, Section 17.24.040 Light and Glare, https://library.qcode.us/lib/los_alamitos_ca/pub/municipal_code/item/title_17-division_3-chapter_17_24-17_24_040, accessed on May 23, 2023.

3. Environmental Analysis

Issues	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
b) Conflict with existing zoning for agricultural use, or a Williamson Act contract?				X
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))?				X
d) Result in the loss of forest land or conversion of forest land to non-forest use?				X
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?				X

In determining whether impacts to agricultural resources are significant environmental effects, lead agencies may refer to the California Agricultural Land Evaluation and Site Assessment Model (1997) prepared by the California Dept. of Conservation as an optional model to use in assessing impacts on agriculture and farmland. In determining whether impacts to forest resources, including timberland, are significant environmental effects, lead agencies may refer to information compiled by the California Department of Forestry and Fire Protection regarding the state's inventory of forest land, including the Forest and Range Assessment Project and the Forest Legacy Assessment project; and forest carbon measurement methodology provided in Forest Protocols adopted by the California Air Resources Board. Would the project:

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?

No Impact. The project site is mapped as "Urban and Built-Up Land" on the California Important Farmland Finder.[16] Therefore, the project site does not include Prime Farmland, Unique Farmland, or Farmland of Statewide Importance. The project site is currently developed with a high school and does not contain any agricultural uses on site. Development of the proposed project would not convert mapped farmland to a nonagricultural use, therefore no impact would occur.

b) Conflict with existing zoning for agricultural use, or a Williamson Act contract?

No Impact. The project site is not zoned for agricultural uses. The project site is zoned Community Facilities (C-F) which does not allow for agricultural uses.[17] The project site is developed within the Los Alamitos High School and does not contain active farmland or other agricultural uses. As such, the proposed project would

[16] California Important Farmland Finder, https://maps.conservation.ca.gov/dlrp/ciff/, accessed on April 18, 2023.

[17] Los Alamitos Municipal Code, Section 17.14.020 Allowable Uses and Permit Requirements for Special Purpose and Overlay Zones, https://library.qcode.us/lib/los_alamitos_ca/pub/municipal_code/item/title_17-division_2-chapter_17_14-17_14_020, accessed on May 1, 2023.

not conflict with an existing zone for agricultural use or conflict with a Williamson Act contract. No impact would occur, and no mitigation measures are required.

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))?

No Impact. Forest land is defined as land that can support 10-percent native tree cover of any species, including hardwoods, under natural conditions, and that allows for management of one or more forest resources, including timber, aesthetics, fish and wildlife, biodiversity, water quality, recreation, and other public benefits.[18] Timberland is defined as land which is available for, and capable of, growing a crop of trees of any commercial species used to produce lumber and other forest products, including Christmas trees.[19]

The project site is currently developed within the Los Alamitos High School and does not contain any forest land or timberland production. The project site is not zoned for timberland production and would not conflict with existing zoning or cause the rezoning of forest land or timberland. As such, no impact would occur.

d) Result in the loss of forest land or conversion of forest land to non-forest use?

No Impact. The project site is located within an urbanized area within the City of Los Alamitos. The project site is currently developed with existing portable buildings and storage containers. Development of the proposed project would not result in the loss of forest land or the conversion of forest land to non-forest use, therefore no impact would occur.

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?

No Impact. Within Los Alamitos, there are three areas of land that is considered Prime Farmland and surrounds the Los Alamitos Army Airfield which is 2.3 miles southeast of the Los Alamitos High School. Both the project site and the surrounding area are identified as Urban and Built-Up Land.[20] Development of the proposed project would relocate the existing portable buildings and remove the existing storage containers on the project site and build a 32,000-square-foot gymnasium. These activities would not conflict with the prime farmland around the Los Alamitos Army Airfield and would also not increase the student capacity at the school. Therefore, the proposed project would not involve changes to the existing environment that could result in the conversion of Farmland or forest land to non-agricultural or non-forest uses, respectively. No impact would occur.

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[18] California Public Resources Code § 12220(g).
[19] California Public Resources Code § 4526.
[20] California Important Farmland Finder, https://maps.conservation.ca.gov/dlrp/ciff/, accessed on April 18, 2023.

3.2.1 Cumulative Impact Discussion

The proposed project and its surrounding area are urbanized and on lands identified as "Urban and Built-Up Land."[21] Since no agricultural land, including forest land, exist on site, the proposed project would not contribute to any cumulative impacts related to agricultural resources.

3.3 AIR QUALITY

Issues	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
III. AIR QUALITY. Where available, the significance criteria established by the applicable air quality management district or air pollution control district may be relied upon to make the following determinations. Would the project:				
a) Conflict with or obstruct implementation of the applicable air quality plan?			X	
b) 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?			X	
c) Expose sensitive receptors to substantial pollutant concentrations?			X	
d) Result in other emissions (such as those leading to odors) adversely affecting a substantial number of people?			X	

The Air Quality section addresses the impacts of the proposed project on ambient air quality and the exposure of people, especially sensitive individuals, to unhealthy pollutant concentrations. A background discussion on the air quality regulatory setting, meteorological conditions, existing ambient air quality in the vicinity of the project site, and air quality modeling can be found in Appendix A.

The primary air pollutants of concern for which ambient air quality standards (AAQS) have been established are ozone (O_3), carbon monoxide (CO), coarse inhalable particulate matter (PM_{10}), fine inhalable particulate matter ($PM_{2.5}$), sulfur dioxide (SO_2), nitrogen dioxide (NO_2), and lead (Pb). Areas are classified under the federal and California Clean Air Act as either in attainment or nonattainment for each criteria pollutant based on whether the AAQS have been achieved. The South Coast Air Basin (SoCAB), which is managed by the South Coast Air Quality Management District (South Coast AQMD), is designated nonattainment for O_3, and $PM_{2.5}$ under the California and National AAQS, nonattainment for PM_{10} under the California AAQS, and nonattainment for lead (Los Angeles County only) under the National AAQS (CARB 2023).

Furthermore, the South Coast AQMD has identified regional thresholds of significance for criteria pollutant emissions and criteria air pollutant precursors, including volatile organic compounds (VOC), CO, NO_X, SO_X, PM_{10}, and $PM_{2.5}$. Development projects below the regional significance thresholds are not expected to generate sufficient criteria pollutant emissions to violate any air quality standard or contribute substantially to an existing

[21] California Important Farmland Finder, https://maps.conservation.ca.gov/dlrp/ciff/, accessed on April 18, 2023.

or projected air quality violation. Where available, the significance criteria established by the South Coast AQMD may be relied upon to make the following determinations.

Would the project:

a) Conflict with or obstruct implementation of the applicable air quality plan?

Less Than Significant Impact. The South Coast AQMD adopted the 2022 Air Quality Management Plan (AQMP) on December 2, 2022. Regional growth projections are used by South Coast AQMD to forecast future emission levels in the SoCAB. For southern California, these regional growth projections are provided by the Southern California Association of Governments (SCAG) and are partially based on land use designations included in city/county general plans. Typically, only large, regionally significant projects have the potential to affect regional growth projections. In addition, a consistency analysis with the 2022 AQMP is generally only required in connection with the adoption of General Plans, specific plans, and significant projects. Changes in population, housing, or employment growth projections have the potential to affect SCAG's demographic projections and therefore the assumptions in South Coast AQMD's AQMP. These demographic trends are incorporated into SCAG's 2020–2045 Regional Transportation Plan/Sustainable Communities Strategy (RTP/SCS) to determine priority transportation projects and vehicle miles traveled in the SCAG region.

Changes in population, housing, or employment growth projections have the potential to affect SCAG's demographic projections and therefore the assumptions in South Coast AQMD's AQMP. As mentioned in Section 1.1, *Project Overview*, the proposed project involves development of a gymnasium on the LAHS campus. The proposed project also involves site improvements, removing fifteen storage containers off-site, and relocating eight portable classroom buildings on the campus. The classrooms that used to operate in the portable buildings would be accommodated by the newly built STEM building, therefore the proposed project would not increase or decrease the student capacity of the school.

Based on the scope and nature of the proposed project, the proposed project would not substantially affect housing, employment, or population projections within the region. Additionally, as demonstrated below in Section 3.3(b), the regional emissions that would be generated by the operational phase of the proposed project would be less than the South Coast AQMD emissions thresholds; and would therefore, not be considered by South Coast AQMD to be a substantial source of air pollutant emissions that would have the potential to affect the attainment designations in the SoCAB. Therefore, the proposed project would not affect the regional emissions inventory or conflict with strategies in the 2022 AQMP. Impacts would be less than significant.

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?

Less Than Significant Impact. The following describes project-related impacts from regional short-term construction activities and regional long-term operation of the proposed project.

3. Environmental Analysis

Regional Short-Term Construction Impacts

Construction activities would result in the generation of air pollutants. These emissions would primarily be 1) exhaust from off-road diesel-powered construction equipment; 2) dust generated by construction activities; 3) exhaust from on-road vehicles; and 4) off-gassing of VOCs from paints and asphalt.

Construction activities associated with the development of the gymnasium and campus site improvements are anticipated to disturb 1.40 acres on the project site. The project would involve building and asphalt demolition and debris hauling, site preparation, rough grading, utilities trenching, building construction, paving, and architectural coating. Construction is anticipated to start in Autumn 2023 and finish in Spring 2025. Construction emissions were estimated using the California Emissions Estimator Model (CalEEMod), Version 2022.1.1.13, and are based on the preliminary construction duration and equipment mix provided by the District. Construction emissions modeling are shown in Table 2, *Maximum Daily Regional Construction Emissions*, and maximum daily emissions for VOC, NO_X, CO, SO_2, PM_{10}, and $PM_{2.5}$ from construction-related activities would be less than their respective South Coast AQMD regional significance threshold values. Projects that do not exceed the South Coast AQMD regional significance thresholds would not result in an incremental increase in health impacts in the SoCAB from project-related increases in criteria air pollutants. Therefore, air quality impacts from project-related construction activities would be less than significant.

Table 2 Maximum Daily Regional Construction Emissions

Construction Phase	Pollutants (lb/day)[1, 2]					
	VOC	NO_X	CO	SO_2	PM_{10}	$PM_{2.5}$
Year 2023						
Asphalt Demolition and Site Preparation	2	29	27	<1	6	3
Site Preparation	2	17	15	<1	4	2
Site Preparation and Grading	2	19	18	<1	5	2
Site Preparation, Grading, and Utility Trenching	2	21	21	<1	5	2
Utility Trenching	0	2	3	<1	<1	<1
Year 2024						
Utility Trenching and Building Construction	1	12	15	<1	1	1
Building Construction	1	10	12	<1	1	<1
Year 2025						
Building Construction and Paving	2	13	16	<1	1	1
Building Construction, Paving, and Architectural Coating	2	13	16	<1	1	1
Maximum Daily Construction Emissions						
Maximum Daily Emissions	32	29	27	<1	6	3
South Coast AQMD Regional Construction Threshold	**75**	**100**	**550**	**150**	**150**	**55**
Significant?	No	No	No	No	No	No

Source: CalEEMod Version 2022.1.1.13
1 Based on the preliminary information provided by the District. Where specific information regarding project-related construction activities was not available, construction assumptions were based on CalEEMod defaults, which are based on construction surveys conducted by South Coast AQMD of construction equipment.
2 Includes implementation of fugitive dust control measures required by South Coast AQMD under Rule 403, including watering disturbed areas a minimum of two times per day, reducing speed limit to 25 miles per hour on unpaved surfaces, replacing ground cover quickly, and street sweeping with Rule 1186–compliant sweepers.

Long-Term Operation-Related Air Quality Impact

Typical long-term air pollutant emissions are generated by area sources (e.g., landscape fuel use, aerosols, architectural coatings, and asphalt pavement), energy use (natural gas), and mobile sources (i.e., on-road vehicles). Implementation of the proposed project would result in redevelopment on the LAHS campus. However, the proposed project would not result in an increase in capacity and would not change attendance boundaries. Because student capacity and staffing would not increase or change after full buildout, the proposed project would not result in an increase in emissions from mobile sources, and criteria air pollutant emissions from the proposed project would be minimal.

Therefore, the proposed project would not generate emissions that exceed the South Coast AQMD regional significance thresholds. Projects that do not exceed the South Coast AQMD regional significance thresholds would not result in an incremental increase in health impacts in the SoCAB from project-related increases in criteria air pollutants. In addition, emissions from building energy use would be minimized because the older buildings on the campus, which were constructed prior to modern building energy codes, would be replaced with newer, more energy-efficient buildings that meet the current California Building and Energy Efficiency Standards. Therefore, impacts to the regional air quality associated with operation of the project would be less than significant.

b) Expose sensitive receptors to substantial pollutant concentrations?

Less Than Significant Impact with Mitigation Incorporated. The proposed project could expose sensitive receptors to elevated pollutant concentrations if it causes or significantly contributes to elevated pollutant concentration levels. Unlike regional emissions, localized emissions are typically evaluated in terms of air concentration rather than mass so they can be more readily correlated to potential health effects.

Construction LSTs

Localized significance thresholds (LST) are based on the California AAQS, which are the most stringent AAQS to provide a margin of safety in the protection of public health and welfare. They are designated to protect sensitive receptors most susceptible to further respiratory distress, such as asthmatics, the elderly, very young children, people already weakened by other disease or illness, and people engaged in strenuous work or exercise. The screening-level construction LSTs are based on the size of the project site, distance to the nearest sensitive receptor, and Source Receptor Area. The nearest offsite sensitive receptors are the single-family residences along El Dorado Way to the southeast, Fenley Drive to the north, and Humbolt Street to the east of the project site. The nearest onsite sensitive receptors are the students and staff attending LAHS campus during construction period.

Air pollutant emissions generated by construction activities would cause temporary increases in air pollutant concentrations. Table 3, *Localized Construction Emissions*, shows the maximum daily construction emissions (pounds per day) generated during onsite construction activities compared with the South Coast AQMD's screening-level LSTs, for sensitive receptors within 82 feet for NO_X and CO and 270 feet for PM_{10} and $PM_{2.5}$. As shown in Table 3, the construction of the proposed project would not generate construction-related onsite emissions that would exceed the screening-level LSTs.

3. Environmental Analysis

Table 3 Localized Construction Emissions

Construction Activity	Pollutants(lbs/day)[1]			
	NO_X	CO	PM_{10}[2]	$PM_{2.5}$[2]
South Coast AQMD ≤1.00 Acre LST	**81**	**485**	**22.33**	**7.23**
Utility Trenching	2	3	0.09	0.09
Building Construction	10	11	0.38	0.35
Building Construction and Paving	13	15	0.50	0.46
Building Construction, Paving, and Architectural Coating	14	16	0.53	0.49
Exceeds LST?	No	No	No	No
South Coast AQMD 1.40-Acre LST	**95**	**577**	**25.13**	**8.03**
Asphalt Demolition and Site Preparation	25	24	5.13	2.53
Site Preparation	17	15	4.00	2.11
Site Preparation and Grading	18	16	4.19	2.18
Site Preparation, Grading, and Utility Trenching	20	19	4.28	2.27
Exceeds LST?	No	No	No	No

Source: CalEEMod Version 2022.1.1.13 South Coast AQMD 2008 and 2011.
Notes: In accordance with South Coast AQMD methodology, only onsite stationary sources and mobile equipment are included in the analysis. Screening level LSTs are based on an 82 ft receptor for NO_X and CO and 270 ft receptor for PM_{10} and $PM_{2.5}$ in Source Receptor Area 17.
1 Where specific information for project-related construction activities or processes was not available modeling was based on CalEEMod defaults. These defaults are based on construction surveys conducted by the South Coast AQMD.
2 Includes fugitive dust control measures required by South Coast AQMD under Rule 403, such as watering disturbed areas a minimum of two times per day, reducing speed limit to 25 miles per hour on unpaved surfaces, replacing ground cover quickly, and street sweeping with Rule 1186–compliant sweepers.

Thus, project-related construction activities would not have the potential to expose sensitive receptors to substantial pollutant concentrations. Localized air quality impacts from construction activities would be less than significant.

Construction Health Risk

Emissions from construction equipment primarily consist of diesel particulate matter (DPM). In 2015, the Office of Environmental Health Hazards Assessment adopted guidance for preparation of health risk assessments, which included the development of a cancer risk factor and non-cancer chronic reference exposure level for DPM over a 30-year time frame (OEHHA 2015). Currently, South Coast AQMD does not require the evaluation of long-term excess cancer risk or chronic health impacts for a short-term project. The proposed project is anticipated to be completed in approximately 23 months, which would limit the exposure to onsite and offsite receptors. Furthermore, construction activities would not generate onsite exhaust emissions that would exceed the screening-level construction LSTs. Thus, construction emissions would not pose a health risk to onsite and offsite receptors, and project-related construction health impacts would be less than significant.

Operation LSTs

Operation of the proposed project would not generate substantial emissions from onsite stationary sources. Land uses that have the potential to generate substantial stationary sources of emissions include industrial land uses, such as chemical processing and warehousing operations where truck idling would occur onsite and would require a permit from South Coast AQMD. The proposed project does not fall within these categories of uses. While operation of the new gymnasium building would use standard onsite mechanical equipment such as heating, ventilation, and air conditioning, air pollutant emissions would be nominal. Localized air quality impacts related to operation-related emissions would be less than significant.

Carbon Monoxide Hotspots

Vehicle congestion has the potential to create pockets of CO called hotspots. Hotspots are typically produced at intersections, where traffic congestion is highest because vehicles are backed-up and idle for longer periods and are subject to reduced speeds. These pockets could exceed the state one-hour standard of 20 parts per million (ppm) or the eight-hour standard of 9.0 ppm. Because CO is produced in greatest quantities from vehicle combustion and does not readily disperse into the atmosphere, adherence to ambient air quality standards is typically demonstrated through an analysis of localized CO concentrations.

The SoCAB has been designated attainment under both the national and California AAQS for CO. Under existing and future vehicle emission rates, a project would have to increase traffic volumes at a single intersection to more than 44,000 vehicles per hour—or 24,000 vehicles per hour where vertical and/or horizontal mixing is substantially limited—in order to generate a significant CO impact (BAAQMD 2023). Based on the traffic study, a capacity-level event with 2,000 spectators would only generate 800 peak hour trips (Garland Associates 2023). Therefore, implementation of the proposed project would not have the potential to substantially increase CO hotspots at intersections in the vicinity of the proposed site. Operational impacts would be less than significant.

c) Result in other emissions (such as those leading to odors) adversely affecting a substantial number of people?

Less Than Significant Impact. The proposed project would not result in objectionable odors. The threshold for odor is if a project creates an odor nuisance pursuant to South Coast AQMD Rule 402, Nuisance, which states:

> A person shall not discharge from any source whatsoever such quantities of air contaminants or other material which cause injury, detriment, nuisance, or annoyance to any considerable number of persons or to the public, or which endanger the comfort, repose, health or safety of any such persons or the public, or which cause, or have a natural tendency to cause, injury or damage to business or property. The provisions of this rule shall not apply to odors emanating from agricultural operations necessary for the growing of crops or the raising of fowl or animals.

The type of facilities that are considered to have objectionable odors include wastewater treatments plants, compost facilities, landfills, solid waste transfer stations, fiberglass manufacturing facilities, paint/coating operations (e.g., auto body shops), dairy farms, petroleum refineries, asphalt batch plants, chemical manufacturing, and food manufacturing facilities. The proposed project involves the development of a gymnasium building on LAHS campus and would not fall within the objectionable odors land uses or generate odors different than what is already generated onsite. Emissions from construction equipment, such as diesel exhaust and volatile organic compounds from architectural coatings and paving activities may generate odors.

However, these odors would be low in concentration, temporary, and would not affect a substantial number of people. Odor impacts would be less than significant.

3.3.1 Cumulative Impact Discussion

A project that exceeds South Coast AQMD's significance criteria in the context of emissions from all other development projected within the entire SoCAB would cumulatively contribute to impacts.

As described above, the proposed project would not result in significant long-term operational nor short-term construction air quality impacts. Thus, the proposed project would not be considered by South Coast AQMD to be a substantial source of air pollutant emissions that would have the potential to affect the attainment designations in the SoCAB.

Based on the scope and nature of the proposed project, the proposed project would not substantially affect housing, employment, or population projections within the region. Additionally, the proposed project would be consistent with the existing zone and General Plan land use designation onsite. Therefore, the proposed project would not affect the regional emissions inventory or conflict with strategies in the 2022 AQMP. Overall, the proposed project's contribution to regional pollutant concentrations would not be cumulatively considerable.

3.4 BIOLOGICAL RESOURCES

Issues	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
IV. BIOLOGICAL RESOURCES. Would the project:				
a) Have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special status species in local or regional plans, policies, or regulations, or by the California Department of Fish and Wildlife or U.S. Fish and Wildlife Service?			X	
b) Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, regulations or by the California Department of Fish and Wildlife or U.S. Fish and Wildlife Service?				X
c) Have a substantial adverse effect on state or federally protected wetlands (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means?				X
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?			X	
e) Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance?				X

Issues	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
f) Conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state habitat conservation plan?				X

Would the project:

a) Have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special status species in local or regional plans, policies, or regulations, or by the California Department of Fish and Wildlife or U.S. Fish and Wildlife Service?

Less Than Significant. The project site is on the existing LAHS campus and is currently developed with buildings, paved surfaces (such as walking paths and parking lots), and sports fields. According to the Los Alamitos High School Multistory STEM Classroom Initial Study/Mitigated Negative Declaration (STEM IS/MND)(SCH No. 2019099082), the existing onsite vegetation consists of turf grass field and nonnative trees/ornamental shrub species that do not support sensitive habitats and provide low habitat value for special-status species.[22] In this study it was also noted that the project vicinity lacks suitable soils, biological resources, and physical features to support special-status plant or wildlife species.[23]

The proposed project involves the construction of a gymnasium that is 32,000 gross square feet and would include ornamental landscaping at the proposed gymnasium entrance, hardscape areas, and utility upgrades. The project site and surrounding area are outside of any federally designated critical habitat and the project site and surrounding area are not located within the range for special-status plant species.[24] The project site also does not have any onsite trees.

While Coyote Creek is 0.19 miles to the west of the project site and feeds into the San Gabriel River, it is heavily channelized with concrete embankments and provides limited habitat for species. According to the STEM IS/MND, Coyote Creek's habitat is of very low quality and, except during the rainy season, water flow within these channels is dependent upon urban discharge.[25] Stormwater leaving the project site does not enter Coyote Creek; therefore, implementation of the proposed project would not have a substantial adverse effect on habitat nor candidate, sensitive, or special status species. A less than significant impact would occur.

[22] Los Alamitos High School Multistory STEM Classroom Initial Study/Mitigated Negative Declaration, 2019, Page 4.4-2
[23] Los Alamitos High School Multistory STEM Classroom Initial Study/Mitigated Negative Declaration, 2019, Page 4.4-3
[24] USFW, Critical Habitat for Threatened & Endangered Species, https://fws.maps.arcgis.com/home/webmap/viewer.html?webmap=9d8de5e265ad4fe09893cf75b8dbfb77, accessed on April 19, 2023.
[25] Los Alamitos High School Multistory STEM Classroom Initial Study/Mitigated Negative Declaration, 2019, Page 4.4-3

3. Environmental Analysis

b) Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, regulations, or by the California Department of Fish and Wildlife or U.S. Fish and Wildlife Service?

No Impact. The project site is in the existing LAHS Campus, and is currently developed with portable classrooms, paved surfaces, and storage containers. As discussed in Checklist Question 3.4 (a), above, the existing onsite vegetation consists of turf grass field and nonnative trees/ornamental shrub species that do not support sensitive habitats and provide low habitat value for special-status species.[26] While Coyote Creek is 0.19 miles to the west of the project site and feeds into the San Gabriel River, it is heavily channelized with concrete embankments and provides limited habitat for species. There are no wetlands or critical habitat that exist onsite, and Coyote Creek is not identified by the California Department of Fish and Wildlife or the U.S. Fish and Wildlife Service as being a riparian or sensitive habitat.[27,28] Therefore, the proposed project would not result in a substantial adverse effect on riparian habitat or other sensitive natural community, and a no impact would occur.

c) Have a substantial adverse effect on state or federally protected wetlands (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means?

No Impact. As discussed in Checklist Question 3.4(b), the project site is currently developed on the LAHS Campus, and no wetlands exist onsite or in the vicinity of the project site.[29] Therefore, the proposed project would not have a substantial adverse effect on protected wetlands, and no impact would occur.

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?

Less Than Significant Impact. Construction of the proposed project would occur in a developed area on the LAHS campus. According to the Los Alamitos High School Multistory STEM Classroom Initial Study/Mitigated Negative Declaration, the campus does not function as a wildlife movement corridor and the campus does not contain wildlife travel routes, such as a riparian strip, ridgeline, drainage, or wildlife crossings such as a tunnel, culvert, or underpass.[30] The project site itself does not contain any trees and no trees would be removed as part of the proposed project.

The project site is located around 0.19 miles away from the Coyote Creek Channel, which the STEM IS/MND found could serve as a wildlife corridor for riparian-dependent species, shorebirds, and waterfowl and may

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[26] Los Alamitos High School Multistory STEM Classroom Initial Study/Mitigated Negative Declaration, 2019, Page 4.4-2

[27] USFW, Critical Habitat for Threatened & Endangered Species, https://fws.maps.arcgis.com/home/webmap/viewer.html?webmap=9d8de5e265ad4fe09893cf75b8dbfb77, accessed on April 19, 2023.

[28] National Wetlands Inventory, https://fwsprimary.wim.usgs.gov/wetlands/apps/wetlands-mapper/, accessed on April 20, 2023.

[29] National Wetlands Inventory, https://fwsprimary.wim.usgs.gov/wetlands/apps/wetlands-mapper/, accessed on April 20, 2023.

[30] Los Alamitos High School Multistory STEM Classroom Building Initial Study/Mitigated Negative Declaration, 2019, page 4.4-4, accessed on April 20, 2023.

provide limited habitat for other terrestrial species.[31] However, it was found that Coyote Creek did not contain enough continuous water flow and vegetation to support substantial movement of any native resident fish or wildlife species; it was also found that adjacent areas around the campus do not support resident or migratory fish species or wildlife nursery sites.[32] Therefore, implementation of the proposed project would not have a substantial adverse effect on 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. A less than significant impact would occur.

e) Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance?

No Impact. According to the Los Alamitos General Plan Update Initial Study, the municipal code has several measures to protect trees on public lands and right of ways, to contribute to the City's property values, aesthetics, and natural resources.[33] Due to the proposed project being located on an existing high school campus that is not on public land or rights-of-way, and no trees exist on the project site, development of the proposed project will not conflict with any of these tree protection measures. No impact would occur as part of the proposed project.

f) Conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state habitat conservation plan?

No Impact. The project site is not within an adopted Habitat Conservation Plan (HCP), Natural Community Conservation Plan (NCCP), or other local, regional, or state HCP. Additionally, the project site is already developed with school uses and the proposed project would redevelop the site with school uses. The proposed project would result in no impact to any HCP or NCCP.

3.4.1 Cumulative Impact Discussion

The potential impacts of a project on biological resources tend to be site-specific, and the overall cumulative effect would be dependent on the degree to which significant vegetation and wildlife resources are protected on a particular site. This includes preservation of well-developed native vegetation. Environmental review of specific development proposals in the vicinity of the project site would ensure that important biological resources are identified, protected, and properly managed, and to prevent any significant adverse development-related impacts. Adherence to relevant Federal, State, and local policies and actions would ensure identification and protection of sensitive biological resources, and adequate mitigation and resource agency authorization where potential impacts exist for a project. The impact would be less than significant.

[31] Los Alamitos High School Multistory STEM Classroom Building Initial Study/Mitigated Negative Declaration, 2019, page 4.4-4, accessed on April 20, 2023.
[32] Los Alamitos High School Multistory STEM Classroom Building Initial Study/Mitigated Negative Declaration, 2019, page 4.4-4, accessed on April 20, 2023.
[33] Los Alamitos General Plan Update Initial Study, 2013, page 42.

3.5 CULTURAL RESOURCES

Issues	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
V. CULTURAL RESOURCES. Would the project:				
a) Cause a substantial adverse change in the significance of a historical resource pursuant to § 15064.5?				X
b) Cause a substantial adverse change in the significance of an archaeological resource pursuant to § 15064.5?		X		
c) Disturb any human remains, including those interred outside of formal cemeteries?			X	

Would the project:

a) Cause a substantial adverse change in the significance of a historical resource pursuant to § 15064.5?

No Impact. The project site is currently developed with the portable classrooms, storage containers, and associated facilities that comprise the LAHS campus, a public high school within the Los Alamitos Unified School District. According to the Los Alamitos High School Multistory STEM Classroom Building Initial Study/Mitigated Negative Declaration (STEM IS/MND), a cultural resources analysis was conducted for the Los Alamitos High School project site, including a California Historic Resources Inventory System (CHRIS) records search and literature search at the South Central Coastal Information Center (SCCIC) at California State University, Fullerton.[34]

Based on the cultural resources records search in the STEM IS/MND conducted at the SCCIC, no historical resources have been recorded within the project's area of potential effect (APE) boundary, which includes the project site.[35] However, two historic-era cultural resource sites were recorded within the half-mile radius buffer zone of the APE.[36] These resources are the Newcomb Academy (19-189924) and Oak Middle School (30-177412).[37] Since the historic resources are outside of the project's APE boundary, the proposed project would result in no impact and no mitigation is required.

b) Cause a substantial adverse change in the significance of an archaeological resource pursuant to § 15064.5?

Less Than Significant Impact with Mitigation Incorporated. The project site has been previously developed and currently operates as the LAHS, which, according to the STEM IS/MND, has been used since the mid-1970s. During previous ground disturbance activities, no human remains were identified or recorded

34 Los Alamitos High School Multistory STEM Classroom Building Initial Study/Mitigated Negative Declaration, 2019, Page 4.5-1.
35 Los Alamitos High School Multistory STEM Classroom Building Initial Study/Mitigated Negative Declaration, 2019, Page 4.5-1.
36 Los Alamitos High School Multistory STEM Classroom Building Initial Study/Mitigated Negative Declaration, 2019, Page 4.5-1.
37 Los Alamitos High School Multistory STEM Classroom Building Initial Study/Mitigated Negative Declaration, 2019, Page 4.5-1.

onsite.[38] However, ground disturbing activities associated with hardscape removal and construction of the proposed gymnasium could unearth previously undiscovered archeological resources.

Since the potential exists to unearth archeological resources that meet the criteria of CEQA Guidelines Section 21084.1 or Section 15064.5, construction of the proposed project could cause a significant impact to unknown archeological resources pursuant to CEQA Guidelines Section 15064.5. Incorporation of Mitigation Measure CUL-1 would ensure that impacts to archeological resources would be less than significant.

Mitigation Measure

CUL-1 If historical or unique archaeological resources are discovered during construction activities, the contractor shall halt construction activities in the immediate area and notify the Los Alamitos Unified School District. The on-call qualified archaeologist shall be notified and afforded the necessary time to recover, analyze, and curate the find(s). The qualified archaeologist shall recommend the extent of archaeological monitoring necessary to ensure the protection of any other resources that may be in the area and shall be afforded the necessary time and funds to recover, analyze, and curate the find(s). Construction activities may continue on other parts of the project site while evaluation and treatment of historical or unique archaeological resources takes place.

CUL-2 If historical or unique archaeological resources are discovered during construction activities, the contractor shall halt construction activities in the immediate area and notify the Los Alamitos Unified School District. The on-call Native American monitor shall be notified and afforded the necessary time to recover, analyze, and curate the find(s). The monitor shall recommend the extent of monitoring necessary to ensure the protection of any other resources that may be in the area and shall be afforded the necessary time and funds to recover, analyze, and curate the find(s). Construction activities may continue on other parts of the project site while evaluation and treatment of resources takes place. Native American monitors will be required to complete and submit daily monitoring logs to the project proponent's lead archaeologist while at the project site.

c) Disturb any human remains, including those interred outside of dedicated cemeteries?

Less Than Significant Impact. There are no known human remains on the project site. However, the potential to unearth unknown human remains during earthwork activities associated with the construction of the proposed project may occur. The policies and actions identified in Section 3.5(b) above would reduce potential environmental impacts related to the disturbance of any human remains, including those interred outside of formal cemeteries. Additionally, the proposed project would be required to comply with the National Historic Preservation Act, American Indian Religious Freedom Act, Native American Graves and Repatriation Act, and the California Health and Safety Code, which generally require that any ground disturbance must cease in the event of accidental discovery or disturbance of human remains during construction activities. In the event of accidental discover of human remains, California Health and Safety Code section 7050.5 and CEQA Guidelines Section 15064.5(e) require that there be no further excavation or disturbance of the site or any nearby area reasonably suspected to overlie adjacent human remains until the Orange County Coroner is

[38] Los Alamitos High School Multistory STEM Classroom Building Initial Study/Mitigated Negative Declaration, 2019, Page 4.5-4.

contacted and makes a determination as to whether an investigation into the cause of death is required or whether the remains may be Native American. If the remains are likely to be Native American, the coroner shall contact, by telephone within 24 hours, the Native American Heritage Commission (NAHC). The NAHC shall identify the person(s) it believes to be the most likely descendant, and the most likely descendant may make recommendations regarding proper treatment and burial, which would be implemented in accordance with Section 15064.5(e) of the CEQA Guidelines. Compliance with state codes and guidelines would ensure that the proposed project's potential disturbance of human remains is less than significant.

3.5.1 Cumulative Impact Discussion

Cumulative impacts would occur when a series of actions leads to the loss of a substantial type of site, building, or resource. For example, while the loss of a single historic structure may not be significant to the character of the neighborhood or streetscape, continued loss of such resources on a project-by-project basis could result in a cumulative significant impact. However, similar to the project, any cumulative projects would be required to comply with existing federal and state regulations.

As there are no historic structures, no known archaeological resources, or no known human remains on the project site, and because the project site is outside adopted historic districts, construction of the project would not create nor contribute to a cumulative impact on cultural resources. Additionally, the existing federal and state regulations and policies described throughout this section would protect any undiscovered cultural resources. Continued compliance with these regulations would prevent impacts; therefore, a less-than-significant cumulative impact would occur.

3.6 ENERGY

Issues	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
VI. ENERGY. Would the project:				
a) Result in potentially significant environmental impact due to wasteful, inefficient, or unnecessary consumption of energy resources, during project construction or operation?			X	
b) Conflict with or obstruct a state or local plan for renewable energy or energy efficiency?				X

Would the project:

a) Result in potentially significant environmental impact due to wasteful, inefficient, or unnecessary consumption of energy resources, during project construction or operation?

Less Than Significant Impact. The following discusses the potential energy demands from short-term construction and long-term operational energy consumption associated with the new gymnasium building and site improvements at LAHS campus.

Short-Term Construction Impacts

Electrical Energy

The majority of construction equipment would be gas or diesel powered, and electricity would not be used to power most of the construction equipment. Electricity use during construction would vary during different phases of construction. Later construction phases could use electricity-powered equipment for interior construction and architectural coatings. It is anticipated that the majority of electric-powered construction equipment would be hand tools (e.g., power drills, table saws) and lighting, which would result in minimal electricity usage during construction activities. Therefore, project-related construction activities would not result in wasteful or unnecessary electricity demands, and impacts would be less than significant.

Natural Gas Energy

It is not anticipated that construction equipment used for the proposed project would be powered by natural gas, and no natural gas demand is anticipated during construction. Therefore, impacts would be less than significant with respect to natural gas usage.

Transportation Energy

Transportation energy use depends on the type and number of trips, vehicle miles traveled, fuel efficiency of vehicles, and travel mode. Transportation energy use during construction would come from the transport and use of construction equipment, delivery vehicles and haul trucks, and construction employee vehicles that would use diesel fuel and/or gasoline. It is anticipated that the majority of off-road construction equipment, such as those used during demolition and grading, would be gas or diesel powered.

The use of energy resources by vehicles and equipment would fluctuate according to the phase of construction. In addition, all construction equipment would cease operating upon completion of proposed project construction. Thus, impacts related to transportation energy use during construction would be temporary and would not require expanded energy supplies or the construction of new infrastructure.

Furthermore, to limit wasteful and unnecessary energy consumption, the construction contractors would minimize nonessential idling of construction equipment during construction, in accordance with Section 2449 of the California Code of Regulations, Title 13, Article 4.8, Chapter 9. Construction trips would also not result in unnecessary use of energy since the project site is centrally located and is served by numerous regional freeway systems (e.g., I-605 and SR-22) that provide the most direct routes from various areas of the region. Thus, energy use during construction of the project would not be considered inefficient, wasteful, or unnecessary. Impacts would be less than significant.

Long-Term Impacts During Operation

Operation of the proposed project would generate new demand for building electricity and natural gas on the project site. Operational use of energy would include heating, cooling, and ventilation of the proposed gymnasium building; water heating; operation of electrical systems, use of on-site equipment and appliances; and indoor/outdoor lighting.

3. Environmental Analysis

Electrical Energy

The proposed increase in electricity consumption from the proposed building is shown in Table 4, *Operation-Related Electricity Consumption*.

Table 4 Operation-Related Electricity Consumption

Land Use	Electricity (kWh/year)[1]
High School	200,139

Source: CalEEMod Version 2022.1.1.13, Appendix A.
Note: kWh=kilowatt-hour
[1] The electricity use per year is based on the proposed square footage of the new gymnasium building.

While the proposed project would not include solar or battery storage, it would be required to comply with Title 24, Part 6, Building Energy Code. For a school occupancy type, compliance with the Energy Code requires building designs to include solar and battery storage under the "prescriptive approach," which the Energy Code refers to as the "Standard Design Building." As an alternative, the Energy Code also allows projects, such as the proposed project, to demonstrate under the "performance approach" that the building's energy efficiency would be equivalent to or greater than the Standard Design Building—that is, what the proposed project's energy efficiency performance would be if it were to include solar and battery storage. Thus, because the proposed project would not include solar or battery storage and is therefore seeking compliance under the performance approach, project compliance with the Energy Code would ensure that the proposed building achieves a level of energy efficiency equivalent to or greater than the proposed project's Standard Design Building.

In addition to the proposed building energy efficiency, SCE is required to comply with the state's renewable portfolios standard (RPS), which mandates utilities to procure a certain proportion of electricity from eligible renewable and carbon-free sources and to increase the proportion through the coming years, with an ultimate procurement requirement of 100 percent by 2045. The RPS requirements would support use of electricity by the proposed project that is generated from renewable or carbon-free sources. Overall, the proposed project would generally be consistent with the goals outlined in Appendix F of the CEQA Guidelines regarding increasing energy efficiency, decreasing reliance on fossil fuels, and increasing renewable energy sources. Because the proposed project would comply with these regulations and would provide features to decrease electricity use by the LAHS campus, it would not result in wasteful, inefficient, or unnecessary electricity demands. Therefore, operation of the proposed project would result in a less than significant impact related to electricity.

Natural Gas Energy

The new natural gas consumption associated with the proposed project is shown in Table 5, *Operation-Related Natural Gas Consumption*. As seen in the table, the new natural gas demand by the new gymnasium building would total 671,357 kilo-British thermal units per year following buildout of the proposed project.

While the proposed project would result in a higher natural gas demand than existing conditions onsite, the new building would be consistent with the requirements of the Building Energy Efficiency Standards and would generally result in a decrease in per capita natural gas consumption. Compliance with the Building Energy Efficiency Standards would include installation of a higher efficiency heating, ventilation, and air conditioning system and thermal envelope (e.g., insulation materials), which would contribute to reducing natural gas demands and decreasing overall reliance on fossil fuels. Therefore, operation of the proposed project would result in less than significant impacts with respect to natural gas usage.

Table 5 Operation-Related Natural Gas Consumption

Land Use	Natural Gas (kBTU/year)[1]
High School	671,357

Source: CalEEMod Version 2022.1.1.13, Appendix A.
Note: kBTU=kilo-British thermal units.
[1] The natural gas use per year is based on the proposed square footage of the new gymnasium building.

Transportation Energy

The new gymnasium building would consume transportation energy during operations from the use of motor vehicles associated with students, staff, and visitors to the gymnasium building. As described in Section 1.5.1, *Proposed Project*, the proposed 2,000-seat capacity gymnasium building is anticipated to host all competitions, while the existing 1,200-seat capacity gym would continue to be used for practices and small Junior Varsity games. It is important to note that events at the gymnasium would not be a common occurrence and would generate minimal vehicle trips on most days. Additionally, events in the gymnasium would not coincide with other major events at the school, and there would not be a net increase in vehicle trips. Therefore, the proposed project would not result in a net increase in consumption of transportation energy during operation from the use of motor vehicles. Impacts would be less than significant with respect to operation-related fuel usage.

b) Conflict with or obstruct a state or local plan for renewable energy or energy efficiency?

No Impact. The state's electricity grid is transitioning to renewable energy under California's Renewable Energy Program. Renewable sources of electricity include wind, small hydropower, solar, geothermal, biomass, and biogas. Electricity production from renewable sources is generally considered carbon neutral. Executive Order S-14-08, signed in November 2008, expanded the state's renewable portfolios standard (RPS) to 33 percent renewable power by 2020. This standard was adopted by the legislature in 2011 (SB X1-2). Senate Bill 350 (de Leon) was signed into law September 2015 and establishes tiered increases to the RPS—40 percent by 2024, 45 percent by 2027, and 50 percent by 2030. Senate Bill 350 also set a new goal to double the energy-efficiency savings in electricity and natural gas through energy efficiency and conservation measures.

On September 10, 2018, Governor Brown signed SB 100, which supersedes the SB 350 requirements. Under SB 100, the RPS for public owned facilities and retail sellers consist of 44 percent renewable energy by 2024, 50 percent by 2026, 52 percent by 2027, and 60 percent by 2030. The bill also established a state policy that eligible renewable energy resources and zero-carbon resources supply 100 percent of all retail sales of electricity to California end-use customers and 100 percent of electricity procured to serve all state agencies by December 31, 2045. Additionally, SB 1020 adds interim targets to SB 100 framework to require renewable energy and zero-carbon resources to supply 90 percent of all retail electricity sales by 2035 and 95 percent of all retail electricity sales by 2040. Under SB 100 and SB 1020, the state cannot increase carbon emissions elsewhere in the western grid or allow resource shuffling to achieve the 100 percent carbon-free electricity target.

The statewide RPS requirements do not directly apply to individual development projects, but to utilities and energy providers such as SCE, whose compliance with RPS requirements would contribute to the state objective of transitioning to renewable energy. In addition, the proposed project would be required to comply with the applicable Building Energy Efficiency Standards and CALGreen (California Green Building Code) requirements. Therefore, implementation of the proposed project would not conflict with or obstruct implementation of California's RPS Program and impacts would be less than significant.

3.6.1 Cumulative Impact Discussion

The areas considered for cumulative impacts to electricity and natural gas supplies are the service areas of SCE and the Southern California Gas Company (SoCalGas), respectively. Other similar development projects would generate increased electricity and natural gas demands in the nearby area. However, all projects within the SCE and SoCalGas service areas would be required to comply with the latest Building Energy Efficiency Standards and CALGreen, which would contribute to minimizing wasteful energy consumption. Additionally, the new gymnasium building would continue to serve the local student population, and student capacity would stay consistent, so transportation-related fuel usage would not increase. As discussed in Section 3.17, *Transportation*, the proposed project is included in the public facilities category and therefore would not result in a significant VMT impact. Therefore, cumulative impacts would be less than significant, and project impacts would not be cumulatively considerable.

3.7 GEOLOGY AND SOILS

This section is completed based on the following technical report:

- *Revised Geotechnical Evaluation Los Alamitos High School New Gymnasium 3591 West Cerritos Avenue*, Ninyo & Moore, September 30, 2022. The geotechnical report is in Appendix B to this IS/MND.

Issues	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
VII. GEOLOGY AND SOILS. Would the project:				
a) Directly or indirectly cause 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.				X
ii) Strong seismic ground shaking?			X	
iii) Seismic-related ground failure, including liquefaction?			X	
iv) Landslides?				X

Issues	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
b) Result in substantial soil erosion or the loss of topsoil?			X	
c) Be located on a geologic unit 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?			X	
d) Be located on expansive soil, as defined in Table 18-1-B of the Uniform Building Code (1994), creating substantial direct or indirect risks to life or property?			X	
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 waste water?				X
f) Directly or indirectly destroy a unique paleontological resource or site or unique geologic feature?		X		

Would the project:

a) Directly or indirectly cause 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.

No Impact. According to the Geotechnical Report prepared by Ninyo & Moore, the site is not located within a State of California Earthquake Fault Zone (formerly known as an Alquist-Priolo Special Studies Zone). Additionally, based on a review of the City of Los Alamitos General Plan 2035, there are no known active faults on or immediately adjacent to the site. The nearest active faults to the project site are El Modena (15 miles east), Elysian Park (21 miles northwest), Newport-Inglewood (4.2 miles northwest), Norwalk (6 miles north), and Whittier-Elsinore (12 miles northeast).[39] Therefore, no impact would occur.

ii) Strong seismic ground shaking?

Less Than Significant Impact. According to Ninyo & Moore, the site is located in a seismically active area, as is the majority of southern California. Ground shaking from earthquakes along active faults in the region could cause injury to people and damage to property at the project site. The closest significant regional active fault is the Newport-Inglewood fault, 4.2 miles southwest from the project site. Considering the proximity of the site to active faults capable of producing a maximum moment magnitude of 6.0 or

[39] Los Alamitos General Plan, Public Facilities and Safety Element, Page 17.

more, the project area has a high potential for experiencing strong ground motion. Meanwhile, the probability of surface fault rupture is considered low at the project site.

The main geologic concern at the project site is the potential for strong seismic shaking during a moderate to large earthquake on the Newport-Inglewood fault. Such events could produce large peak ground accelerations and cause strong to violent shaking at the project site. Development of the proposed project would be required to comply with the California Building Code (CBC), including seismic design parameters. In addition, the proposed project is subject to review by the California Geological Survey (CGS) and Division of State Architects (DSA), which would ensure that the buildings are sufficiently designed to withstand ground shaking. Compliance with the CBC and DSA would ensure that impacts are less than significant.

iii) Seismic-related ground failure, including liquefaction?

Less Than Significant Impact. Liquefaction refers to loose, saturated sand, or gravel deposits that lose their load-supporting capability when subjected to intense shaking. Three simultaneous conditions are necessary for liquefaction: 1) generally cohesionless soils, predominantly sand; 2) high ground water (less than 30 feet from the surface); and 3) ground shaking.[40]

According to the liquefaction analysis done by Ninyo & Moore, granular soil layers below the historic high depth to groundwater level and at depths of 30 to 75 feet are susceptible to liquefaction during the design seismic event. The amount of soil settlement during a strong seismic event depends on the thickness of the liquefiable layers and the density and/or consistency of the soils. The Ninyo & Moore liquefaction analysis indicated that there could be a post-earthquake liquefaction-induced settlement of 3.5 to 2.6 inches during the design seismic event. Differential settlement on the order of 0.4 inch over a horizontal distance of 30 feet may be anticipated.[41]

Due to these findings, the Ninyo & Moore report recommends that the proposed gymnasium be supported on shallow foundations, including spread and continuous footings, bearing on engineered fill material compacted in accordance with the recommendations in the "Earthwork" section of the report.[42] With the incorporation of design considerations recommended in the project's Geotechnical Report and to the satisfaction of CGS and DSA, impacts associated with liquefaction would be less than significant.

iv) Landslides?

No Impact. Landslides are a type of erosion in which masses of earth and rock move down slope as a single unit. Susceptibility of slopes to landslides and other forms of slope failure depend on several factors. These factors are usually present in combination and include steep slopes, condition of rock and soil materials, the presence of water, formational contacts, geologic shear zones, and seismic activity.

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40 Los Alamitos General Plan 2035, 2015, Page 17.
41 Revised Geotechnical Evaluation Los Alamitos High School New Gymnasium 3591 West Cerritos Avenue, Ninyo & Moore, 2022, Page 8.
42 Revised Geotechnical Evaluation Los Alamitos High School New Gymnasium 3591 West Cerritos Avenue, Ninyo & Moore, 2022,, Page 16

As described in the Los Alamitos General Plan, Los Alamitos is at low risk for earthquake-induced landslides because it is on flat land.[43] Therefore, no impacts to people or structures due to landslides are anticipated.

b) Result in substantial soil erosion or the loss of topsoil?

Less Than Significant Impact. Erosion is a normal and inevitable geologic process whereby earthen materials are loosened, worn away, decomposed, or dissolved, and removed from one place and transported to another. Precipitation, running water, waves, and wind are all agents of erosion. Activities associated with development may accelerate erosion within an urban area, which can cause damage by undermining structures, blocking storm sewers, and depositing silt, sand, or mud in roads and tunnels. The project site contains relatively flat terrain, which decreases the project's potential to accelerate erosion.

Additionally, the proposed project does not contain any subterranean levels and would not require extensive excavation, which would mean that soils would not be exposed to substantial adverse erosion impacts. In addition, because the proposed project encompasses an area of more than one acre, the proposed project would be subject to the National Pollutant Discharge Elimination System (NPDES) permit requirements. These include the preparation of a Storm Water Pollution Prevention Plan (SWPPP) and Monitoring Program. The SWPPP for the proposed project would describe minimum and advanced construction best practices for, among other things, erosion control at the site. Therefore, the proposed project would not result in a substantial soil erosion or loss of topsoil, and a less than significant impact would occur.

c) Be located on a geologic unit 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?

Less Than Significant Impact.

Landslide. The project site is relatively flat, and as discussed above, is not located within an area subject to landslides. Therefore, no impacts on people or structures would occur due to landslides.

Lateral Spreading. Lateral spread of the ground surface during an earthquake usually takes place along weak shear zones that have formed within a liquefiable soil layer. The concrete-lined Coyote creek is located approximately 500 feet north of the proposed gymnasium. Accordingly, the depth of the liquefiable soil layer contributing to lateral spreading on-site is approximately 30 feet below the existing ground surface. Due to the fine-grained nature of the soils in the upper 30 feet the site is not considered susceptible to seismically induced lateral spread.44 Therefore, the potential for lateral spreading would be less than significant.

Subsidence. According to the Los Alamitos General Plan, subsidence is the gradual sinking of land as a result of natural or man-made causes.45 According to the STEM/IS MND, the project site lies in an area of

[43] Los Alamitos General Plan 2035, 2015, Page 17.
[44] Revised Geotechnical Evaluation Los Alamitos High School New Gymnasium 3591 West Cerritos Avenue, Ninyo & Moore, 2022, Page 10.
[45] Los Alamitos General Plan, 2015, Page 20.

groundwater withdrawal subsidence, and design provisions such as adequate reinforcements or other measures may help alleviate the effects of subsidence.46 The Ninyo & Moore report recommends that the proposed gymnasium be supported on shallow foundations, including spread and continuous footings, with floor slabs designed by the project's structural engineer based on the anticipated loading conditions.47 With the incorporation of design considerations recommended in the project's geotechnical report and to the satisfaction of CGS and DSA, impacts associated with subsidence would be less than significant.

Liquefaction. As discussed in Checklist Question 3.7.a. iii, the proposed project is in an area where liquefaction is possible, and the city is zoned as an area of historical liquefaction. The Ninyo & Moore report recommends that the proposed gymnasium be supported on shallow foundations, including spread and continuous footings, bearing on engineered fill material compacted in accordance with the recommendations in the "Earthwork" section of the report. With the incorporation of design considerations recommended in the project's geotechnical report and to the satisfaction of CGS and DSA, impacts associated with liquefaction would be less than significant.

For the proposed project, the relatively loose soils in the upper 10 feet could be susceptible to dynamic compaction of dry soils during a design earthquake. However, with the incorporation of design considerations recommended in the project's geotechnical report and to the satisfaction of CGS and DSA, the potential for soil collapse within the proposed project site would be less than significant.

d) Be located on expansive soil, as defined in Table 18-1-B of the Uniform Building Code (1994), creating substantial direct or indirect risks to life or property?

Less Than Significant Impact. Expansive soils swell when they become wet and shrink when they dry out, resulting in the potential for cracked building foundations and in some cases, structural distress of the buildings themselves.

With the incorporation of design considerations recommended in the project's geotechnical report and to the satisfaction of CGS and DSA the project would not expose people or the new school buildings to adverse effects associated with expansive soils, and a less than significant impact would occur.

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?

No Impact. The proposed project is located in an urbanized area of Los Alamitos. The proposed project would connect to existing sewer lines in the vicinity of the project site. No septic tanks or alternative wastewater disposal system are proposed for the proposed project, and no impact would occur.

[46] Los Alamitos High School Multistory STEM Classroom Initial Study/Mitigated Negative Declaration, 2019, Page 4.7-9.
[47] Revised Geotechnical Evaluation Los Alamitos High School New Gymnasium 3591 West Cerritos Avenue, Ninyo & Moore, 2022, Page 17.

f) Directly or indirectly destroy a unique paleontological resource or site or unique geologic feature?

Less Than Significant Impact With Mitigation Incorporated. As with archaeological resources, the project site has been previously developed, and new ground disturbing activities are unlikely to unearth paleontological resources. Nevertheless, it is possible that significant fossils could be discovered during excavation activities, even in areas with a low likelihood of occurrence. Unknown fossils encountered during excavation could be inadvertently damaged. Implementation of Mitigation Measure GEO-1 would ensure that impacts to unknown paleontological resources are less than significant.

Mitigation Measure

GEO-1 In the event that fossils or fossil-bearing deposits are discovered during construction, excavations within 50 feet of the find shall be temporarily halted or diverted. The contractor shall notify a qualified paleontologist to examine the discovery. The paleontologist shall document the discovery as needed, in accordance with Society of Vertebrate Paleontology standards, evaluate the potential resource, and assess the significance of the finding under the criteria set forth in CEQA Guidelines Section 15064.5. The paleontologist shall notify the appropriate agencies to determine procedures that would be followed before construction is allowed to resume at the location of the find. If the project proponent determines that avoidance is not feasible, the paleontologist shall prepare an excavation plan for mitigating the effect of the project based on the qualities that make the resource important. The excavation plan shall be submitted to the District for review and approval prior to implementation.

3.7.1 Cumulative Impact Discussion

Similar to the proposed project, cumulative projects located in a seismically active region of California would be expected to be impacted by similar geological hazards as the proposed project. As such, the proposed project, and cumulative projects would be required to comply with the CBC. Additionally, proposed school projects, including the proposed project, would be subject to review by the CGS and DSA, which would ensure that the buildings are sufficiently designed to withstand geological hazards. Compliance with the CBC, CGS and DSA review, and implementation of erosion best management practices under the SWPPP would result in less than significant cumulative impacts associated with geologic hazards and soil erosion.

3.8 GREENHOUSE GAS EMISSIONS

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

Scientists have concluded that human activities are contributing to global climate change by adding large amounts of heat-trapping gases, known as greenhouse gases (GHGs), into the atmosphere. The primary source of these GHGs is fossil fuel use. The Intergovernmental Panel on Climate Change (IPCC) has identified four major GHGs—water vapor, carbon dioxide (CO_2), methane (CH_4), and ozone (O_3)—that are the likely cause of an increase in global average temperatures observed within the 20th and 21st centuries. Other GHG identified by the IPCC that contribute to global warming to a lesser extent include nitrous oxide (N_2O), sulfur hexafluoride (SF_6), hydrofluorocarbons, perfluorocarbons, and chlorofluorocarbons.

Information on manufacture of cement, steel, and other "life cycle" emissions that would occur as a result of the project are not applicable and are not included in the analysis. Black carbon emissions are not included in the GHG analysis because the California Air Resources Board (CARB) does not include this pollutant in the state's Senate Bill 32 (SB 32) and Assembly Bill 1279 (AB 1279) inventory and treats this short-lived climate pollutant separately. A background discussion on the GHG regulatory setting and GHG modeling can be found in Appendix A to this Initial Study.

Would the project:

a) Generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment?

Less Than Significant Impact. Global climate change is not confined to a particular project area and is generally accepted as the consequence of global industrialization over the last 200 years. A typical project, even a very large one, does not generate enough greenhouse gas emissions on its own to influence global climate change significantly; hence, the issue of global climate change is, by definition, a cumulative environmental impact.

Project-related construction and operation-phase GHG emissions are shown in Table 6, *Project-Related GHG Emissions*. Implementation of the proposed project would result in the development of a gymnasium building and site improvements to the LAHS campus. Construction of the proposed project would generate GHG emissions. The annual average construction emissions were amortized over 30 years and included in the emissions inventory to account for one-time GHG emissions from the construction phase of the project. Since student capacity would not increase after buildout of the proposed project and there would not be a net increase in vehicle trips from major events in the new gymnasium building, operation of the proposed project would not result in an increase in trips, water demand, wastewater generation, or solid waste generation. Furthermore, GHG emissions from building energy use would be minimized because the existing portable classroom buildings, which were constructed prior to modern building energy codes, would be replaced with a newer, more energy-efficient gymnasium building that meets the current California Building and Energy Efficiency Standards and CALGreen. Overall, construction and operation of the proposed project would not generate annual emissions that exceed the South Coast AQMD Working Group bright-line threshold of 3,000 metric tons of carbon dioxide equivalent ($MTCO_2e$) per year (South Coast AQMD 2010). Therefore, the proposed project's cumulative contribution to GHG emissions would be less than significant.

Table 6 Project-Related GHG Emissions

Source[1]	GHG ($MTCO_2e$/Year)
Area	1
Energy	68
Amortized Construction Emissions[2]	15
Total	**84**
South Coast AQMD Working Group Bright-Line Threshold	3,000 $MTCO_2e$/Yr
Exceeds Bright-Line Threshold?	**No**

Source: CalEEMod, Version 2022.1.1.13
Notes: MTons = metric tons; $MTCO_2e$ = metric ton of carbon dioxide equivalent
1 Student capacity at buildout would not change from existing conditions; therefore mobile, water use, and solid waste emissions were not evaluated.
2 Total construction emission are amortized over 30 years per South Coast AQMD methodology.

b) Conflict with an applicable plan, policy or regulation adopted for the purpose of reducing the emissions of greenhouse gases?

Less Than Significant Impact. Applicable plans adopted for the purpose of reducing GHG emissions include CARB's Scoping Plan and the Southern California Association of Governments' (SCAG) Regional Transportation Plan/Sustainable Communities Strategy (RTP/SCS). A consistency analysis with these plans is presented below.

CARB 2022 Scoping Plan

CARB's latest Climate Change Scoping Plan (2022) outlines the State's strategies to reduce GHG emissions in accordance with the targets established under AB 32, SB 32, and AB 1279. The Scoping Plan is applicable to State agencies and is not directly applicable to cities/counties and individual projects. Nonetheless, the Scoping Plan has been the primary tool that is used to develop performance-based and efficiency-based CEQA criteria and GHG reduction targets for climate action planning efforts.

Statewide strategies to reduce GHG emissions in the 2022 Climate Change Scoping Plan include: implementing SB 100, which expands the RPS to 60 percent by 2030; expanding the Low Carbon Fuel Standards (LCFS) to

3. Environmental Analysis

18 percent by 2030; implementing the Mobile Source Strategy to deploy zero-electric vehicle buses and trucks; implementing the Sustainable Freight Action Plan; implementing the Short-Lived Climate Pollutant Reduction Strategy, which reduces methane and hydrofluorocarbons to 40 percent below 2013 levels by 2030 and black carbon emissions to 50 percent below 2013 levels by 2030; continuing to implement SB 375; creating a post-2020 Cap-and-Trade Program; and developing an Integrated Natural and Working Lands Action Plan to secure California's land base as a net carbon sink.

Statewide strategies to reduce GHG emissions include the low carbon fuel standards, California Appliance Energy Efficiency regulations, California Renewable Energy Portfolio standard, changes in the corporate average fuel economy standards, and other early action measures as necessary to ensure the State is on target to achieve the GHG emissions reduction goals of AB 32, SB 32, and AB 1279. In addition, new developments are required to comply with the current Building Energy Efficiency Standards and CALGreen. The proposed project would comply with these GHG emissions reduction measures since they are statewide strategies. The proposed project's GHG emissions would be reduced by compliance with statewide measures that have been adopted since AB 32, SB 32, and AB 1279 were adopted. Therefore, impacts would be less than significant.

SCAG's Regional Transportation Plan / Sustainable Communities Strategy

SCAG adopted the 2020-2045 RTP/SCS, Connect SoCal, in September 2020. Connect SoCal finds that land use strategies that focus on new housing and job growth in areas rich with destinations and mobility options would be consistent with a land use development pattern that supports and complements the proposed transportation network. The overarching strategy in Connect SoCal is to plan for the southern California region to grow in more compact communities in transit priority areas and priority growth areas; provide neighborhoods with efficient and plentiful public transit; establish abundant and safe opportunities to walk, bike, and pursue other forms of active transportation; and preserve more of the region's remaining natural lands and farmlands (SCAG 2020). Connect SoCal's transportation projects help more efficiently distribute population, housing, and employment growth, and forecast development is generally consistent with regional-level general plan data to promote active transportation and reduce GHG emissions. The projected regional development, when integrated with the proposed regional transportation network in Connect SoCal, would reduce per-capita GHG emissions related to vehicular travel and achieve the GHG reduction per capita targets for the SCAG region.

Connect SoCal does not require that local general plans, specific plans, or zoning be consistent with the SCS, but provides incentives for consistency to governments and developers. The proposed project would develop a new gymnasium facility for the existing and future students of the LAHS campus on an operational school campus. The proposed project would continue to serve the local student population within the surrounding communities. Since the proposed project would continue to be a local-serving land use, and because the proposed project would not result in an increase in student capacity or new events, the proposed project would not generate an increase in VMT. Therefore, the proposed project would not interfere with SCAG's ability to implement the regional strategies in Connect SoCal, and impacts would be less than significant.

3.8.1 Cumulative Impact Discussion

Project-related GHG emissions are not confined to a particular air basin but are dispersed worldwide. Therefore, it is accepted as very unlikely that any individual development project would have GHG emissions of a magnitude to directly impact global climate change Project-related GHG emissions under Checklist Question 3.8.a are not project-specific impacts to global warming, but the proposed project's contribution to this cumulative impact.

As discussed above, project-related construction and operation-phase GHG emissions would be below South Coast AQMD's Working Group bright-line threshold. The proposed project would continue to serve the local student population within the surrounding communities and would not generate an increase in VMT or transportation-related fuel usage. Furthermore, the proposed gymnasium building would be built to be energy efficient in compliance with the latest Building and Energy Efficiency Standards. Overall, the proposed project's GHG impacts would be less than cumulatively considerable.

3.9 HAZARDS AND HAZARDOUS MATERIALS

This section is based in part on the following technical report:

- *Revised Geotechnical Evaluation Los Alamitos High School New Gymnasium 3591 West Cerritos Avenue*, Ninyo & Moore, September 30, 2022. The Geotechnical Report is in Appendix B to this IS/MND.

Issues	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
IX. HAZARDS AND HAZARDOUS MATERIALS. Would the project:				
a) Create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials?			X	
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?			X	
c) Emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school?			X	
d) Be located on a site which is included on a list of hazardous materials sites compiled pursuant to Government Code § 65962.5 and, as a result, would it create a significant hazard to the public or the environment?				X
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 or excessive noise for people residing or working in the project area?			X	

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Issues	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
f) Impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan?			X	
g) Expose people or structures, either directly or indirectly, to a significant risk of loss, injury or death involving wildland fires?				X

Would the project:

a) Create a significant hazard to the public or the environment through the routine transport, use or disposal of hazardous materials?

Less Than Significant Impact. Construction of the proposed project would require small amounts of hazardous materials, such as vehicle fuels, lubricants, grease, and transmission fluids in construction equipment, and paints and coatings. The handling, use, transport, and disposal of hazardous materials by the construction phase of the project would comply with existing regulations of several agencies—the US Environmental Protection Agency (EPA), California Division of Occupational Safety and Health, US Occupational Safety and Health Administration, and US Department of Transportation.

Operation of the proposed project would transport, use, store, and dispose of small amounts of hazardous materials typical of school facilities, such as cleaning and maintenance supplies (cleaners, gasoline, paint, and pesticides). The proposed project is a gymnasium development and would use cleaners and other chemicals in relatively small quantities; these are not typically considered hazardous materials that could result in a significant hazard to the public or the environment.

All on-site activities during construction and operation would be required to adhere to federal and state regulations for the handling, transport, and disposal of hazardous materials. With the exercise of normal safety practices, the proposed project would not create substantial hazards to the public or the environment. Therefore, a less than significant impact would occur.

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?

Less Than Significant Impact. The project site currently operates as the Los Alamitos High School. According to the STEM IS/MND, a Preliminary Endangerment Assessment (PEA) was conducted in 2005 at the Los Alamitos High School for a previous project, the construction of buildings 700 (L1) and 750 (L2) and a parking lot located west of the proposed STEM building site.[48] The PEA acknowledged that the site has not been identified on any of the regulatory databases as a hazardous waste generator, or as a facility that treats, stores or disposes of hazardous waste onsite, however, it was identified for previous disposal of asbestos and

[48] Los Alamitos High School Multistory STEM Classroom Initial Study/Mitigated Negative Declaration, 2019, Page 4.9-4.

polychlorinated biphenyl (PCB) wastes (fluorescent light ballast) as part of the schools remodeling activities.[49] The conclusion of the 2005 PEA report prepared for that project determined contaminants onsite were below levels of significance and no further action was required. A No Further Action (NFA) and PEA approval letter were issued by the DTSC on May 17, 2005; The issuance of the NFA letter indicates that the DTSC has concluded that there are no contaminants of concern in the Los Alamitos High School field area; therefore, the impacts would be less than significant.[50]

c) Emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school?

Less Than Significant Impact. The proposed project includes the construction of a 32,000-square-foot gymnasium on LAHS, a public school within the Los Alamitos Unified School District. The project site currently operates as part of the LAHS campus. In addition, the project site is approximately 0.3 mile southeast from Keystone Academy (at 10549 Humbolt St), approximately 0.7 mile southeast from Los Alamitos Elementary School (at 10862 Bloomfield St), and approximately 0.4 mile east from McAuliffe Middle School (at 4112 W Cerritos Ave). As discussed under Threshold 3.9(a), construction and operation of the proposed project would handle small amounts of hazardous materials typical of construction activities and those used in the operation of school facilities. The use, transport, and storage of such hazardous materials would be required to comply with all applicable state and federal regulations that would ensure the proper handling of such materials. As discussed under Threshold 3.9(b), the site has not been identified on any of the regulatory databases as a hazardous waste generator, or as a facility that treats, stores, or disposes of hazardous waste onsite. No significant hazard from hazardous materials is expected at the project site. Therefore, impacts would be less than significant.

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?

No Impact. California Government Code Section 65962.5 requires the compiling of lists of the following types of hazardous materials sites: hazardous waste facilities; hazardous waste discharges for which the State Water Quality Control Board has issued certain types of orders; public drinking water wells containing detectable levels of organic contaminants; underground storage tanks with reported unauthorized releases; and solid waste disposal facilities from which hazardous waste has migrated.

Five environmental lists were searched for hazardous materials sites on the project site:

- GeoTracker. State Water Resources Control Board
- EnviroStor. Department of Toxic Substances Control
- EJScreen. US Environmental Protection Agency

[49] Los Alamitos High School Multistory STEM Classroom Initial Study/Mitigated Negative Declaration, 2019, Page 4.9-4.
[50] Los Alamitos High School Multistory STEM Classroom Initial Study/Mitigated Negative Declaration, 2019, Page 4.9-4.

- EnviroMapper. US Environmental Protection Agency
- Solid Waste Information System (SWIS). California Department of Resources Recovery and Recycling

Based on a search of these lists, several properties with potential hazardous materials are near the school site:

- UNOCAL #4727 (T0605901594), 3501 CERRITOS, LUST Cleanup Site, Cleanup Status: Open - Remediation, RB Case #: 083002155T, Loc Case #: 92UT123

- CHEVRON #20-6285 (T0605901948), 10471 LOS ALAMITOS, LUST Cleanup Site, Cleanup Status: Open - Site Assessment, RB Case #: 083002837T, Loc Case #: 96UT016

- Monte Collins Property (T10000010252), 3342 Cerritos Avenue, Cleanup Program Site, Cleanup Status: Open - Site Assessment, RB Case #: 2080167

- Cottonwood Church (T10000008413), 3311 Sausalito Street, Cleanup Program Site, Cleanup Status: Open - Assessment & Interim Remedial Action, RB Case #: 2080181

- EL DORADO CLEANER (SL204BF1760), 8171 WARDLOW, Cleanup Program Site, Cleanup Status: Open –Long Term Management, RB Case #: 0822

While the project site is listed on one of the five databases, according to the STEM IS/MND, a school site evaluation was completed in 2005 on the site and a NFA letter was issued by the DTSC on May 17, 2005.[51] As discussed under Threshold 3.9(a), the issuance of the NFA letter indicates that the DTSC has concluded that there are no contaminants of concern on the Los Alamitos High School site.

Other than the listing above, the environmental records review found that the project site was not listed as a hazardous materials site, a hazardous substance release site, or a hazardous waste disposal site. Therefore, the proposed project would not create a hazardous impact to the public because of a hazardous materials site pursuant to Government Code § 65962.5.

e) For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles or a public airport or public use airport, would the project result in a safety hazard or excessive noise for people residing or working in the project area?

Less than Significant Impact. The Joint Forces Training Base (JFTB) is located approximately 1.8 miles southeast of the proposed project site. The JFTB is owned by the U.S. Department of Defense and operated by the U.S. Army. The Los Alamitos JFTB is also within the oversight of the Orange County Airport Land Use Commission (ALUC), which is required to prepare and adopt an airport land-use plan for each of the airports in its jurisdiction.[52] The Airport Environs Land Use Plan (AELUP) for the JFTB was issued by ALUC in 2002 and then amended in 2017 and is intended to protect the public from adverse effects of aircraft noise, ensure

[51] Los Alamitos High School Multistory STEM Classroom Initial Study/Mitigated Negative Declaration, 2019, Page 4.9-11.
[52] The City of Los Alamitos General Plan Update Draft EIR, 2014, Page 5.5-8.

that people and facilities are not concentrated in areas susceptible to aircraft accidents, and ensure that no structures or activities adversely affect navigable space.[53]

The City of Los Alamitos, including the project site, falls within the airport planning area of the Los Alamitos JFTB; land uses within the airport planning-area boundaries are required to conform to safety, height, and noise restrictions established in the AELUP for the JFTB.[54] Due to this, any development above 200 feet requires filing with the Federal Aviation Administration (FAA) and notification to the ALUC, including filing of a Notice of Proposed Construction or Alteration (FAA Form 7460-1).[55] However, due to the proposed project being approximately 40 feet in height when constructed, no filing with the FAA would be necessary.

The second closest airport to the project site is the Long Beach Airport, which is approximately 4.2 miles west of the project site. The project site is outside of this airport's land use plan.

According to the STEM IS/MND, the Education Code Sections 17215 (a)&(b) require school sites built or acquired after January 1, 1996, to be two nautical miles (12,152 feet) from an airstrip. Los Alamitos High School was built in 1968 and therefore is exempt from this requirement.[56]

For the reasons above, the project site would cause a less than significant impact and would not result in a safety hazard or excessive noise for people residing or working in the project area.

f) Impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan?

Less Than Significant Impact. The proposed project would have a significant impact if it would impair or physically interfere with an adopted emergency response plan or emergency evacuation plan. There are three plans that are relevant to the project site—the Emergency Operations Plan (EOP) for Orange County, the Local Hazard Mitigation Plan (LHMP) for the Unified County of Orange and Orange County, and the Los Alamitos Emergency Operations Plan (EOP). The City's Emergency Operations Plan addresses the jurisdiction's planned response to natural disasters and public safety emergency situations, and the County's Emergency Operations Plan functions in a similar manner.[57] The LHMP is a multi-jurisdiction plan developed jointly by the County of Orange; a local government; and the Orange County Fire Authority, a Joint Powers Authority, with the goal to promote sound public policy designed to protect residents, critical facilities, infrastructure, key resources, private property, and the environment from natural hazards in unincorporated areas, fire hazards in the Fire Authority service area, and County- and Fire Authority-owned facilities.[58]

As discussed further in Section 3.17, *Transportation*, to address emergency and fire access needs, project site improvements would be designed in accordance with all applicable CDE and Orange County Fire Authority

[53] The City of Los Alamitos General Plan Update Draft EIR, 2014, Page 5.5-8.
[54] The City of Los Alamitos General Plan Update Draft EIR, 2014, Page 5.5-8.
[55] The City of Los Alamitos General Plan Update Draft EIR, 2014, Page 5.5-8.
[56] The City of Los Alamitos General Plan Update Draft EIR, 2014, Page 5.5-8.
[57] Los Alamitos General Plan, 2015, Public Facilities and Safety Element, Page 38.
[58] County of Orange and Orange County Fire Authority Local Hazard Mitigation Plan, 2021, page 1https://www.ocsheriff.gov/sites/ocsd/files/2022-03/2021%20County%20of%20Orange%20and%20Orange%20County%20Fire%20Authority%20Local%20Hazard%20Mitigation%20Plan.pdf, accessed on May 5, 2023.

design standards for emergency access. These characteristics and compliance with applicable federal, state, and local regulations would reduce the project's potential to interfere with adopted emergency operations plans, and impacts would be less than significant.

g) Expose people or structures, either directly or indirectly, to a significant risk of loss, injury or death involving wildland fires?

No Impact. As discussed in Section 3.20, *Wildfire*, neither the project site nor the surrounding community are located within a Very High Fire Hazard Severity Zone. The closest area designated as a very high fire hazard severity zone is located near the City of Whittier, approximately 20 miles north of the project site.[59] Development of the proposed project would comply with all applicable local and state building guidelines. The proposed project would not expose people or structures to a significant risk of loss, injury or death involving wildfires and no impact would occur.

3.9.1 Cumulative Impact Discussion

With respect to hazardous materials in the environment, effects are generally limited to site-specific conditions due to the fact that exposure typically is dependent on proximity to the source of the hazardous material. The proposed project includes development of a new gymnasium on an existing high school campus. As discussed under Threshold 3.9(d), the proposed project is not listed as a hazardous material site, and no hazardous material sites exist in the vicinity of the proposed project.

The proposed project and cumulative projects would require small amounts of hazardous materials, such as cleaning solutions, paint, and gasoline, that are typically used during construction and operation. The use of these materials would be required to comply with regional, state, and federal regulations for the handling, use, transport, and storage of such materials. Similar to the proposed project, cumulative projects would be required to prepare evacuation and safety plans that would be required to comply with the Orange County Fire Authority's design standards for emergency access.

Therefore, construction of the proposed project along with cumulative projects would not result in a significant cumulative impact.

[59] Fire Hazard Severity Zones in State Responsibility Areas, 2022, https://calfire-forestry.maps.arcgis.com/apps/webappviewer/index.html?id=4466cf1d2b9947bea1d4269997e86553, accessed on May 5, 2023.

3.10 HYDROLOGY AND WATER QUALITY

Would the project:

Issues	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
X. HYDROLOGY AND WATER QUALITY. Would the project:				
a) Violate any water quality standards or waste discharge requirements or otherwise substantially degrade surface or ground water quality?			X	
b) Substantially decrease groundwater supplies or interfere substantially with groundwater recharge such that the project may impede sustainable groundwater management of the basin?			X	
c) Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river or through the addition of impervious surfaces, in a manner which would:				
i) result in a substantial erosion or siltation on- or off-site;			X	
ii) substantially increase the rate or amount of surface runoff in a manner which would result in flooding on- or offsite;			X	
iii) create or contribute runoff water which would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff; or			X	
iv) impede or redirect flood flows?				X
d) In flood hazard, tsunami, or seiche zones, risk release of pollutants due to project inundation?				X
e) Conflict with or obstruct implementation of a water quality control plan or sustainable groundwater management plan?				X

a) Violate any water quality standards or waste discharge requirements or otherwise substantially degrade surface or ground water quality?

Less Than Significant Impact. Urban runoff from storms or nuisance flows (runoff during dry periods) from development projects can carry pollutants to receiving waters. Runoff can contain pollutants such as oil, fertilizers, pesticides, trash, and sediment. This runoff can flow directly into local streams or into storm drains and continue through pipes until it is released untreated into a local waterway and eventually the ocean. Untreated stormwater runoff degrades water quality in surface waters and groundwater and can affect drinking water, human health, and plant and animal habitats.

The construction and operational phases of the proposed project could have the potential to impact water quality. Construction activities may impact water quality due to sheet erosion of exposed soils. Operational-related activities of the proposed project (e.g., runoff from parking areas, solid waste storage areas, and

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landscaped areas) would generate pollutants that could adversely affect the water quality of downstream receiving waters if effective measures are not used to keep pollutants out of and remove pollutants from urban runoff. The following is a discussion of the potential impacts that the construction and operational phases of the proposed project could have on water resources and quality.

Construction Activities

Clearing, grading, excavation, and construction activities associated with the proposed project may impact water quality through soil erosion and increasing the amount of silt and debris carried in runoff. Additionally, the use of construction materials such as fuels, solvents, and paints may present a risk to surface water quality. Finally, the refueling and parking of construction vehicles and other equipment on-site during construction may result in oil, grease, or related pollutant leaks and spills that may discharge into the storm drain system.

The US Environmental Protection Agency (EPA) establishes national water quality standards. Pursuant to Section 402 of the Clean Water Act, the EPA has also established regulations under the National Pollution Discharge Elimination System (NPDES) program to control direct stormwater discharges. In Los Alamitos, the Santa Ana RWQCB administers NPDES permitting programs and is responsible for developing wastewater discharge requirements.

To minimize these potential impacts, the proposed project would be required to comply with the National Pollutant Discharge Elimination System (NPDES) Construction General Permit (CGP) (NPDES No. CAS000002) through the Santa Ana RWQCB NPDES program. The CGP requires the preparation of a Stormwater Pollution Prevention Plan (SWPPP) that incorporates Best Management Practices (BMPs) to control sedimentation, erosion, and hazardous materials contamination of runoff during construction. The State Water Resource Control Board (SWRCB) mandates that projects that disturb one or more acres of land must obtain coverage under the Statewide CGP. The CGP also requires that prior to the start of construction activities, the project applicant must file Permit Registration Documents (PRDs) with the SWRCB, which includes a Notice of Intent, risk assessment, site map, annual fee, signed certification statement, SWPPP, and post-construction water balance calculations. The construction contractor is required to maintain a copy of the SWPPP on-site at all times and implement all construction BMPs identified in the SWPPP during construction activities. Prior to the issuance of a grading permit, the project applicant is required to provide proof of filing of the PRDs with the SWRCB, which includes preparation of a SWPPP.

The SWPPP must describe construction BMPs that address pollutant source reduction and provide measures/controls to mitigate potential pollutant sources. These include, but are not limited to:

- Erosion controls (e.g., earth dikes and swales, mulching, slope drains, compost blankets)
- Sediment controls (e.g., silt fence, sediment trap, sandbag, or straw bale barriers)
- Tracking controls (e.g., stabilized construction entrance/exit, tire wash)
- Non storm water management (e.g., dewatering practices, vehicle, and equipment cleaning)

- Materials and waste management (e.g., material storage, hazardous waste management, soil management)
- Good housekeeping practices

Submittal of the PRDs and implementation of the SWPPP and its associated BMPs throughout the construction phase of the proposed project will address anticipated and expected pollutants of concern due to construction activities. The proposed project would comply with all applicable water quality standards and waste discharge requirements.

Operational Phase

Once the proposed project has been constructed, urban runoff could include a variety of contaminants that could impact water quality. Runoff from buildings and parking lots typically contains oils, grease, fuel, antifreeze, byproducts of combustion (such as lead, cadmium, nickel, and other metals), as well as fertilizers, herbicides, pesticides, and other pollutants. Precipitation at the beginning of the rainy season may result in an initial stormwater runoff (first flush) with high pollutant concentrations.

According to the STEM IS/MND, the Areawide Urban Stormwater Runoff Municipal Storm Sewer System (MS4) Waste Discharge Requirements (Order No. R8-2009-0030 [as amended by Order No. R8-2010-0062]; NPDES No. CAS618030) for the County of Orange, Orange County Flood Control District, and Incorporated Cities of Orange County (including the City of Los Alamitos) require new development and significant redevelopment projects to incorporate low impact development (LID) BMPs to address increases in impervious areas and to reduce the quantity of rainfall runoff and improve the quality of water that leaves a site.[60] The following is a discussion of site-design, source-control, and treatment-control BMPs that could be incorporated into the proposed project. At this phase of the planning process, detailed design drawings have not yet been developed and the project is in the conceptual design phase.

Site Design BMPs

Site design BMPs would be incorporated into the project's design to reduce the potential impacts on surface and groundwater quality. These may include, but are not limited to:

- Using on-site ponding areas
- Constructing hardscape with permeable materials and implementing hydrologically functional landscape design.
- Incorporating landscaping to mitigate urban heat island impacts.
- Including mostly native plants and drought-tolerant plants in landscaping plans.
- Using effective irrigation systems to minimize water usage.

[60] Los Alamitos High School Multistory STEM Classroom Initial Study/Mitigated Negative Declaration, 2019, page 4.10-5.

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Source Control BMPs

Source control BMPs effectively minimize the potential for typical urban pollutants to contact stormwater, thereby limiting water quality impacts downstream. Source control BMPs would be incorporated into the proposed project and implemented throughout the operation of the campus. These BMPs could include, but are not limited to the following:

- Inspection and maintenance of site BMPs—catch basins, grate inlets, etc.
- Providing storm drain stenciling or signage on all storm drain inlets and catch basins.
- Properly designing and inspecting all trash storage areas, loading docks, outdoor storage areas, and outdoor work areas on a regular basis.

Treatment Control BMPs

The proposed project has been designed to avoid and/or minimize impacts to hydrology and water quality by creating bioretention basins to treat stormwater prior to discharge into the City's storm drain system. Based on project site plans the preliminary treatment control BMPs are as follows:

- 18x18' prefabricated catch basin along the southern edge of the project site.
- Subsurface chamber in the northeastern point of the project site.

With the implementation of the BMP features described above, as well as compliance with State, County, and local regulations and code requirements, the proposed project would have a less than significant impact on surface or groundwater quality during the operational phase.

b) Substantially decrease groundwater supplies or interfere substantially with groundwater recharge such that the project may impede sustainable groundwater management of the basin?

Less Than Significant Impact. Groundwater for the City of Los Alamitos is provided by the Golden State Water Company (GSWC), which owns and operates the water lines serving the majority of the City.[61] GSWC's water supply comes from the Orange County Groundwater Basin and imported water from the Municipal Water District of Orange County (MWDOC). Within the GSWC, the West Orange Area includes Los Alamitos. According to the West orange Service Area 2020 Urban Water Management Plan (UWMP), GSWC West Orange has reliable supplies to meet its retail customer demands in normal, single dry years, and five consecutive dry year conditions through 2045.[62]

The development of the proposed project would not result in substantial changes in the quantity of existing groundwater supplies because no groundwater extraction activities would occur. The restrooms and drinking fountains on the project site will be the largest amount of water use, and showers will not be built as part of the proposed project. No new classrooms are proposed as part of this project and the proposed project would not increase or decrease the student capacity of the school. Furthermore, the project site is not in or near a

[61] Los Alamitos General Plan Update Initial Study, 2013, Page 51.
[62] West Orange Service Area 2020 Urban Water Management Plan, 2021, Page ES-4.

groundwater recharge area/facility, nor does it represent a source of groundwater recharge. Therefore, the proposed project would not substantially interfere with groundwater supply or recharge.

Based on the Geotechnical Evaluation by Ninyo and Moore (see Appendix B), groundwater was encountered in exploratory borings during drilling at depths ranging from approximately 9½ to 16½ feet below the ground surface.[63] Regional maps indicate that the historic high groundwater at the site is approximately 10 feet below the ground surface, and at approximately 1,200 feet southwest of the site the depth to groundwater was approximately 11 feet below the ground surface.[64] Fluctuations in groundwater levels may occur due to variations in precipitation, ground surface topography, subsurface stratification, irrigation, groundwater pumping, and other factors. Seepage and wet soil conditions should be anticipated during construction and may be subject to pumping under heavy equipment loads. In general, unstable bottom conditions may be mitigated by over excavating to a depth of approximately 1 to 2 feet below the proposed subgrade and replacing the excavated soil with crushed aggregate base or gravel wrapped in geofabric.

The Golden State Water District would supply the facilities with water, and no water supply wells would be constructed or used. For these reasons, impacts on groundwater supplies or recharge would be less than significant.

c) Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river or through the addition of impervious surfaces, in a manner which would:

i) Result in a substantial erosion or siltation on- or off-site?

Less Than Significant Impact. The proposed project would marginally increase impervious surfaces, as compared to existing conditions. Due to the already developed conditions of the project site and campus, the proposed project does not have the potential to increase stormwater runoff and peak discharges to a degree that would cause substantial erosion and siltation. The proposed project would not involve the alteration of any natural drainage channels or any watercourse. The proposed project drainage would include a bioretention basin, subsurface chamber, and new sections of an on-site storm drain system to connect to the City's existing storm drains.

Most of the potential erosion and siltation impacts would occur during the construction phase (e.g., grading, clearing, excavating, and cut-and-fill activities) of the proposed project. During construction, the project site would demolish hardscaping and remove some vegetation in preparation for grading, which would expose loose soil to potential wind and water erosion. If not controlled, the transport of these materials to local waterways would temporarily increase suspended sediment concentrations and release pollutants attached to sediment particles into local waterways. As previously stated, the project would be required to submit PRDs and a SWPPP to the SWRCB for approval prior to the commencement of

[63] Revised Geotechnical Evaluation Los Alamitos High School New Gymnasium 3591 West Cerritos Avenue, Ninyo & Moore, 2022, Page 4.
[64] Revised Geotechnical Evaluation Los Alamitos High School New Gymnasium 3591 West Cerritos Avenue, Ninyo & Moore, 2022, Page 4.

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construction activities. The SWPPP would describe the BMPs to be implemented during the project's construction activities, including:

- Minimize disturbed areas of the site.
- Preserve existing vegetation to the maximum extent practicable.
- Revegetate exposed areas as quickly as possible.
- Install on-site sediment basins to prevent off-site migration of erodible materials, as needed.
- Install velocity dissipation devices at outlets of sediment basins.
- Implement dust control measures, such as silt fences and regular watering of areas.
- Stabilize construction entrances/exits.
- Install storm drain inlet protection measures.
- Install sediment control measures along the site, such as silt fences or gravel bag barriers.

The operational phase of the project would contain a number of features to reduce the impact of erosion and siltation. The site design, source control, and treatment control BMPs for the operational phase are described in Section 3.10.a. Implementation of the project's proposed construction phase and operational phase BMPs would therefore ensure that erosion and siltation impacts would be less than significant.

ii) Substantially increase the rate or amount of surface runoff in a manner which would result in flooding on- or offsite?

Less Than Significant Impact. The proposed project would marginally increase impervious surfaces, which in turn could increase stormwater runoff, result in higher peak discharges, and create the potential for nuisance flooding in areas without adequate drainage facilities.

The proposed project would not involve the alteration of any natural drainage or watercourse. With the implementation of site BMPs like a bioretention basin the amount of stormwater runoff reaching the City's storm drain system would be similar or less as compared to existing conditions. Since the site BMPs would be designed to collect and detain peak runoff flows, the project would not substantially increase the rate or amount of surface runoff in a manner that would cause flooding. Therefore, impacts related to stormwater drainage and flooding are less than significant.

iii) Create or contribute runoff water which would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff?

Less Than Significant Impact. As stated in Section 3.10.ii, an increase in impervious surfaces with development of the proposed project could result in increases in stormwater runoff, which in turn could exceed the capacity of the existing or planned storm drain systems.

The District proposes to install a bioretention basin and a subsurface catchment basin that would treat stormwater prior to discharge to the City's existing drainage system and potentially reduce peak flows. The bioretention system would treat and infiltrate stormwater and discharge excess water from the bioretention system to the existing City storm drain beneath LAHS. Therefore, the amount of stormwater runoff diverted to the City's storm drain system would not exceed the discharge rates under existing conditions and the capacity of the storm drain system would not be exceeded. The proposed project would not create substantial additional sources of polluted runoff. During the construction phase, the proposed project would be required to prepare a SWPPP that includes erosion controls, thus limiting the discharge of pollutants from the site. During operation, the proposed project would implement BMP measures that minimize the amount of stormwater runoff and associated pollutants.

With implementation of these measures, the project would not substantially increase the rate or amount of stormwater runoff in a manner that would cause flooding. Therefore, stormwater runoff would not exceed the capacity of existing or planned storm drain facilities.

iv) Impede or redirect flood flows?

Less than Significant. According to the report by Ninyo and Moore, the project site is not within a Federal Emergency Management Agency (FEMA) 100-year flood hazard zone.[65] However, as outlined in the STEM IS/MND, this area may be subject to a 0.2-percent annual chance [500-year] flood, which would potentially overtop the storm drains (i.e., levee system) or Carbon Creek to the north and Coyote Creek to the west.[66] The project site is also not located in a dam inundation zone.[67]

While the proposed project would have a larger footprint than the existing buildings that it would replace, the project site is near other buildings and would be unlikely to be a significant new impediment to flood flows. Therefore, there would be a less than significant impact to flood flows.

d) In flood hazard, tsunami, or seiche zones, risk release of pollutants due to project inundation?

No Impact. As noted in Section 3.10.c.iv, above, the project site is not in a 100-year flood zone and is not in the dam inundation zone. The project site is not at risk of inundation by flooding or dam failure.

A seiche is an oscillating surface wave in a restricted or enclosed body of water, generated by ground motion, usually during an earthquake. Seiches are of concern for water storage facilities because inundation from a seiche can occur if the wave overflows a containment wall, such as the wall of a reservoir, water storage tank, dam, or other artificial body of water. The project site is adjacent to Carbon Creek and Coyote Creek. However, the project site is located outside of the 100-year flood zone for both water bodies. Therefore, the project site would not be at risk from flooding due to seiches from either Carbon Creek or Coyote Creek due to distance from the school site. Therefore, impacts due to a seiche are considered less than significant.

Tsunamis are a type of earthquake-induced flooding produced by large-scale sudden disturbances of the sea floor. Tsunami waves interact with the shallow sea floor when approaching a landmass, resulting in an increase in wave height and a destructive wave surge into low-lying coastal areas. The proposed project is approximately

[65] Revised Geotechnical Evaluation Los Alamitos High School New Gymnasium 3591 West Cerritos Avenue, Ninyo & Moore, 2022, Page 4.
[66] Los Alamitos High School Multistory STEM Classroom Initial Study/Mitigated Negative Declaration, 2019, Page 4.10-8.
[67] Department of Water Resources, Dam Breach Inundation Map Web Publisher, https://fmds.water.ca.gov/webgis/?appid=dam_prototype_v2, accessed on May 3, 2023.

5.9 miles inland from the Pacific Ocean. Therefore, the site is outside the tsunami hazard zone and would not be affected by a tsunami.

Based on the preceding, the proposed project would not risk releasing pollutants as the result of floods, tsunami, or seiches. Therefore, there would be no impact.

e) Conflict with or obstruct implementation of a water quality control plan or sustainable groundwater management plan?

Less than Significant Impact. The proposed project would not conflict or obstruct the implementation of a water quality control plan or a sustainable groundwater management plan. The proposed project construction would be subject to the Statewide CGP and implementation of BMPs specified in the SWPPP. This would minimize the potential for erosion or siltation impacts to occur that could impact receiving waters. Also, the installation of BMPs would improve the water quality of stormwater by physical filtration of sediment and solids and biological activity to remove pollutants. Therefore, the project would comply with the Santa Ana RWQCB Water Quality Control Plan.

Additionally, the project site is in the Orange County Groundwater Basin. The groundwater basin is categorized as medium priority by the Department of Water Resources.[68] SGMA requires medium- and high-priority basins to develop groundwater sustainability agencies (GSAs), groundwater sustainability plans (GSPs) and manage groundwater for long-term sustainability. Additionally, as substantiated in Sections 3.10.(a) and (b), above, the proposed project would not violate any water quality standards and will not decrease groundwater supplies or interfere substantially with groundwater recharge. Therefore, the proposed project would have a less than significant impact.

3.10.1 Cumulative Impact Discussion

Cumulative impacts refer to incremental effects of an individual project when viewed in connection with the effects of past projects, current projects, and probable future projects. The cumulative impact area considered for this project is the Orange County Groundwater Basin.

As with the proposed project, future projects in the City and within the Orange County Groundwater Basin would be required to comply with the MS4 permit, the SWRCB's Construction General Permit, respective municipal codes, and ordinances that control runoff and regulate water quality. New projects would be required to demonstrate that stormwater volumes could be managed by downstream conveyance facilities and would not induce flooding. A comprehensive Stormwater Control Plan would be prepared that incorporates these BMPs into the project. New projects or redevelopment projects would be required to submit SWPPPs and Stormwater Control Plans to minimize the potential hydrology and water quality impacts associated with future development.

The proposed project would mitigate potential water quality and hydrology impacts by incorporating site design elements and regulatory code as described above that do not allow significant increases in peak flows and allow

[68] SGMA Basin Prioritization Dashboard, https://gis.water.ca.gov/app/bp-dashboard/final/, accessed on May 3, 2023.

for filtration or removal of pollutants prior to off-site discharge. Therefore, the project's contribution to cumulative hydrology impacts is considered less than significant.

3.11 LAND USE AND PLANNING

Issues	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
XI. LAND USE AND PLANNING. Would the project:				
a) Physically divide an established community?				X
b) Cause a significant environmental impact due to a conflict with any land use plan, policy, or regulation adopted for the purpose of avoiding or mitigating an environmental effect?			X	

Would the project:

a) Physically divide an established community?

No Impact. The project site is currently developed within the LAHS campus. The proposed project would construct a new gymnasium for the LAHS. The proposed project would occur on the same site as the existing school, and proposed improvements would not occur outside of the school boundaries. Therefore, the proposed project would not physically divide an established community and no impact would occur.

b) Cause a significant environmental impact due to a conflict with any land use plan, policy, or regulation adopted for the purpose of avoiding or mitigating an environmental effect?

Less Than Significant Impact. As discussed in Subsection 1.4.3, *Existing Zoning and General Plan Land Use Designations*, of this IS/MND, the project site is currently zoned Community Facilities with a corresponding General Plan land use designation of Community and Institutional. The project site currently functions as part of the LAHS campus, and the use of the site is consistent with the existing zoning and General Plan land use designations. The proposed project would build a new gymnasium on the LAHS campus with ornamental landscaping at the proposed gymnasium entrance, hardscape and softscape areas, and utility upgrades. The proposed project would be consistent with the existing zoning and General Plan land use designations for the project site. The proposed project would therefore not conflict with any land use plan, policy or regulation adopted for the purpose of avoiding or mitigating an environmental effect and a less than significant impact would occur.

3.11.1 Cumulative Impact Discussion

Cumulative impacts would occur if development associated with the proposed project together with cumulative growth would physically divide an existing community or conflict with applicable land use plans, policies, or regulations or with an adopted conservation plan. The proposed project is under the jurisdiction of Los Alamitos Unified School District and is exempt from local regulations. The project site currently operates as a school campus and would continue to do so after project implementation. Therefore, the proposed project would not alter the existing land use and zoning designations onsite. Other development projects within the City of Los Alamitos would be required to be consistent with the General Plan and other applicable local policies. Therefore, cumulative impacts would be less than significant regarding land use and planning.

3.12 MINERAL RESOURCES

Issues	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
XII. MINERAL RESOURCES. Would the project:				
a) Result in the loss of availability of a known mineral resource that would be a value to the region and the residents of the state?				X
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?				X

Would the project:

a) Result in the loss of availability of a known mineral resource that would be a value to the region and the residents of the state?

No Impact. As described in the Los Alamitos High School Multistory STEM Classroom Building IS/MND (STEM IS/MND), the project site is classified within the Surface Mining and Reclamation Act (SMARA) as a Mineral Resource Zone-1 (MRZ-1), which is an area of no significant mineral resource deposits.[69] Also according to the STEM IS/MND, the project area is not located within a known oil and gas field or in the vicinity of oil and gas wells.[70] Therefore, the development of the proposed project would not result in the loss of availability of a known mineral resource that would be a value to the region and the residents of the state. Therefore, no impact would occur.

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?

No Impact. As discussed under Checklist Question 3.12(a), the project site and the surrounding vicinity are not located within an area identified as containing mineral resources or oil fields.[71] The project site and the surrounding area are not used for mineral, oil, or gas extraction. Therefore, no impact would occur.

[69] Los Alamitos High School Multistory STEM Classroom Building Initial Study/Mitigated Negative Declaration, 2019, Page 4.12-1.
[70] Los Alamitos High School Multistory STEM Classroom Building Initial Study/Mitigated Negative Declaration, 2019, Page 4.12-1.
[71] Los Alamitos High School Multistory STEM Classroom Building Initial Study/Mitigated Negative Declaration, 2019, Page 4.12-1.

3.12.1 Cumulative Impact Discussion

Impacts to mineral resources is site specific, and since the project site does not contain mineral resources or oil fields, a significant cumulative impact would not occur.

3.13 NOISE

Issues	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
XIII. NOISE. Would the project result in:				
a) Generation of a substantial temporary or permanent increase in ambient noise levels in the vicinity of the project in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies?			X	
b) Generation of excessive groundborne vibration or groundborne noise levels?			X	
c) For a project located within the vicinity of a private airstrip or 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?				X

Noise Fundamentals

Noise is defined as unwanted sound and, when overexposed, is known to have several adverse effects on people, including hearing loss, speech and sleep interference, physiological responses, and annoyance. Based on these known adverse effects of noise, both the state, and city governments have established criteria to protect public health and safety and to prevent the disruption of certain human activities, such as classroom instruction, communication, or sleep. Additional information on noise and vibration fundamentals and applicable regulations are contained in Appendix C.

Environmental Setting

Existing Noise Environment

The proposed project is an existing school which plans to incorporate a new gymnasium to the east of the existing gymnasium and school's pool and west of the track and football field. The project site is in a predominantly residential area with a noise environment influenced primarily by transportation noise from local adjacent roadways, which includes Los Alamitos Boulevard, Cerritos Avenue, and Bloomfield Street. Noise from nearby residential uses (e.g., property maintenance and parking lot noise) also contribute to the total noise environment intermittently in the project vicinity as well as occasional flights from the Los Alamitos Joint Forces Training Base approximately 1.8 miles southwest.

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The City of Los Alamito General Plan's Noise Element includes future noise contours to assess the noise and land use compatibility of a project site. According to the future noise contour figure, the project site is well outside the 60 dBA CNEL contour for roadway noise from Los Alamitos Boulevard, Cerritos Avenue, and Bloomfield Street, which is considered "clearly acceptable" per the City's community noise and land use standards for schools.

Sensitive Receptors

Certain land uses are particularly sensitive to noise and vibration. These uses include residences, schools, hospital facilities, houses of worship, and open space/recreation areas where quiet environments are necessary for the enjoyment, public health, and safety of the community. Sensitive receptors surrounding the proposed project are residences to the north, east, and south of the project site.

Applicable Standards

State Noise Regulations

California Building Code

The State of California regulates freeway noise, sets standards for sound transmission, provides occupational noise control criteria, identifies noise standards, and provides guidance for local land use compatibility. State law requires that each county and city adopt a general plan that includes a noise element which is to be prepared according to guidelines adopted by the Governor's Office of Planning and Research. The purpose of the noise element is to "limit the exposure of the community to excessive noise levels."

The California Green Building Standards Code (CALGreen) has requirements for insulation that affects exterior-interior noise transmission for nonresidential structures. Pursuant to CALGreen Section 5.507.4.1, Exterior Noise Transmission, an architectural acoustics study may be required when a project site is within a 65 dBA CNEL or L_{dn} noise contour of an airport, freeway or expressway, railroad, industrial sources or fixed-guideway sources. Where noise contours are not readily available, if buildings are exposed to a noise level of 65 dBA L_{eq} during any hour of operation, specific wall and ceiling assembly and sound-rated windows may be necessary to reduce interior noise to acceptable levels.

City of Los Alamitos General Plan Noise Standards

The City has developed policies related to noise and land use compatibly based on Federal and State exterior noise abatement criteria. The proposed project includes the addition of a gymnasium to an existing school. The City of Los Alamitos General Plan set forth standards which present allowable interior and exterior noise levels for land uses within the City as shown in Table 7 below.

Table 7 City of Los Alamitos Noise Standards

Noise Zone	Exterior Noise Standards		Interior Noise Standards	
	Noise Level	Time Period	Noise Level	Time Period
1 (Residential) day	55 dBA	7:00 AM to 10:00 PM	55 dBA	7:00 AM to 10:00 PM
1 (Residential) night	50 dBA	10:00 PM to 7:00 AM	45 dBA	10:00 PM to 7:00 AM
2 (Professional and Institutional)	55 dBA	Anytime	55 dBA	Anytime
3 (Commercial)	60 dBA	Anytime	55 dBA	Anytime

Source: City of Los Alamitos General Plan, Table 3, City of Los Alamitos Noise Standards (dBA)
Notes: These standards can also be found within the City of Los Alamitos Municipal Code under Section 17.20.050, Table 3-01 and Section 17.20.060, Table 3-02.
The noise levels at the affected property shall not exceed:
0 dBA for cumulative period of 30 minutes per hour (L50).
5 dBA for cumulative period of 15 minutes per hour (L25).
10 dBA for cumulative period of 5 minutes per hour (L8).
15 dBA for cumulative period of 1 minutes per hour (L2).
20 dBA not to be exceeded for any time per hour (Lmax).

City of Los Alamitos Municipal Code

Special Provisions – Schools, Hospitals, and Places of Public Assembly

Under section 17.20.070 of the City's Municipal Code, it is unlawful for a person to create noise that causes the noise level at a school, hospital, or place of public assembly—while the facility is in use—to exceed the noise limits specified for exterior noise in this chapter, or which noise level unreasonably interferes with the use of the facility or which unreasonably disturbs or annoys patients in a hospital, provided conspicuous signs are displayed in three separate locations within one-tenth of a mile of the school, hospital, or place of public assembly indicating the presence of such school, hospital, or place of public assembly.

Exemptions

Section 17.20.020 exempts certain activities from Chapter 17.20, including "associated with construction, repair, remodeling, or grading of any real property" provided a permit has been obtained from the City and as long as these activities are limited to the hours of 7:00 AM to 8:00 PM Monday through Saturday, and does not occur at any time during Sundays or Federal Holidays.

Federal Transit Administration

The City of Los Alamitos does not have a quantified threshold for temporary construction noise and vibration. Therefore, to determine impact significance, the following FTA criteria are adopted.

A vibration or construction noise impact would occur if:

- Vibration levels would exceed 0.20 inches/second (in/sec) peak particle velocity (PPV) at the façade of a non-engineered structure (e.g., wood-frame residential). Additionally, the FTA's threshold of 72 vibration velocity (VdB) for frequent events will be used to assess vibration annoyance to residences at the nearby sensitive receptors.

3. Environmental Analysis

- Project construction activities would generate noise levels greater than 80 dBA L_{eq} at the sensitive receptor property line.

Would the project result in:

a) Generation of a substantial temporary or permanent increase in ambient noise levels in the vicinity of the project in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies?

Less Than Significant Impact.

Construction Noise

Construction equipment for the proposed project would include equipment such as concrete saws, excavators, dozers, tractors, loaders, graders, cranes, lifts, rollers, pavers, and air compressors and was based on CalEEMod defaults found in the air quality and GHG analysis conducted for this project (see Appendix A of this IS/MND).

Two types of short-term noise impacts could occur during construction: (1) mobile-source noise from transport of workers, material deliveries, and debris and soil haul and (2) stationary-source noise from use of construction equipment.

Construction Vehicles

The transport of workers and materials to and from the construction site would incrementally increase noise levels along site access roadways. Individual construction vehicle pass-bys including haul trucks may create momentary noise levels of up to approximately 85 dBA L_{max} at 50 feet. However, these occurrences would generally be infrequent and short-lived.

Worker and vendor trips would total a maximum of 31 daily trips during overlapping building construction, paving, and architectural coating and up to 10 daily haul truck trips during demolition, debris haul, and site preparation activity. [72] Existing average daily trips in the project vicinity are not available, but student enrollment for the year 2021-2022 was 3,172 students.[73] Comparing the temporary construction trips to trips generated from existing student enrollment alone, the addition of 41 temporary workers, vendors, and haul daily trips would result in a negligible noise increase. With traffic volumes generated by surrounding residential uses added to the existing traffic counts, project-related construction traffic trips would result in an even lower percentage of increase in traffic noise. Therefore, construction-related trip noise would result in a less-than-significant impact.

Construction Equipment

Noise generated by onsite construction equipment is based on the type of equipment used, its location relative to sensitive receptors, and the timing and duration of noise-generating activities. Each stage of construction

[72] Based on information provided by Los Alamitos School District and the project air quality modeling.
[73] California Department of Education, 2021-2022 Los Alamitos High Student Enrollment, https://dq.cde.ca.gov/dataquest/dqcensus/EnrGrdLevels.aspx?cds=30739243033917&agglevel=School&year=2021-22.

involves different kinds of equipment and has distinct noise characteristics. Noise levels from construction activities are typically dominated by the loudest equipment. The dominant equipment noise source is typically the engine, although work-piece noise (such as dropping of materials) can also be noticeable.

The noise produced at each activity phase is determined by combining the L_{eq} contributions from each piece of equipment used at a given time, while accounting for the ongoing time-variations of noise emissions. Heavy equipment, such as a dozer or a loader, can have maximum, short-duration noise levels of up to 85 dBA Lmax at 50 feet. However, overall noise emissions vary considerably, depending on the specific activity performed at any given moment. Noise attenuation due to distance, the number and type of equipment, and the load and power requirements to accomplish tasks at each construction phase would result in different noise levels from construction activities at a given receptor. Since noise from construction equipment is intermittent and diminishes at a rate of at least 6 dBA per doubling of distance (conservatively ignoring other attenuation effects from air absorption, ground effects, and shielding effects), the average noise levels at noise-sensitive receptors could vary considerably, because mobile construction equipment would move around the site with different loads and power requirements.

Average noise levels from project-related construction activities are calculated by modeling the three loudest pieces of equipment per activity phase. Equipment for grading, site preparation, demolition, and paving is modeled at spatially averaged distances (i.e., from the acoustical center of the general construction site to the property line of the nearest receptors) because the area around the center of construction activities best represents the potential average construction-related noise levels at the various sensitive receptors for mobile equipment. Construction equipment for building construction, architectural coating, and utility trenching is modeled from the edge of the proposed building to the nearest sensitive receptors.

The expected construction equipment mix was categorized by construction activity using the Federal Highway Administration (FHWA) Roadway Construction Noise Model (RCNM). The associated, aggregate sound levels—grouped by construction activity—are summarized in Table 8. RCNM modeling input and output worksheets are included in Appendix C.

3. Environmental Analysis

Table 8 Project-Related Construction Noise, dBA Leq

Construction Activity Phase	RCNM Reference Noise Level	Nearest On/Off-campus Receptors: Single-Family Residence at 3682 Fenley Drive (North)	Single-Family Residence at 10211 Humbolt Street (East)	Los Alamitos HS Dance Building (South)	Los Alamitos HS Gymnasium Building G (West)
Distance in feet	50	740	730	300	130
Asphalt Demolition	85	62	62	69	77
Site Preparation	81	58	58	65	73
Rough Grading	82	59	59	66	74
Paving	79	56	56	63	71
Distance in feet	50	615	650	190	20
Building Construction	82	60	60	70	**90**
Architectural Coating	74	52	52	62	**82**
Utilities Trenching	83	61	61	71	**91**
Maximum dBA L_{eq}		**62**	**62**	**71**	**91**
Exceeds 80 dBA L_{eq} Threshold?		**No**	**No**	**No**	**Yes**

Notes: Calculations performed with the FHWA RCNM software are included in Appendix C.

Off-Campus Receptors

Residential Receptors

Construction is proposed to take place during the municipal code allowable hours, provided a permit has been obtained from the City to the hours of 7:00 AM to 8:00 PM Monday through Saturday, and does not occur at any time during Sundays or Federal Holidays. However, as shown in Table 8, on average noise levels would not exceed the FTA threshold of 80 dBA L_{eq} at the nearest residential exterior property line. The nearest residences not shown in Table 8 are residences approximately 260 feet south of the project site. Given that the distances to the nearest residences are further away than the Los Alamitos HS Dance Building; noise levels would be even lower than what is shown for the Los Alamitos HS Dance Building (which already does not exceed the 80 dBA threshold). Therefore, impacts on the selected off-campus receptors would be less than significant.

On-Campus Receptors

The nearest on-campus receptor to the proposed gymnasium is the existing gymnasium to the west where construction activities could occur as close as 20 feet to 130 feet. Average construction noise could reach up to 91 dBA L_{eq} at the existing gymnasium for activity that would most likely occur within 20 feet (e.g., building construction, architectural coating, and utilities trenching). Construction noise levels are therefore anticipated to exceed 80 dBA L_{eq} at the nearest school property. Therefore, this would have a impact on the campus itself, which under CEQA guidelines, is not considered a significant impact.

Therefore, as a best practice measure, the campus should postpone or move events which would occur within the existing gymnasium to other buildings at least 100 feet away (to fall below the 80 dBA FTA threshold) for construction activities that exceed 80 dBA at 50 feet.

Operational Noise

Traffic Noise

A project will normally have a significant effect on the environment related to noise if it substantially increases the ambient noise levels for adjoining areas. Most people can detect changes in sound levels of approximately 3 dBA under normal, quiet conditions, and changes of 1 to 3 dBA under quiet, controlled conditions. Changes of less than 1 dBA are usually indiscernible. A change of 5 dBA is readily discernible to most people in an outdoor environment. Noise levels above 65 dBA CNEL are normally unacceptable at sensitive receptor locations such as residences, and noise environments in these areas would be considered degraded. Based on this, a significant impact would occur if the following traffic noise increases occurred relative to the existing noise environment:

- For project-related traffic noise, the project causes the ambient noise levels measured at the property line of affected uses to increase by 3 dBA CNEL to or within the "normally unacceptable" or "clearly unacceptable" categories; or

- The project causes the ambient noise levels measured at the property line of affected uses to increase by 5 dBA CNEL or more within the "normally acceptable" or "conditionally acceptable" categories.

With the planned school gymnasium, the proposed project would not result in an increase in students. Additionally, there are no planned roadway upgrades associated with the proposed project. Therefore, the project would not result in a significant change in long-term traffic volumes. However, events would be planned to occur within the new gymnasium which has a 2,000-seat capacity, which would result in approximately 1,600 trips to occur along the adjacent roadways to the school for an at capacity event. It is important to note that events at the gymnasium would not be a common occurrence and would therefore, be significantly less on most days. Additionally, events that would occur in the gymnasium would not coincide with other major events within the school, thus reducing the possibility of cumulative trips from the project and other school events within roadways that connect to the school. Assuming similar assumptions from the traffic analysis, which stated three seats would result in one trip and a 10 percent addition buffer for individuals who are dropped off to the school and don't park their vehicle during the duration of school. A conservative assumption can be made, which would present daily traffic along Norwalk Boulevard, Los Alamitos Boulevard, and Cerritos Avenue based solely on student enrollment at the school. Since student enrollment for the 21-22 year was approximately 3,172 students, the inbound trips from normal school activity would be approximately 1,163 trips (3,172 "seats"/3 seats = 1,057 vehicle trips x 1.1 from 10 percent drop off trips = 1,163 drop off trips), and outbound trips would be approximately 105 trips (3,172 "seats" x 0.033 = 105 early departure trips) based on the assumptions the traffic engineer followed (Garland & Associates 2023). This would result in a total of 1,268 trips one way and 2,536 daily trips (for when students leave/picked up). Therefore, when conservatively assuming traffic along roadway segments that connect directly to the school (Norwalk Boulevard and W Cerritos Avenue) only have school trips. Traffic noise increases from the proposed Project on nearby roadway segments would result in only a 2.1 dB increase under this conservative scenario as trips would go from 2,536 trips to 4,136 trips. Since the school is not the only land use that would use these roadway segments as there are other surrounding land uses, the increase from the proposed project would be much lower in a real-world scenario. In all cases, projected traffic noise increases would be below the 3.0 dBA significance threshold (lowest threshold) as trips would need to effectively double what existing trips are to reach a 3 dBA change (e.g., 1,000 to 2,000 trips). Therefore, traffic-related increases from the proposed project were found to be less than significant and no mitigation measures are necessary.

Mechanical Equipment

The construction of the proposed gymnasium would have mechanical HVAC systems. HVAC equipment would be new, and it is anticipated that the associated noise would be similar to existing HVAC equipment or quieter. For reference, typical HVAC noise is 55 dBA at 50 feet and the nearest sensitive receptors would be the existing school gymnasium (Building G) approximately 125 feet west from the center of the new gymnasium building. At that distance, HVAC noise levels would attenuate to 47 dBA or less. This would not exceed the exterior noise limits for professional and institutional land zoning uses of 55 dBA L_{eq} at any time of the day as set forth in section 17.20.050 of the Los Alamitos Municipal Code and Table 3 of the Los Alamitos General Plan. This impact would be less than significant.

Less Than Significant Impact.

b) Generation of excessive groundborne vibration or groundborne noise levels?

Less Than Significant Impact.

Operational Vibration

The operation of the proposed project would not include any substantial long-term vibration sources. Thus, no significant vibration effects from operations sources would occur.

Construction Vibration

Vibration Annoyance

Groundborne vibration is rarely annoying to people who are outdoors, so it is usually evaluated in terms of indoor receivers. For annoyance, vibration is typically noticed nearby when objects in a building generate noise from rattling windows or picture frames. Since construction activities are typically distributed throughout the project site, vibration annoyance impacts are typically based on average vibration levels (levels that would be experienced by sensitive receptors most of the time). However, to represent the worst-case vibration level, distances to the nearest sensitive receptor buildings are measured from the edge of the proposed gymnasium building. For vibration annoyance, the FTA vibration level limit of 72 VdB will apply to the surrounding residential receptors.

For vibration annoyance, while the nearby school buildings are considered sensitive receptors which have a threshold for vibration annoyance under FTA guidelines, the Los Alamitos Municipal Code does not consider them sensitive receptors when evaluating noise/vibration annoyance. As stated before, under section 17.20.070, it is unlawful for a person to create noise that causes the noise level at a school, hospital, or place of public assembly—while the facility is in use—to exceed the noise limits specified for exterior noise in this chapter (Table 7), or which noise level unreasonably interferes with the use of the facility or which unreasonably disturbs or annoys patients in a hospital, provided conspicuous signs are displayed in three separate locations within one-tenth of a mile of the school, hospital, or place of public assembly indicating the presence of such school, hospital, or place of public assembly. For such land uses only hospitals are considered for evaluation of vibration annoyance. Therefore, only construction noise and vibration damage are analyzed for the nearby school buildings, and two other sensitive receptors were chosen to analyze vibrational annoyance in lieu of school buildings in Table 9.

Table 9 shows the vibration levels from typical earthmoving construction equipment at the nearest sensitive receptors. As shown in the table, construction-generated vibration levels would not exceed 72 VdB at any nearby off-campus sensitive receptors. Additionally, vibration-related construction activities would occur in the daytime when residential land uses are least susceptible to vibration annoyance. Therefore, impacts related to construction vibration annoyance would be less than significant.

Table 9 Worst-Case Annoyance Vibration Levels from Construction Equipment

	Vibration Levels (VdB)				
Equipment	**Reference Levels at 25 feet**	**Single-Family Residence at 3682 Fenley Drive (610 feet North)**	**Single-Family Residence at 10211 Humbolt Street (650 feet East)**	**Single-Family Residence at 10411 El Dorado Way (300 feet South)**	**Single-Family Residence at 3196 Lilly Avenue (1200 feet West)**
Vibratory Roller	94.0	52.4	51.6	61.6	43.6
Static Roller	82.0	40.4	39.6	49.6	31.6
Hoe Ram	87.0	45.4	44.6	54.6	36.6
Large Bulldozer	87.0	45.4	44.6	54.6	36.6
Caisson Drilling	87.0	45.4	44.6	54.6	36.6
Loaded Trucks	86.0	44.4	43.6	53.6	35.6
Jackhammer	79.0	37.4	36.6	46.6	28.6
Small Bulldozer	58.0	16.4	15.6	25.6	7.6
FTA Threshold	-	72	72	72	72
Exceeds Threshold?	**-**	**No**	**No**	**No**	**No**

Source: FTA 2006.
Bold numbers indicate values that exceed the FTA annoyance criteria.
Distances are from the edge of the overall construction to the nearest receptor building within each land use type.

Vibration Damage

Construction Vibration

Construction operations can generate varying degrees of ground vibration, depending on the construction procedures and equipment. Operation of construction equipment generates vibrations that spread through the ground and diminish with distance from the source. The effect on buildings in the vicinity of the construction site varies depending on soil type, ground strata, and receptor-building construction. The effects from vibration can range from no perceptible effects at the lowest vibration levels, to low rumbling sounds and perceptible

3. Environmental Analysis

vibrations at moderate levels, to slight architectural damage at the highest levels. Vibration from construction activities rarely reaches the levels that can damage structures.

For reference, a vibration level of 0.2 in/sec PPV is used as the limit for non-engineered timber and masonry buildings (which would apply to the surrounding residential structures).[74] Vibration damage is measured from the edge of the project site to the nearest structure façade because vibration damage, unlike human vibration perception or annoyance, is determined by measuring instantaneous peak particle velocity generated by equipment. Table 10 summarizes vibration levels for typical construction equipment at a reference distance of 25 feet and at the nearest sensitive receptors. The nearest structure to proposed construction activities is the Los Alamitos existing gymnasium approximately 20 feet or less to the west of the project site.

Table 10 Vibration Damage Levels for Typical Construction Equipment

	PPV (in/sec)				
Equipment	**FTA Reference at 25 feet**	**Single-Family Residence at 3682 Fenley Drive (610 feet North)**	**Single-Family Residence at 10211 Humbolt Street (650 feet East)**	**Los Alamitos HS Dance Building (185 feet South)**	**Los Alamitos HS Gymnasium Building G (20 feet West)**
Vibratory Roller	0.21	0.002	0.002	0.010	**0.293**
Static Roller	0.05	0.000	0.000	0.002	0.070
Hoe Ram	0.089	0.001	0.001	0.004	0.124
Large Bulldozer	0.089	0.001	0.001	0.004	0.124
Caisson Drilling	0.089	0.001	0.001	0.004	0.124
Loaded Trucks	0.076	0.001	0.001	0.004	0.106
Jackhammer	0.035	0.000	0.000	0.002	0.049
Small Bulldozer	0.003	0.000	0.000	0.000	0.004

Sources: Federal Transit Administration, *Transit Noise and Vibration Impact Assessment Manual,* September 2018. New Zealand Transport Agency 2012.
NA= Not Applicable
Bold = Threshold exceedance

As shown in Table 10, vibration levels would cause an exceedance of 0.2 in/sec PPV at the nearby existing school gymnasium approximately 20 feet west of the proposed project, resulting in damage to the existing school gymnasium. However, in terms of what CEQA analyzes, which is surrounding sensitive receptors in the environment (off-site) the 0.2 in/sec PPV would not be exceeded. Therefore, impacts regarding vibration damage would be less than significant.

As a best practice measure (to prevent damage to surrounding on-campus buildings) the Los Alamitos School District and its construction contractor should implement the following measures during all ground-disturbing activities:

- Vibratory compaction that is within 15 to 25 feet of any surrounding school structure shall be conducted with the use of a static roller in lieu of a vibratory roller. At a distance greater than 25 feet, a vibratory roller would no longer exceed 0.20 inches per second (in/sec) peak particle velocity PPV

[74] Federal Transit Administration, 2018, Transit Noise and Vibration Impact Assessment.

and would be allowed for use. Therefore, a static roller shall be used within 25 feet where levels would be reduced to 0.20 in/sec PPV or less and mitigate vibration damage.

- Paving activities within 10 feet (should they occur within that distance) of a sensitive structure shall employ self-compacting pea gravel for the base and a concrete finish so as to not require vibratory compaction.

c) For a project located within the vicinity of a private airstrip or 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?

Less than Significant. The proposed project is located approximately 1.8 miles northwest of the privately owned military airstrip within the Los Alamitos Joint Forces Training Base. The Airport Environs Land Use Plan (AELUP) is a land-use compatibility plan that describes the effects of aircraft noise on surrounding areas. Land uses within the airport planning area boundaries are required to conform to noise restrictions established in the AELUP. According to the AELUP Noise Contour which can be found in the Los Alamitos General Plan (Figure 6) the project site is located well outside the 60 dBA CNEL contour. As shown in the General Plan, clearly acceptable noise levels for schools in the City of Los Alamitos are within the 55 to 60 dBA CNEL range. Therefore, since the project is located well outside of the 60 dBA CNEL contour of the Los Alamitos Joint Forces Training Base, the project would not expose people working in the project area to excessive aircraft noise levels above the standards set in the Los Alamitos General Plan. Thus, the impact would be less than significant with no mitigation required.

3.13.2 Cumulative Impact Discussion

A cumulative impact would be considered significant if the project, taken together with past, present, and reasonably foreseeable projects in the project vicinity, would result in a substantial increase in noise. The proposed project includes constructing a new gymnasium on an existing school campus and would not increase the enrollment capacity onsite or change the overall use of the campus, or number of events hosted on campus. Therefore, the proposed project would not contribute to a cumulative impact.

3.14 POPULATION AND HOUSING

Issues	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
XIV. POPULATION AND HOUSING. **Would the project:**				
a) Induce substantial unplanned 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)?				X
b) Displace substantial numbers of existing people or housing, necessitating the construction of replacement housing elsewhere?				X

Would the project:

a) Induce substantial unplanned 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)?

No Impact. The proposed project would involve the development of a 32,000-square-foot gymnasium on the LAHS Campus, as described in Section 1.5, *Project Description*. Construction of the project would not increase the existing student capacity of the school, and therefore, would not generate population growth. The proposed project does not include the construction of new homes or businesses and would not extend roads and other infrastructure offsite. The proposed project would not directly or indirectly result in unplanned population growth. Therefore, no impact would occur.

b) Displace substantial numbers of existing people or housing, necessitating the construction of replacement housing elsewhere?

No Impact. The project site currently operates as a high school campus. The project site does not contain any housing units. Therefore, the construction of the proposed project would not displace any existing people or housing units, which could necessitate the construction of replacement housing elsewhere. No impact would occur.

3.14.1 Cumulative Impact Discussion

A cumulative impact would be considered significant if the project, taken together with past, present, and reasonably foreseeable projects in the project vicinity, would result in substantial unplanned growth or the displacement of people or housing units. The proposed project includes building a gymnasium on an existing school campus and would not increase the enrollment capacity onsite. Therefore, the proposed project would not contribute to a cumulative impact.

3.15 PUBLIC SERVICES

Issues	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
XV. PUBLIC SERVICES. Would the project:				
a) 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:				
Fire protection?			X	
Police protection?			X	
Schools?			X	
Parks?			X	
Other public facilities?			X	

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:

a) Fire protection?

Less Than Significant Impact. The Orange County Fire Authority (OCFA) would provide fire protection and emergency services to the project site. OCFA is a regional fire service agency providing fire suppression and prevention, emergency medical response, rescue response, hazardous materials coordination, and wildland management services to 23 cities in Orange County in addition to unincorporated areas.[75] OCFA is divided into three departments: Operations, Fire Prevention, and Human Resources. Fire Station 2 is the closest to the project site, located at 3642 Green Avenue, which is 0.8 miles south from the project site.

As discussed in Section 3.14, *Population and Housing*, the proposed project would not result in unplanned population growth. Development of the proposed project would not increase student enrollment nor capacity of LAHS. Although the development of the proposed project may increase the intensity of use on the site as compared to existing conditions, because the proposed project would not increase student enrollment nor induce population growth, the proposed project would not require new or physically altered fire protection facilities, construction of which could cause significant environmental impacts. As such, the proposed project would result in a less than significant impact to fire protection services.

[75] The City of Los Alamitos General Plan Update Draft EIR, 2014, Page 5.9-1

3. Environmental Analysis

b) Police protection?

Less Than Significant Impact. The Los Alamitos Police Department (LAPD) would provide police protection services to the proposed project. The LAPD is comprised of two divisions—Operations Division and Support Services Division.[76] The LAPD station is located at 3201 Katella Avenue, approximately 0.8 miles southwest of the project site.

As discussed under Section 3.15(a) above, the proposed project would not induce population growth nor increase student enrollment or capacity. Therefore, the proposed project would not generate a new demand for police protection services. The proposed project would not require new or physically altered police protection facilities, construction of which could cause significant environmental impacts. As such, the proposed project would result in a less than significant impact to police protection services.

c) Schools?

Less Than Significant Impact. The proposed project includes the building of a 32,000 square foot gymnasium on the Los Alamitos High School campus, which is within the LAUSD. An evaluation of the proposed project's potential impacts to the environment during construction and operation is provided within this IS/MND. Furthermore, the proposed project would not result in increased student enrollment nor population growth and would not necessitate new or physically altered school facilities beyond the proposed project. Therefore, a less than significant impact would occur related to school facilities.

d) Parks?

Less Than Significant Impact. Parks in the city are managed by the Los Alamitos Recreation and Community Services Department (LARCSD). The LARCSD manages approximately 317 acres of public parks space (which include 6 neighborhood parks, 5 pocket parks, 4 special use facilities, and 6 school fields).[77] Table 11, *Parks Near the Project Site*, summarizes the park facilities, their amenities and size near the project site.

[76] The City of Los Alamitos General Plan Update Draft EIR, 2014, page 5.9-11
[77] The City of Los Alamitos General Plan Update Draft EIR, 2014, page 5.10-3

Table 11 Parks Near the Project Site

Park	Location	Distance from the Project Site (approx.)	Acres	Description
Coyote Creek Park	10821 Oak St	0.8 miles	3.69	• Trail and grass area.
Labourdette Park	4401 Howard Ave	1.6 miles	0.44	• Play area • Barbecue, picnic shelter
Laurel Park	10862 Bloomfield St	0.7 miles	4.33	• Lighted multipurpose field, lighted softball field, lighted tennis courts • Picnic tables, drinking fountain, restrooms
Little Cottonwood Park	4000 Farquhar Ave	1.2 miles	6.75	• Multipurpose field space • Basketball court, sand volleyball court, softball field • Play area • Cement jogging sidewalk • Barbecues, picnic tables/shelters, drinking fountain, restrooms
Orville Lewis, Jr. Park	3662 Kempton Dr	2.0 miles	1.65	• Grass area, baseball backstop, basketball court • Play area • Barbecue, picnic shelter and tables, drinking fountain
Roberts Park	10911 Oak St	0.7 miles	0.09	• Play area
Soroptimist Park	10822 Pine St	0.6 miles	0.17	• Play area
Stansbury Park	3711 Toland Ave	1.2 miles	0.62	• Grass area and play area
Sterns Park	3871 Farquhar Ave	1.2 miles	0.29	• Play area and barbecue

Source: Los Alamitos General Plan Update Draft EIR

As discussed under Section 3.15(a) above, the proposed project would not induce population growth nor increase student enrollment or capacity. Additionally, the proposed project includes enhanced sports facilities, which are available for public use after school hours and subject to the Civic Center Act. Therefore, the proposed project would not generate a new demand for parks and would not require new or physically altered parks, construction of which could cause significant environmental impacts. As such, the proposed project would result in a less than significant impact to parks.

e) Other public facilities?

Less Than Significant Impact. Orange County Public Libraries (OCPL) provides library services to the City of Los Alamitos, Orange County, and the community of Rossmoor. OCPL operates 33 branch libraries throughout Orange County. While no branch libraries are located within the City of Los Alamitos, two branch libraries are located nearby, these include the Los Alamitos-Rossmoor Library at 12700 Montecito (approximately 2.4 miles south of the project site) and Cypress Library at 5331 Orange Avenue (approximately 2.6 miles northeast of the project site).[78]

[78] Orange County Public Libraries, Library Locator, https://www.ocpl.org/libraries, accessed on May 1, 2023.

As discussed under Section 3.15(a) above, the proposed project would not induce population growth nor increase student enrollment or capacity. Therefore, the proposed project would not generate a new demand for libraries facilities or services. The proposed project would not require new or physically altered libraries facilities, construction of which could cause significant environmental impacts. As such, the proposed project would result in a less than significant impact with respect to libraries.

3.15.1 Cumulative Impact Discussion

The proposed project would not result in new residents as it would not increase the enrollment capacity at LAHS. Therefore, the proposed project and cumulative projects would not combine to result in population growth, which may increase the demand for public services. The proposed project would not result in a cumulatively considerable impact, and cumulative impacts related to public services would be less than significant.

3.16 RECREATION

Issues	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
XVI. RECREATION.				
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?			X	
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?				X

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?

Less Than Significant Impact. The demand for recreation facilities generally increases when the population of the surrounding area increases. As discussed in Section 1.5, *Project Description*, the proposed project would not increase or decrease the student capacity of the school. Therefore, the proposed project would not generate an increased demand for existing neighborhood and regional parks and other recreational facilities and would not result in substantial physical deterioration of such facilities nor cause deterioration to accelerate. Therefore, the proposed project would result in a less than significant impact to recreation.

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?

No Impact. The proposed project involves the construction of a gymnasium that is 32,000 gross square feet and would include ornamental landscaping at the proposed gymnasium entrance, hardscape areas, and utility upgrades. The proposed project does not include the development of recreational facilities. All proposed outdoor spaces are a part of the Los Alamitos High School Campus and would be developed on the project site as part of the proposed project. As such, the construction of outdoor spaces is evaluated in this IS/MND. The proposed project would not induce population growth nor increase student enrollment or capacity. No demand for facilities offsite is created by the proposed project. Therefore, no impact would occur.

3.16.1 Cumulative Impact Discussion

Similar to the cumulative impact discussion for 3.15, *Public Services*, the proposed project would not induce population growth and would not increase the existing enrollment capacity of LAHS. Therefore, the proposed project and the cumulative projects would not combine to result in population growth, which may increase the demand for recreational facilities and services. The proposed project would not result in a cumulatively considerable impact, and cumulative impacts related to recreation would be less than significant.

3.17 TRANSPORTATION

This section is completed based on the following technical reports:

- Los Alamitos Unified School District Focused Access/Circulation Analysis, 2023, Garland Associates.
- The Focused Access/Circulation Analysis is contained in Appendix D to this IS/MND.

Issues	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
XVII. TRANSPORTATION. Would the project:				
a) Conflict with a program, plan, ordinance or policy addressing the circulation system, including transit, roadway, bicycle and pedestrian facilities?			X	
b) Conflict or be inconsistent with CEQA Guidelines § 15064.3, subdivision (b)?			X	
c) Substantially increase hazards due to a geometric design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment)?			X	
d) Result in inadequate emergency access?			X	

Would the project:

a) Conflict with a program, plan, ordinance or policy addressing the circulation system, including transit, roadway, bicycle and pedestrian facilities?

Less Than Significant Impact. The proposed project includes developing a new 2,000-seat gymnasium on the campus of the existing Los Alamitos High School in the City of Los Alamitos. Since all improvements would be made within the existing site and along private streets with no planned changes to the existing circulation system, the proposed project would not cause conflicts with proposed programs or plans to improve the circulation system for all users including transit passengers, vehicles, bicyclists, and pedestrians. The primary ordinances and policies addressing the circulation system in the area are from the City of Los Alamitos's General Plan under the Open Space, Recreation, and Conservation Element (OPEN) and the Mobility and Circulation Element (MOB). Table 12, *Consistency with General Plan Goals and Policies Related to Transportation*, provides a consistency analysis with the City's General Plan's six overarching transportation goals. The proposed project would be required to comply with applicable provisions of the Los Alamitos Municipal Code. Additionally, as further discussed under Threshold 3.17(c), the proposed project would be required to comply with the California Department of Education (CDE) guidelines for site design and circulation and the Orange County Fire Authority's design standards which are imposed on project developments by the State and the Orange County Fire Authority during the building plan check and development review process. Since the proposed project would not make off-site improvements that would conflict with planned programs and plans and would also not conflict with policies governing the local circulation system, the proposed project would not conflict with programs, plans, and ordinances addressing the circulation system, and a less than significant impact would occur.

Table 12 Consistency with General Plan Goals and Policies Related to Transportation

<table>
<tr><th>Policy</th><th>Consistency Discussion</th></tr>
<tr><td colspan="2">Goal OPEN-4. Air, water, and energy resources that are protected from pollution and overuse</td></tr>
<tr><td>Policy OPEN-4.1 Land use and transportation. Reduce greenhouse gas and other local pollutant emissions through mixed-use and transit-oriented development and well-designed transit, pedestrian, and bicycle systems.</td><td>Consistent. The proposed project does not interfere with the City of Los Alamitos's goal to reduce greenhouse gases through mixed use and transit-oriented development. The project site is situated near local and regional transit lines, with first- and last-mile bicycle and pedestrian connections on surrounding local streets and would not interfere with the continued development of these types of improvements.</td></tr>
<tr><td colspan="2">Goal MOB-1. A context-sensitive network of streets, bikeways, and pedestrian areas that promote the safe and efficient movement of people and goods.</td></tr>
<tr><td>Policy MOB-1.1. Multimodal network. The City shall plan, design, operate, and maintain the transportation network to promote safe and convenient travel for all users: pedestrians, bicyclists, transit riders, freight, and motorists.</td><td rowspan="3">Consistent. The proposed project does not interfere with the City of Los Alamitos's goal to be context-sensitive network of streets, bikeways, and pedestrian areas. The project site is situated near local and regional transit lines, with first- and last-mile bicycle and pedestrian connections on surrounding local streets. The location is easily accessed through the existing regional transportation network, with close proximity to freeways, state routes, and arterial roadways.</td></tr>
<tr><td>Policy MOB-1.2. Transportation decisions. Decisions should balance the comfort, convenience, and safety of pedestrians, bicyclists, and motorists of all ages and abilities.</td></tr>
<tr><td>Policy MOB-1.3. Downtown connectivity. Downtown Los Alamitos shall be safely and comfortably accessible by car, by bike, or on foot while maintaining Los Alamitos Boulevard as a four-lane facility with sufficient space for turning movements and queuing space for school access.</td></tr>
<tr><td>Policy MOB-1.4. Level of Service. Maintain a Level of Service (LOS) "D" or better along all City arterials and at intersections during peak hours, with the following exceptions:
A. There is a desire to prioritize pedestrians and/or bicyclists over vehicles
B. Insufficient ROW exists
C. The intersection or roadway is considered built out
The following intersections and roadways are exempt from the LOS D standard:
Katella Avenue and Los Alamitos Boulevard intersection</td><td>Consistent. Recent legislature changes now consider VMT analysis instead of LOS. However, the gymnasium project can be screened from a CEQA VMT analysis because the County of Orange CEQA guidelines state that the development of public facilities, which includes institutional/government and public service uses such as a school, can be screened from a VMT analysis. So, there are no VMT impacts.[1]</td></tr>
</table>

Table 12 Consistency with General Plan Goals and Policies Related to Transportation

Policy	Consistency Discussion
-Katella Avenue and Walnut Street/Wallingsford Road intersection -Bloomfield Street and Cerritos Avenue intersection -Katella Avenue (between Interstate 605 and Walker Street) -Cerritos Avenue (between Interstate 605 and Los Alamitos Boulevard)	
Policy MOB-1.5. Multimodal LOS. Monitor the evolution of multimodal level of service (MMLOS) standards. The City may adopt MMLOS standards when appropriate.	
Policy MOB-1.6. Access management. Minimize access points and curb cuts along arterials and within 200 feet of an intersection to improve traffic flow and safety. Eliminate and/or consolidate driveways when new development occurs or when traffic operation or safety warrants.	**Consistent.** Curb cuts and access alterations are not part of the proposed project description; therefore, the proposed project will not interfere with access management policies.
Goal MOB-2. Neighborhoods that are protected from through traffic.	
Policy MOB-2.1. Traffic calming. Discourage cut-through traffic in residential neighborhoods through the application of traffic-calming measures.	**Consistent.** The proposed project is not located in a neighborhood; therefore, the proposed project will not interfere with neighborhood management policies.
Goal MOB-3. Safe and convenient access to schools and parks that promote healthy and active living.	
Policy MOB-3.1. Commuting to school. Maximize the number of students walking, biking, and riding the bus to and from school.	**Consistent.** Los Alamitos High School is near several other schools and has bicycle lanes and bus stops along the major arteries leading to the campus. While most of the policies under this goal are directed toward the City of Los Alamitos, the proposed project would support and not hinder the implementation of the policies. The proposed project does not prevent these improvements from being implemented and will utilize existing bike racks on campus. Additionally, the proposed project itself would make site improvements within the boundaries of the project site that include improved walkways and other amenities to facilitate multimodal travel.
Policy MOB-3.2. Active trips. Establish, maintain, and improve bicycle and pedestrian systems to promote active trips to schools and parks.	
Policy MOB-3.3. Pedestrian bridges. Invest in the construction of pedestrian bridges at key intersections near schools to enhance safety and reduce congestion.	
Goal MOB-4. Bicycle, pedestrian, and transit systems that are desirable alternatives to the car.	
Policy MOB-4.1. Walkable business districts. Create pedestrian-friendly business districts by expanding and improving spaces for walking along and crossing business corridors.	**Consistent.** Los Alamitos High School is near several other schools and has bicycle lanes and bus stops along the major arteries leading to the campus. While most of the policies under this goal are directed toward the City of Los Alamitos, the proposed project would support and not hinder the implementation of the policies. The proposed project does not prevent these improvements from being implemented and will utilize existing bike racks on campus. Additionally, the proposed project itself would make site improvements within the boundaries of the project site that include improved walkways and other amenities to facilitate multimodal travel.
Policy MOB-4.2. Site design. Require physical designs for new development that provide convenience and security to pedestrians, bicyclists, and transit users.	
Policy MOB-4.3. Intersections. Improve the safety and comfort of pedestrian and bicycle crossings at intersections.	
Policy MOB-4.4. Bicycle and pedestrian trails. Convert railroad rights-of-way, former rights-of-way, alleyways, and areas along storm drain channels into pedestrian and bicycle trails.	
Policy MOB-4.5. Regional connections. Connect bicycle and pedestrian trails to local and regional trails in adjacent jurisdictions.	
Policy MOB-4.6. Bicycle and pedestrian wayfinding. Provide bicycle and pedestrian network wayfinding and information through signs, street markings, or other technologies.	

3. Environmental Analysis

Table 12 Consistency with General Plan Goals and Policies Related to Transportation

Policy	Consistency Discussion
Policy MOB-4.7. Transit stops. Improve and maintain safe, clean, comfortable, well-lit, and rider friendly transit stops that are well marked and visible to motorists.	
Policy MOB-4.8. Bus rapid transit. Plan for bus rapid transit along Katella Avenue, with an emphasis for service to the Los Alamitos Medical Center and Downtown Los Alamitos.	
Goal MOB-5. The right amount of convenient parking at commercial, employment, and civic facilities.	
Policy MOB-5.1. Parking tools. Support innovative parking techniques to maximize parking efficiency throughout the City, especially in the downtown, including: - Shared parking - Unbundled parking - In-lieu parking fees - Parking management plans - Parking districts	**Consistent.** While most of the policies under this goal are directed toward the City of Los Alamitos, the proposed project would support and not hinder the implementation of these policies. While the proposed project does not include any change to parking in the vicinity, the proposed project does not prevent these improvements from being implemented. Additionally, the school's access and circulation features can readily accommodate the safe and efficient movement of vehicles and pedestrians to and from the new gym and the adjacent parking lot.[1]
Policy MOB-5.2. Additions to existing uses. As a component of remodeling where square footage is added, require commercial, business, and industrial centers to provide adequate on-site parking.	
Policy MOB-5.3. Public facilities. Provide adequate on-site parking at public facilities for daily and event-based activities, especially in the downtown and medical center areas.	
Policy MOB-5.4. Centralized parking. Design and establish large parking facilities and parking management districts to connect to and serve multiple activity centers.	
Policy MOB-5.5. Automobile parking demand. Reduce automobile parking demand by improving public transit, bicycle, and pedestrian mobility.	
Policy MOB-5.6. Bicycle parking. Encourage safe, secure, attractive, and convenient bicycle parking, especially in the downtown, at schools, and for employees of local businesses.	
Policy MOB-5.7. Motorcycle and scooter parking. Encourage businesses to provide parking spaces specifically designed for motorcycles and motorized scooters.	

Source: Los Alamitos 2015 General Plan.
Note:
1 Los Alamitos Unified School District Focused Access/Circulation Analysis, 2023.

b) Conflict or be inconsistent with CEQA Guidelines § 15064.3, subdivision (b)?

Less Than Significant Impact. Significance criteria "b" is related to the implementation of vehicle miles traveled (VMT) as the primary performance metric. The County of Orange "Guidelines for Evaluating VMT Under CEQA" state that the development of public facilities, which includes institutional/government and public service uses, can be screened from a CEQA VMT analysis.[79] The proposed project, which is an expansion

79 Los Alamitos Unified School District Focused Access/Circulation Analysis, 2023, Garland Associates.

of an existing high school's recreational facilities, is included in the public facilities category.[80] The proposed project would therefore not result in a significant VMT impact.

c) Substantially increase hazards due to a geometric design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment)?

Less Than Significant Impact. The proposed project would develop a new 2,000-seat gymnasium on the campus of the existing LAHS. The project site currently operates as the LAHS, and operation of the proposed project would continue this use. Therefore, the operation of the proposed project does not represent an incompatible use. The proposed project is not proposing to make off-site improvements to the local transportation network that would result in sharp curves, dangerous intersections, or other hazards.

The design of the proposed fire lane would be required to adhere to the California Department of Education (CDE) guidelines for site design and circulation, and the Orange County Fire Authority (OCFA) design standards which are imposed on project developments by the State and Orange County Fire Authority during the building plan check and development review process. Compliance with CDE's established design standards and implementation of signage and pedestrian circulation features would ensure that hazards due to design features would not occur and that the placement of the circulation improvements would not create a conflict for motorists, pedestrians, or bicyclists traveling within or around the project site. Therefore, a less than significant impact would occur.

d) Result in inadequate emergency access?

Less Than Significant Impact. Factors such as number of driveway access points, roadway widths, and proximity to fire stations determine whether a project provides sufficient emergency access. To address emergency and fire access needs, the site improvements would be required to be designed in accordance with all applicable CDE and the Orange County Fire Authority's (OCFA) design standards for emergency access (e.g., minimum lane width and turning radius).

According to the Access/Circulation Analysis, the existing and proposed access and circulation features at the school, including the driveways, on-site circulation roads, parking lots, and fire lanes, would accommodate emergency ingress and egress by fire trucks, police units, and ambulance/paramedic vehicles. In addition to the existing on-site access routes, a fire lane will be provided on all sides of the new gymnasium.[81] This fire lane will connect to an existing fire lane that runs east-west between the gymnasium site and the driveway on Los Alamitos Boulevard. Emergency vehicles could, therefore, readily access the new gym site and all other areas of the school via the existing and proposed travel corridors.[82] Therefore, the proposed project would not result in a less then significant emergency access impact.

[80] Los Alamitos Unified School District Focused Access/Circulation Analysis, 2023, Garland Associates.
[81] Los Alamitos Unified School District Focused Access/Circulation Analysis, 2023, Garland Associates, 2023, page 2.
[82] Los Alamitos Unified School District Focused Access/Circulation Analysis, 2023, Garland Associates, 2023, page 2.

3.17.1 Cumulative Impact Discussion

Similar to the proposed project, construction and operation of any related project would be required to be consistent with local, regional and state goals and policies. As discussed above, the proposed project is consistent with local and state transportation plans and policies (such as the General Plan and the Los Alamitos Municipal Code), and therefore would not result in a cumulative impact.

3.18 TRIBAL CULTURAL RESOURCES

This section is based in part on the following technical study:

- *Cultural Resources Study, Los Alamitos High School Multi-Story STEMS Building Project, Los Alamitos, Orange County, California*, UltraSystems, February 18, 2019.

The Area of Potential Effect (APE) identified in the Cultural Resources Study included the project site within its boundary. As such, AB 52 was previously conducted for the proposed project under the Los Alamitos High School Multistory STEM Classroom Building IS/MND and overview of the report's findings are below.[83]

Issues	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
XVIII. TRIBAL CULTURAL RESOURCES.				
a) Would the project cause a substantial adverse change in the significance of a tribal cultural resource, defined in Public Resources Code § 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:				
i) 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		X		
ii) 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 § 5024.1. In applying the criteria set forth in subdivision (c) of Public Resource Code § 5024.1, the lead agency shall consider the significance of the resource to a California Native American tribe.			X	

[83] Los Alamitos High School Multistory STEM Classroom Building Initial Study/Mitigated Negative Declaration, 2019, Page 4.18-1

a) **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:**

i) **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**

Less Than Significant Impact with Mitigation Incorporated. Based on the Cultural Resources Report for the Los Alamitos High School Multistory STEM Classroom Building, no cultural resources have been previously recorded within the project site boundary. When looking within the half-mile buffer zone of the project area, two previously recorded historic-era cultural resources were found.[84] However, these sites were not considered eligible for listing in the National Register of Historic Places or the California Register of Historical Resources.

As part of the report, a Sacred Lands File search request was sent to the Native American Heritage Commission (NAHC) and the results were negative, meaning that the results of their Sacred Lands File review did not indicate the presence of sacred sites within the project site.[85] As further discussed under Section, 3.5, *Cultural Resources*, no archeological sites were found within the project site.

However, development of the proposed project could unearth previously unknown archeological resources and human remains. Therefore, although no known tribal cultural resources have been identified on the project site, the proposed project has the potential to disturb subsurface deposits possessing traditional or cultural significance to Native American or other descendant communities. With implementation of mitigation measure CUL-1 and CUL-2, included in Section 3.5, *Cultural Resources*, potential impacts to tribal cultural resources would be less than significant.

ii) **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 Resource Code Section 5024.1, the lead agency shall consider the significance of the resource to a California Native American tribe.**

Less Than Significant Impact with Mitigation Incorporated. AB 52 took effect July 1, 2015, and requires inclusion of a new section in CEQA documents titled "Tribal Cultural Resources," which include heritage sites. Under AB 52, a tribal cultural resource is defined as sites, features, places, cultural landscapes, sacred places, and objects with cultural value to a California Native American tribe that are either included or eligible for inclusion in the California Register of Historic Resources or included in a local register of historical resources, or the lead agency, supported by substantial evidence, chooses at its discretion to treat the resource as a tribal cultural resource.

[84] Cultural Resources Report, Page 4-1.
[85] Cultural Resources Report, 2019, Page 4-2.

3. Environmental Analysis

AB 52 requires consultation with tribes at an early stage to determine whether the project would have an adverse impact on the tribal cultural resource and defines mitigation to protect them. Per AB 52, within 14 days of deciding to undertake a project or determining that a project application is complete, the lead agency must provide formal written notification to all tribes who have requested it. The tribe then has 30 days of receiving the notification to respond if it wishes to engage in consultation. The lead agency must initiate consultation within 30 days of receiving the request from the tribe. Consultation concludes when both parties have agreed on measures to mitigate or avoid a significant effect to a tribal cultural resource, or a party, after a reasonable effort in good faith, decides that mutual agreement cannot be reached. Regardless of the outcome of consultation, the CEQA document must disclose significant impacts on tribal cultural resources and discuss feasible alternatives or mitigation that avoid or lessen the impact.

AB 52 requires that tribes interested in consulting submit or have submitted a general request letter to the lead agency to consult under AB 52 on projects requiring the preparation of a Negative Declaration, Mitigated Negative Declaration, or Environmental Impact Report.

The Area of Potential Effect (APE) identified in the Cultural Resources Study included the project site within its boundary. As such, AB 52 was previously conducted for the proposed project under the Los Alamitos High School Multistory STEM Classroom Building IS/MND.[86] The District contacted six Native American individuals and groups provided by the NAHC to inform them of their involvement with the proposed project. The letters were sent on May 3, 2019. This contact does not constitute consultation with tribes. These six Native American individuals and groups include:

- Gabrielino-Kizh Nations Band of Mission Indians, Andrew Salas
- Gabrielino/Tongva San Gabriel Band of Mission Indians, Anthony Morales
- Gabrielino/Tongva Nation, Sandonne Goad
- Gabrielino Tongva Indians of California Tribal Council, Robert F. Dorame
- Gabrielino-Tong Tribe, Linda Cadelaria
- Gabrielino-Tong Tribe, Charles Alarez

Andrew Salas, the Chairperson from the Gabrielino-Kizh Nations Band of Mission Indians, responded on May 7, 2019.[87] The Tribe determined that they would like to initiate a formal consultation with the lead agency and have indicated that they have a sacred land file adjacent to this project.[88] Salas requested that there be Native American monitoring during ground disturbing work at the construction site which the District agreed to, and on September 13, 2019, the District requested that the Band and NDNA (a local Native American cultural resources firm) provide a proposal to conduct the monitoring.[89] The remaining tribes did not request consultation.[90]

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[86] Los Alamitos High School Multistory STEM Classroom Building Initial Study/Mitigated Negative Declaration, 2019, Page 4.18-1
[87] Los Alamitos High School Multistory STEM Classroom Initial Study/Mitigated Negative Declaration, 2019, Page 4.18-2.
[88] Cultural Resources Report, 2019, Page 6-1
[89] Los Alamitos High School Multistory STEM Classroom Initial Study/Mitigated Negative Declaration, 2019, Page 4.18-2.
[90] Los Alamitos High School Multistory STEM Classroom Initial Study/Mitigated Negative Declaration, 2019, Page 4.18-2.

Along with the consultation effort, a pedestrian survey was conducted. During the survey, the project site was carefully inspected for any indication of human activities dating to the prehistoric or historic periods (i.e., 50 years or older).[91] The result of the pedestrian survey was negative for both historic and prehistoric cultural resources.[92]

With implementation of CUL-1 and CUL-2, included in Section 3.5, *Cultural Resources*, the proposed project would not result in potential adverse impacts to the significance of the resource to a California Native American tribe, therefore and impacts would be less than significant.

3.18.1 Cumulative Impact Discussion

Cumulative impacts would occur when a series of actions leads to the loss 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. However, similar to the project, any cumulative projects would be required to comply with existing federal and state regulations.

As there are no known tribal cultural resources within the project site, and the site was not considered eligible for listing in the National Register of Historic Places or the California Register of Historical Resources, the proposed project would not contribute to a cumulative impact on cultural resources.

Additionally, the existing federal and state regulations and policies described throughout this chapter serve to protect any undiscovered cultural resources. Continued compliance with these regulations would prevent impacts; therefore, a less-than-significant cumulative impact would occur.

3.19 UTILITIES AND SERVICE SYSTEMS

Issues	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
XIX. UTILITIES AND SERVICE SYSTEMS. Would the project:				
a) Require or result in the relocation or construction of new or expanded water, wastewater treatment or storm water drainage, electric power, natural gas, or telecommunications facilities, the construction or relocation of which could cause significant environmental effects?			X	
b) Have sufficient water supplies available to serve the project and reasonably foreseeable future development during normal, dry and multiple dry years?			X	
c) Result in a determination by the wastewater treatment provider, which serves or may serve the project that it has adequate capacity to serve the project's projected demand in addition to the provider's existing commitments?			X	

[91] Cultural Resources Report, 2019, Page 4-4
[92] Cultural Resources Report, 2019, Page 4-4

3. Environmental Analysis

Issues	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
d) Generate solid waste in excess of state or local standards, or in excess of the capacity of local infrastructure, or otherwise impair the attainment of solid waste reduction goals?			X	
e) Comply with federal, state, and local management and reduction statutes and regulations related to solid waste?			X	

Would the project:

a) Require or result in the relocation or construction of new or expanded water, wastewater treatment or storm water drainage, electric power, natural gas, or telecommunications facilities, the construction or relocation of which could cause significant environmental effects?

Less Than Significant Impact. The following is a discussion of the proposed project's potential impacts on water, wastewater treatment, storm water drainage, electric power, natural gas, and telecommunications facilities.

Water Supply Facilities

The proposed project's water services would be provided by the Golden State Water Company (GSWC), which owns and operates the water lines serving the majority of the City.[93] GSWC's water supply comes from the Orange County Groundwater Basin and imported water from the Colorado River Aqueduct and State Water Project. GSWC provides water service to approximately 262,000 customer connections located within more than 80 communities in Northern, Coastal and Southern California.[94] According to the West Orange Service Area 2020 Urban Water Management Plan (UWMP), GSWC West Orange has reliable supplies to meet its retail customer demands in normal, single dry years, and five consecutive dry year conditions through 2045.[95]

Water demand estimates for the existing uses onsite and proposed uses under the proposed project are included in Table 13, *Water Demands, Existing and Proposed.* Due to the existing conditions having no landscaping, and the proposed project having very minimal landscaping, outdoor irrigated areas were not considered when performing the water demand calculations. Instead, only the increased square footage was considered for determining the water use of the proposed project. As shown in the table, existing uses have a total water demand of 1,890 gpd. The proposed project would have a water demand of 2,880 gpd. Therefore, the proposed project would result in an increase of 990 gpd (1.11 afy) of water demand.

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93 Los Alamitos General Plan Update Initial Study, 2013, Page 51.
94 Golden State Water Company, Parent Company Information, https://www.gswater.com/post/parent-company-information#:~:text=Through%20its%20water%20utility%20subsidiary,Northern%2C%20Coastal%20and%20Southern%20California, accessed on May 5, 2023.
95 West Orange Service Area 2020 Urban Water Management Plan, 2021, Page ES-4.

Table 13 Water Demands, Existing and Proposed

Scenario	Building Area (SF)	Indoor Water Use Rate (gpd/SF)	Indoor Water Use (gpd)
Existing Uses			
Total Water Demand	21,000	0.09[1]	1,890
Proposed Uses			
School Facilities	32,000	0.09[1]	2,880
Net Increase	-	-	990

Source: California Air Pollution Control Officers Association (CAPCOA), California Emissions Estimator Model Appendix D Default Data Tables, 2016, http://www.aqmd.gov/docs/default-source/caleemod/05_appendix-d2016-3-2.pdf?sfvrsn=4.
Notes: SF = square feet; gpd = gallons per day
[1] CAPCOA rate for “High School” used.

GSWC West Orange has reliable supplies to meet its retail customer demands in normal, single dry years, and five consecutive dry year conditions through 2045. Therefore, no significant impacts would occur, and no mitigation measures are necessary.

Wastewater Treatment Facilities

The Rossmoor/Los Alamitos Area Sewer District (R/LAASD) provides sewer service to the project site.[96] The R/LAASD operates and maintains approximately 57 linear miles of gravity sewers serving over 8,000 residential and commercial connections in Rossmoor, Los Alamitos, and portions of Long Beach, Seal Beach and Cypress.[97] R/LAASD sewers discharge via gravity into trunk sewers owned and maintained by the Orange County Sanitation District (OCSD) that extend north–south in Los Alamitos Boulevard; from Katella Avenue northward the two sewers separate, one extending through the northwest part of the City and the other east on Katella Avenue.[98]

While the proposed project will not increase school capacity at LAHS, due to the increase in water generation, there will be an increase in wastewater generation. However, this increase will be marginal and project development would not require the construction of new or expanded wastewater treatment facilities. Impacts to wastewater treatment facilities would be less than significant.

Stormwater Drainage Facilities

See response to Section 3.10.c.iii, *Hydrology and Water Quality*, above. As substantiated in this section, impacts would be less than significant, and no mitigation measures are necessary.

[96] Los Alamitos General Plan Update Draft EIR, Page 5.12-1.
[97] Rossmoor/Los Alamitos Area Sewer District Sewer System Management Plan, 2017, Page 1.
[98] Los Alamitos General Plan Update Draft EIR, Page 5.12-1.

3. Environmental Analysis

Electrical

Electricity would be supplied by Southern California Edison (SCE), total mid-electricity consumption in SCE's service area is forecast to increase by approximately 6,199 GWh between 2018 and 2030.[99]

Project development would not require SCE to obtain new or expanded electricity supplies, such as electrical power stations or new facilities/infrastructure that would generate additional electric power.

Furthermore, the project would be required to comply with energy efficiency standards set forth by Title 24 of the California Administrative Code and the Appliance Efficiency Regulations. The project would also comply with CALGreen requirements related to energy and water conservation. These measures will decrease electricity and gas consumption.

Therefore, the proposed project would not result in a substantial increase in electrical service demands. SCE would not need to expand their supply and transmission facilities to handle the demand generated by the proposed project and impacts would be less than significant.

Natural Gas

As discussed in Section 3.6, *Energy*, natural gas demand by the new gymnasium building would total 671,357 kilo-British thermal units per year following buildout of the proposed project. While the proposed project would result in a higher natural gas demand than existing conditions onsite, the new building would be consistent with the requirements of the Building Energy Efficiency Standards and would generally result in a decrease in per capita natural gas consumption. Compliance with the Building Energy Efficiency Standards would include installation of a higher efficiency heating, ventilation, and air conditioning system and thermal envelope (e.g., insulation materials), which would contribute to reducing natural gas demands and decreasing overall reliance on fossil fuels. Project development would not require Southern California Gas Company (SoCalGas) to obtain new or expanded natural gas supplies. Therefore, operation of the proposed project would result in less than significant impacts with respect to natural gas usage.

Telecommunication Facilities

The proposed project would include onsite connections to telecommunication services. Through the research done in the STEM IS/MND, it was found that both Frontier and Charter Communications provide internet access in the project area and Verizon, T-Mobile, and Sprint provide phone service in the project area.[100] Due to the availability of telecommunications facilities in the area, the proposed project would not result in the need to construct new telecommunications facilities and impacts would be less then significant.

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[99] California [Energy] Commission, CEDU 2020 Baseline Forecast - LSE and BA Tables Mid Demand Case - Corrected March 2021, https://efiling.energy.ca.gov/Lists/DocketLog.aspx?docketnumber=20-IEPR-03, accessed on May 5, 2023.

[100] Los Alamitos High School Multistory STEM Classroom Initial Study/Mitigated Negative Declaration, 2019, Page 4.19-3.

b) Have sufficient water supplies available to serve the project and reasonably foreseeable future development during normal, dry and multiple dry years?

Less Than Significant Impact.

The proposed project would not increase student enrollment. GSWC West Orange has reliable supplies to meet its retail customer demands in normal, single dry years, and five consecutive dry year conditions through 2045.[101]

Furthermore, development of the proposed project would be required to comply with the provisions of CALGreen, which contains requirements for indoor water use reduction and site irrigation conservation. Specifically, project development would be required to adhere to mandatory non-residential measures outlined in Division 5.3, Water Efficiency and Conservation, of CALGreen, including those of Sections 5.303, Indoor Water Use, and 5.304, Outdoor Water Use.

Based on the preceding, there are adequate water supplies to meet the water demands of the proposed project and project development would not require the GSWC to obtain new or expanded water supplies. Therefore, impacts on water supplies due to project development would be less than significant.

c) Result in a determination by the waste water treatment provider, which serves or may serve the project that it has adequate capacity to serve the project's projected demand in addition to the provider's existing commitments?

Less Than Significant Impact. As substantiated above in Section 3.19.a, the stormwater and wastewater flow from the project site is expected to marginally increase and will not be sufficient enough to require construction of new or expanded wastewater treatment facilities. The proposed project will not increase the student enrollment capacity at the school and would not result in a significant change in school staff members. Therefore, impacts would be less than significant.

d) Generate solid waste in excess of state or local standards, or in excess of the capacity of local infrastructure, or otherwise impair the attainment of solid waste reduction goals?

Less Than Significant Impact. In 2019, approximately 90 percent of the municipal solid waste landfill from the City was disposed of at the Frank R. Bowerman landfill and the Olinda Alpha landfill.[102] Capacity and disposal data for the landfill is shown in Table 14, *Landfill Capacity*. As shown in the table, the Frank R. Bowerman and Olinda Alpha landfill have a residual capacity of 4,198 tons per day and 6,177 tons per day, respectively.

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101 West Orange Service Area 2020 Urban Water Management Plan, 2021, Page ES-4

102 CalRecycle, Jurisdiction Disposal and Alternative Daily Cover (ADC) Tons by Facility, https://www2.calrecycle.ca.gov/LGCentral/DisposalReporting/Destination/DisposalByFacility, accessed on May 8, 2023.

3. Environmental Analysis

Table 14 Landfill Capacity

Landfill	Current Remaining Capacity (tons) [1]	Maximum Daily Disposal Capacity (tons)	Average Daily Disposal, 2022 (tons) [2]	Residual Daily Disposal Capacity (tons)	Estimated Close Date
Frank R. Bowerman	205,000,000	11,500	7,302	4,198	2053
Olinda Alpha	17,500,000	8,000	1,823	6,177	2036

Sources:
CalRecycle Landfill Tonnage Reports, https://www2.calrecycle.ca.gov/LandfillTipFees/, 2022.
CalRecycle, SWIS Facility/Site Activity Details, https://www2.calrecycle.ca.gov/SolidWaste/SiteActivity/Details/2767?siteID=2103
[1] A Volume-to-Weight conversion rate of 2,000 lbs/cubic yard (1 tons/cubic yard) for "Compacted - MSW Large Landfill with Best Management Practices" is used as per CalRecyle's 2016 Volume-to-Weight Conversion Factors https://www.epa.gov/sites/production/files/201604/documents/volume_to_weight_conversion_factors_memorandum_04192016_508fnl.pdf.
[2] Average daily disposal is calculated based on 300 operating days per year. The facility is open six days per week, Monday through Saturday, except certain holidays.

Based on the building square footage, the proposed project is estimated to generate a net increase of about 77 pounds of solid waste per day, as shown in Table 15, *Net Increase in Solid Waste Generation*. However, the proposed project would not increase student enrollment or staff.

Table 15 Net Increase in Solid Waste Generation

Scenario	Square Feet	Solid Waste Generation, pounds per day[1]	
		Per square foot	Total
Existing Conditions			
School Buildings	21,000	0.007	147
Proposed Conditions			
School Buildings	32,000	0.007	224
		Net increase	**77**

Source: CalRecycle, Estimated Solid Waste Generation Rates, https://www2.calrecycle.ca.gov/WasteCharacterization/General/Rates.
[1] CalRecylce rate for "School" used.

As demonstrated in Table 15, there is adequate landfill capacity for the proposed project's forecasted solid waste, and project development would not require additional landfill capacity at the landfill serving the City. The total amount of solid waste expected to be generated under the proposed project would be minimal compared to the total permitted daily maximum solid waste tonnage per day of the landfill serving the City.

Additionally, CALGreen Section 5.408.1.1 requires that at least 65 percent of the nonhazardous construction and demolition waste from nonresidential construction operations be recycled and/or salvaged for reuse. The District would comply with these established building code standards.

Based on the preceding, impacts on landfill capacity would be less than significant and no mitigation measures are necessary.

e) Comply with federal, state, and local management and reduction statutes and regulations related to solid waste?

Less than Significant Impact. Solid waste would be generated during construction and operation of the proposed project. The proposed project would comply with all regulations pertaining to solid waste, such as the California Integrated Waste Management Act and local recycling and waste programs. The District and its construction contractor would comply with all applicable laws and regulations and make every effort to reuse and/or recycle the construction debris that would otherwise be taken to a landfill. Section 5.408 of CALGreen requires that at least 65 percent of the nonhazardous construction and demolition waste from nonresidential construction operations be recycled and/or salvaged for reuse. Hazardous waste, such as paint used during construction, would be disposed of only at facilities permitted to receive them in accordance with local, state, and federal regulations. The proposed project would comply with all applicable federal, state, and local statutes and regulations related to solid waste disposal. Therefore, impacts would be less than significant.

3.19.1 Cumulative Impact Discussion

This section analyzes potential impacts to utilities that could occur from the proposed project in combination with other projects in the surrounding area.

The water supply for the City is anticipated to meet 100 percent of the demand through 2045, and in drought years the City would implement demand reduction measures as appropriate. The City's 2020 Urban Water Management Plan (UWMP) accounts for projected water demand based on development that is in conformance with the land use designation in the City's General Plan. Therefore, the UWMP accounts for cumulative impacts to water supply. Any large future projects would need to prepare water supply assessments per Senate Bill 610. The requirement for a water supply assessment is to substantiate whether the public water system's total projected water supplies during a 20-year projection will meet the projected water demand associated with the project, in addition to the water system's existing and planned future uses. Additionally, future development would comply with the provisions of CALGreen, which contains requirements for indoor water use reduction and site irrigation conservation. Therefore, cumulative impacts regarding water utilities would be less than significant.

The Rossmoor/Los Alamitos Area Sewer District (RLAASD) has a Sewer System Management Plan (SSMP) that provides a plan and schedule to properly manage, operate, and maintain all parts of the sanitary sewer system. SSMPs are required by the SWRCB and need to be updated every five years. The RLAASD also has set standard specifications for the construction of sanitary sewers and defined methods and best practices for installing sewer lines. Following these documents will ensure that sewer lines are maintained and installed properly. Therefore, cumulative impacts regarding wastewater utilities would be less than significant.

The analysis of cumulative storm drainage impacts considers future development within the City. All new development within the City would require conformance with State and local policies that would reduce hydrology and infrastructure construction impacts to less than significant levels. Any new development would be subject to City policies and ordinances, design guidelines, zoning codes, and other applicable City requirements that reduce impacts to stormwater drainage facilities. More specifically, potential changes related to stormwater flows, drainage, impervious surfaces, and flooding would be minimized by the implementation of stormwater control measures, retention, and low impact development measures. The City's Public Works Department would review and approve all potential stormwater infrastructure projects and ensure that they meet the City's design standards. In addition, all projects must comply with Chapter 8.44, *Stormwater and Urban Runoff Pollution Controls,* of the City's municipal code. Therefore, the proposed project in combination with past, present, and future projects would result in a less-than-significant cumulative impact with respect to stormwater infrastructure.

The cumulative impact for solid waste is considered in the context of estimated growth in the area served by the Frank R. Bowerman Landfill and the Olinda Alpha Landfill. While the proposed project would contribute to an increase in the cumulative demand for solid waste disposal, the increase represents a small percentage of existing solid waste transported to the Frank R. Bowerman Landfill and the Olinda Alpha Landfill. The proposed project, in addition to other projects in the surrounding area, would be served by a landfill with permitted capacity and would comply with federal, State, and local statutes and regulations related to solid waste. Accordingly, the proposed project cumulative impacts to solid waste would be less than significant.

The area considered for cumulative impacts to electricity supplies and facilities is in the Sothern California Edison (SCE) service area. Forecast total electricity supply for the service area is identified above. Other projects would increase electricity demand. It is anticipated that electricity demands by most other projects would be accounted for in the above-referenced demand forecasts. Other projects would be subject to independent CEQA review, including analysis of impacts to electricity supplies. Implementation of all feasible mitigation measures would be required for any significant impacts identified. Cumulative impacts would be less than significant, and proposed project impacts would not be cumulatively considerable.

The areas considered for cumulative impacts to electricity and natural gas supplies are the service areas of SCE and the Southern California Gas Company (SoCalGas), respectively. Other similar development projects would generate increased electricity and natural gas demands in the nearby area. However, all projects within the SCE and SoCalGas service areas would be required to comply with the latest Building Energy Efficiency Standards and CALGreen, which would contribute to minimizing wasteful energy consumption. Other projects would be subject to independent CEQA review, including analysis of impacts to natural gas supplies. Implementation of all feasible mitigation measures would be required for any significant impacts identified. Cumulative impacts would be less than significant, and proposed project impacts would not be cumulatively considerable.

Furthermore, telecommunication services currently exist to serve the project site. Other projects would be subject to independent CEQA review, including analysis of impacts to electricity and telecommunications. Therefore, cumulative impacts would be less than significant, and project impacts would not be cumulatively considerable.

3.20 WILDFIRE

Wildland fire protection in California is the responsibility of either the local government, state, or the federal government. State Responsibility Areas (SRA) are the areas in the state where the State of California has the primary financial responsibility for the prevention and suppression of wildland fires. SRA's are recognized by the Board of Forestry and Fire Protection as areas where CAL FIRE is the primary emergency response agency responsible for fire suppression and prevention.

Local responsibility areas (LRA) include incorporated cities, cultivated agriculture lands, and portions of the desert. LRA fire protection is typically provided by city fire departments, fire protection districts, counties, and by CAL FIRE under contract to local government. CAL FIRE uses an extension of the SRA Fire Hazard Severity Zone model, which is a science-based and field-tested model that assigns a hazard score based on the factors that influence fire likelihood and fire behavior, as the basis for evaluating fire hazard in LRAs. The LRA hazard rating reflects flame and ember intrusion from adjacent wildlands and from flammable vegetation in the urban area. As discussed in Checklist Question 3.15 (a), Fire protection services are provided in Los Alamitos by the Orange County Fire Authority (OCFA).

Fire Hazard Severity Zones (FHSZ) are identified by Moderate, High and Very High in an SRA, and Very High in an LRA. The project site is located in an LRA, and the City of Los Alamitos does not contain any areas classified as very high FHSZ.[103,104] The nearest FHSZ to the project site is near Whittler, a Very High FHSZ approximately 20 miles north of the Project Site.[105]

Issues	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
XX. WILDFIRE. **If located in or near state responsibility areas or lands classified as very high fire hazard severity zones, would the project:**				
a) Substantially impair an adopted emergency response plan or emergency evacuation plan?				X
b) Due to slope, prevailing winds, and other factors, exacerbate wildfire risks, and thereby expose project occupants to pollutant concentrations from a wildfire or the uncontrolled spread of a wildfire?				X
c) Require the installation or maintenance of associated infrastructure (such as roads, fuel breaks, emergency water sources, power lines or other utilities) that may exacerbate fire risk or that may result in temporary or ongoing impacts to the environment?				X
d) Expose people or structures to significant risks, including downslope or downstream flooding or landslides, as a result of runoff, post-fire slope instability, or drainage changes?				X

If located in or near state responsibility areas or lands classified as very high fire hazard severity zones, would the project:

[103] CAL Fire, Fire Hazard Severity Zones, 2022, https://osfm.fire.ca.gov/divisions/community-wildfire-preparedness-and-mitigation/wildfire-preparedness/fire-hazard-severity-zones/#explorefhsz, accessed on May 2, 2023.

[104] CAL Fire, State Responsibility Area (SRA) Viewer, 2016, https://calfire-forestry.maps.arcgis.com/apps/webappviewer/index.html?id=468717e399fa4238ad86861638765ce1, accessed on May 2, 2023.

[105] CAL Fire, Fire Hazard Severity Zones, 2022, https://osfm.fire.ca.gov/divisions/community-wildfire-preparedness-and-mitigation/wildfire-preparedness/fire-hazard-severity-zones/#explorefhsz, accessed on May 2, 2023.

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a) Substantially impair an adopted emergency response plan or emergency evacuation plan?

No Impact. The project site is not located within or near a state responsibility area for wildfire nor lands classified as a very high FHSZ.[106] The closest state responsibility area (SRA), which has a high fire hazard classification, is near Whittier, approximately 20 miles north from the project site.[107] CAL FIRE determined that Orange County does not have any very high fire hazard severity zones within local responsibility areas.[108] Additionally, the City's General Plan highlights that due to the urban nature of Los Alamitos there is very little risk of wildland fire hazards.[109] The project site is located within an urbanized area and is not within or near a very high fire hazard zone. The City of Los Alamitos has prepared an Emergency Operations Plan (EOP) which describes planned responses to extraordinary emergency situations associated with natural disasters, technological emergencies, and war emergencies affecting the City.[110] The proposed project would not conflict with the EOP and the surrounding roadways would continue to provide emergency access to the project site and surrounding properties during construction and operational activities. To address emergency and fire access needs, the site improvements would be required to be designed in accordance with all applicable CDE and the City of Los Alamitos Fire Department design standards for emergency access. Therefore, no impact would occur.

b) Due to slope, prevailing winds, and other factors, exacerbate wildfire risks, and thereby expose project occupants to pollutant concentrations from a wildfire or the uncontrolled spread of a wildfire?

No Impact. The existing school campus is in an urban area, and there is no wildland susceptible to wildfire on or near the site. Furthermore, CAL FIRE does not classify any adjacent areas as a Very High FHSZ.[111] Project development would not place people or structures at risk from wildfire. Therefore, no impact would occur.

c) Require the installation or maintenance of associated infrastructure (such as roads, fuel breaks, emergency water sources, power lines or other utilities) that may exacerbate fire risk or that may result in temporary or ongoing impacts to the environment?

No Impact. The campus is in an urban area surrounded by development. The campus improvements would not require the installation of new infrastructure that may exacerbate fire risk. Therefore, no impact would occur.

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[106] CAL Fire, Fire Hazard Severity Zones, 2022, https://osfm.fire.ca.gov/divisions/community-wildfire-preparedness-and-mitigation/wildfire-preparedness/fire-hazard-severity-zones/#explorefhsz, accessed on May 2, 2023.
[107] CAL Fire, State Responsibility Area (SRA) Viewer, 2016, https://calfire-forestry.maps.arcgis.com/apps/webappviewer/index.html?id=468717e399fa4238ad86861638765ce1, accessed on May 3, 2023.
[108] CAL Fire, Fire Hazard Severity Zones, 2022, https://osfm.fire.ca.gov/divisions/community-wildfire-preparedness-and-mitigation/wildfire-preparedness/fire-hazard-severity-zones/#explorefhsz, accessed on May 2, 2023.
[109] Los Alamitos General Plan, 2015, Page 34.
[110] Los Alamitos General Plan, 2015, Page 37.
[111] CAL Fire, Fire Hazard Severity Zones, 2022, https://osfm.fire.ca.gov/divisions/community-wildfire-preparedness-and-mitigation/wildfire-preparedness/fire-hazard-severity-zones/#explorefhsz, accessed on May 2, 2023.

d) Expose people or structures to significant risks, including downslope or downstream flooding or landslides, as a result of runoff, post-fire slope instability, or drainage changes?

No Impact. The campus is surrounded by development with flat topography. There are no vegetated slopes susceptible to wildfire in the surrounding area. Therefore, the proposed project would not result in runoff, post-fire slope instability, or drainage changes. No impact would occur.

3.20.1 Cumulative Impact Discussion

The project site is not located within or near a state responsibility area for wildfire and is not within a very high fire hazard severity zone.[112] CAL FIRE determined that the City of Los Alamitos does not have any very high fire hazard severity zones within any local responsibility areas.[113] Neither the project site nor the surrounding area are within a very high fire hazard severity zone. Therefore, the proposed project would not contribute to a cumulative impact.

3.21 MANDATORY FINDINGS OF SIGNIFICANCE

Issues	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
XXI. MANDATORY FINDINGS OF SIGNIFICANCE.				
a) Does the project have the potential to substantially 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, substantially 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?		X		
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.)			X	
c) Does the project have environmental effects which will cause substantial adverse effects on human beings, either directly or indirectly?			X	

a) Does the project have the potential to substantially 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, substantially

[112] CAL Fire, Fire Hazard Severity Zones, 2022, https://osfm.fire.ca.gov/divisions/community-wildfire-preparedness-and-mitigation/wildfire-preparedness/fire-hazard-severity-zones/#explorefhsz, accessed on May 2, 2023.

[113] CAL Fire, State Responsibility Area (SRA) Viewer, 2016, https://calfire-forestry.maps.arcgis.com/apps/webappviewer/index.html?id=468717e399fa4238ad86861638765ce1, accessed on May 2, 2023.

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?

Less Than Significant Impact with Mitigation Incorporated. As discussed above in Section 3.5, Cultural Resources, Section 3.7, Geology and Soils, and Section 3.18, Tribal Cultural Resources, while it is unlikely that archeological resources or unique paleontological resources would be found during construction of the proposed project, development of the proposed project would involve grading and earthwork activities for redevelopment of the project site; thus, the potential exists to unearth previously undiscovered archeological or unique paleontological resources. Incorporation of Mitigation Measure CUL-1, CUL-2, and GEO-1 would ensure that impacts to archeological resources and unique paleontological resources would be less than significant.

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.)**

Less Than Significant Impact. The potential for cumulative impacts occurs when the independent impacts of a given project are combined with the impacts of related projects in proximity to the project site that would create impacts that are greater than those of the project alone. Related projects include past, current, and/or probable future projects whose development could contribute to potentially significant cumulative impacts in conjunction with a given project. As discussed throughout this Initial Study, the proposed project would have no impact and less than significant impacts with and without mitigation measures. Therefore, all impacts are individually limited and would not result in any cumulatively significant impact. No mitigation measures are required.

c) **Does the project have environmental effects, which will cause substantial adverse effects on human beings, either directly or indirectly?**

Less Than Significant Impact. As discussed in the above analyses, the proposed project would not result in significant direct or indirect adverse impacts or result in substantial adverse effects on human beings. Impacts would be less than significant, and no mitigation measures are required.

4. References

Bay Area Air Quality Management District (BAAQMD). 2023, April. California Environmental Quality Act Air Quality Guidelines. https://www.baaqmd.gov/plans-and-climate/california-environmental-quality-act-ceqa/updated-ceqa-guidelines

California Air Pollution Control Officers Association (CAPCOA). 2022. California Emissions Estimator Model (CalEEMod). Version 2022.1.1.13 Prepared by: ICF in collaboration with Sacramento Metropolitan Air Quality Management District.

California Air Resources Board. 2017, March 14. Final proposed Short-Lived Climate Pollutant Reduction Strategy. https://www.arb.ca.gov/cc/shortlived/shortlived.htm.

———. 2022, 2022 Scoping Plan for Achieving Carbon Neutrality, https://ww2.arb.ca.gov/sites/default/files/2022-12/2022-sp.pdf, accessed January 24, 2023.

———. 2023, Area Designations Maps/State and National. Accessed January 24, 2023. https://ww2.arb.ca.gov/resources/documents/maps-state-and-federal-area-designations.

California Natural Resources Agency (CNRA). 2018, November. Final Statement of Reasons for Regulatory Action. http://resources.ca.gov/ceqa/docs/2018_CEQA_Final_Statement_of%20Reasons_111218.pdf

Garland Associates. 2023, May. Los Alamitos High School Gymnasium Focused Access/Circulation Analysis.

Governor's Office of Planning and Research (OPR). 2008, June. CEQA and Climate Change: Addressing Climate Change through CEQA Review. Technical Advisory. http://www.opr.ca.gov/ceqa/pdfs/june08-ceqa.pdf.

Office of Environmental Health Hazard Assessment (OEHHA). 2015, February. Air Toxics Hot Spots Program Risk Assessment Guidelines. Guidance Manual for Preparation of Health Risk Assessments. http://oehha.ca.gov/air/hot_spots/2015/2015GuidanceManual.pdf.

Southern California Association of Governments (SCAG). 2020, September 3. Connect SoCal Plan: The 2020-2045 Regional Transportation Plan / Sustainable Communities Strategy of The Southern California Association of Governments. https://www.connectsocal.org/Pages/Connect-SoCal-Final-Plan.aspx.

South Coast Air Quality Management District (SCAQMD). 2008, July. Final Localized Significance Threshold Methodology. http://www.aqmd.gov/docs/default-source/ceqa/handbook/localized-significance-thresholds/final-lst-methodology-document.pdf.

4. References

———. 2010, September 28. Minutes for the GHG CEQA Significance Threshold Stakeholder Working Group #15. http://www.aqmd.gov/docs/default-source/ceqa/handbook/greenhouse-gases-(ghg)-ceqa-significance-thresholds/year-2008-2009/ghg-meeting-15/ghg-meeting-15-minutes.pdf.

———. 2022, December. 2022 Air Quality Management Plan. http://www.aqmd.gov/docs/default-source/clean-air-plans/air-quality-management-plans/2022-air-quality-management-plan/final-2022-aqmp/final-2022-aqmp.pdf?sfvrsn=10

———. 2023, March. South Coast AQMD Air Quality Significance Thresholds. https://www.aqmd.gov/docs/default-source/ceqa/handbook/south-coast-aqmd-air-quality-

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Appendix A Air Quality & Greenhouse Gas Modeling

Appendix

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Air Quality and Greenhouse Gas Appendix

Air Quality and Greenhouse Gas Background and Modeling Data

AIR QUALITY

Air Quality Regulatory Setting

The proposed project has the potential to release gaseous emissions of criteria pollutants and dust into the ambient air; therefore, it falls under the ambient air quality standards promulgated at the local, state, and federal levels. The project site is in the SoCAB and is subject to the rules and regulations imposed by the South Coast Air Quality Management District (South Coast AQMD). However, South Coast AQMD reports to California Air Resources board (CARB), and all criteria emissions are also governed by the California and national Ambient Air Quality Standards (AAQS). Federal, state, regional, and local laws, regulations, plans, or guidelines that are potentially applicable to the proposed project are summarized below.

AMBIENT AIR QUALITY STANDARDS

The Clean Air Act (CAA) was passed in 1963 by the US Congress and has been amended several times. The 1970 Clean Air Act amendments strengthened previous legislation and laid the foundation for the regulatory scheme of the 1970s and 1980s. In 1977, Congress again added several provisions, including nonattainment requirements for areas not meeting National AAQS and the Prevention of Significant Deterioration program. The 1990 amendments represent the latest in a series of federal efforts to regulate the protection of air quality in the United States. The CAA allows states to adopt more stringent standards or to include other pollution species. The California Clean Air Act (CCAA), signed into law in 1988, requires all areas of the state to achieve and maintain the California AAQS by the earliest practical date. The California AAQS tend to be more restrictive than the National AAQS, based on even greater health and welfare concerns.

These National AAQS and California AAQS are the levels of air quality considered to provide a margin of safety in the protection of the public health and welfare. They are designed to protect "sensitive receptors" most susceptible to further respiratory distress, such as asthmatics, the elderly, very young children, people already weakened by other disease or illness, and persons engaged in strenuous work or exercise. Healthy adults can tolerate occasional exposure to air pollutant concentrations considerably above these minimum standards before adverse effects are observed.

Both California and the federal government have established health-based AAQS for seven air pollutants. As shown in Table 1, *Ambient Air Quality Standards for Criteria Pollutants*, these pollutants include ozone (O_3), nitrogen dioxide (NO_2), carbon monoxide (CO), sulfur dioxide (SO_2), coarse inhalable particulate matter (PM_{10}), fine inhalable particulate matter ($PM_{2.5}$), and lead (Pb). In addition, the state has set standards for sulfates, hydrogen sulfide, vinyl chloride, and visibility-reducing particles. These standards are designed to protect the health and welfare of the populace with a reasonable margin of safety.

Table 1 Ambient Air Quality Standards for Criteria Pollutants

Pollutant	Averaging Time	California Standard[1]	Federal Primary Standard[2]	Major Pollutant Sources
Ozone (O_3)[3]	1 hour	0.09 ppm	*	Motor vehicles, paints, coatings, and solvents.
	8 hours	0.070 ppm	0.070 ppm	
Carbon Monoxide (CO)	1 hour	20 ppm	35 ppm	Internal combustion engines, primarily gasoline-powered motor vehicles.
	8 hours	9.0 ppm	9 ppm	
Nitrogen Dioxide (NO_2)	Annual Arithmetic Mean	0.030 ppm	0.053 ppm	Motor vehicles, petroleum-refining operations, industrial sources, aircraft, ships, and railroads.
	1 hour	0.18 ppm	0.100 ppm	
Sulfur Dioxide (SO_2)	Annual Arithmetic Mean	*	0.030 ppm	Fuel combustion, chemical plants, sulfur recovery plants, and metal processing.
	1 hour	0.25 ppm	0.075 ppm	
	24 hours	0.04 ppm	0.14 ppm	
Respirable Coarse Particulate Matter (PM_{10})	Annual Arithmetic Mean	20 µg/m^3	*	Dust and fume-producing construction, industrial, and agricultural operations, combustion, atmospheric photochemical reactions, and natural activities (e.g., wind-raised dust and ocean sprays).
	24 hours	50 µg/m^3	150 µg/m^3	
Respirable Fine Particulate Matter ($PM_{2.5}$)[4]	Annual Arithmetic Mean	12 µg/m^3	12 µg/m^3	Dust and fume-producing construction, industrial, and agricultural operations, combustion, atmospheric photochemical reactions, and natural activities (e.g., wind-raised dust and ocean sprays).
	24 hours	*	35 µg/m^3	
Lead (Pb)	30-Day Average	1.5 µg/m^3	*	Present source: lead smelters, battery manufacturing & recycling facilities. Past source: combustion of leaded gasoline.
	Calendar Quarter	*	1.5 µg/m^3	
	Rolling 3-Month Average	*	0.15 µg/m^3	
Sulfates (SO_4)[5]	24 hours	25 µg/m^3	*	Industrial processes.
Visibility Reducing Particles	8 hours	ExCo =0.23/km visibility of 10≥ miles	No Federal Standard	Visibility-reducing particles consist of suspended particulate matter, which is a complex mixture of tiny particles that consists of dry solid fragments, solid cores with liquid coatings, and small droplets of liquid. These particles vary greatly in shape, size and chemical composition, and can be made up of many different materials such as metals, soot, soil, dust, and salt.

Table 1 Ambient Air Quality Standards for Criteria Pollutants

Pollutant	Averaging Time	California Standard[1]	Federal Primary Standard[2]	Major Pollutant Sources
Hydrogen Sulfide	1 hour	0.03 ppm	No Federal Standard	Hydrogen sulfide (H_2S) is a colorless gas with the odor of rotten eggs. It is formed during bacterial decomposition of sulfur-containing organic substances. Also, it can be present in sewer gas and some natural gas and can be emitted as the result of geothermal energy exploitation.
Vinyl Chloride	24 hours	0.01 ppm	No Federal Standard	Vinyl chloride (chloroethene), a chlorinated hydrocarbon, is a colorless gas with a mild, sweet odor. Most vinyl chloride is used to make polyvinyl chloride (PVC) plastic and vinyl products. Vinyl chloride has been detected near landfills, sewage plants, and hazardous waste sites, due to microbial breakdown of chlorinated solvents.

Source: CARB 2016.
Notes: ppm: parts per million; µg/m^3: micrograms per cubic meter
* Standard has not been established for this pollutant/duration by this entity.
1 California standards for O_3, CO (except 8-hour Lake Tahoe), SO_2 (1 and 24 hour), NO_2, and particulate matter (PM_{10}, $PM_{2.5}$, and visibility reducing particles), are values that are not to be exceeded. All others are not to be equaled or exceeded. California ambient air quality standards are listed in the Table of Standards in Section 70200 of Title 17 of the California Code of Regulations.
2 National standards (other than O_3, PM, and those based on annual arithmetic mean) are not to be exceeded more than once a year. The O_3 standard is attained when the fourth highest 8-hour concentration measured at each site in a year, averaged over three years, is equal to or less than the standard. For PM_{10}, the 24-hour standard is attained when the expected number of days per calendar year with a 24-hour average concentration above 150 µg/m^3 is equal to or less than one. For $PM_{2.5}$, the 24-hour standard is attained when 98 percent of the daily concentrations, averaged over three years, are equal to or less than the standard.
3 On October 1, 2015, the national 8-hour ozone primary and secondary standards were lowered from 0.075 to 0.070 ppm.
4 On December 14, 2012, the national annual $PM_{2.5}$ primary standard was lowered from 15 µg/m^3 to 12.0 µg/m^3. The existing national 24-hour $PM_{2.5}$ standards (primary and secondary) were retained at 35 µg/m^3, as was the annual secondary standard of 15 µg/m^3. The existing 24-hour PM_{10} standards (primary and secondary) of 150 µg/m^3 also were retained. The form of the annual primary and secondary standards is the annual mean, averaged over 3 years.
5 On June 2, 2010, a new 1-hour SO_2 standard was established and the existing 24-hour and annual primary standards were revoked. The 1-hour national standard is in units of parts per billion (ppb). California standards are in units of parts per million (ppm). To directly compare the 1-hour national standard to the California standard the units can be converted to ppm. In this case, the national standard of 75 ppb is identical to 0.075 ppm.

California has also adopted a host of other regulations that reduce criteria pollutant emissions, including:

- CARB Advanced Clean Fleets (ACF)
- CARB Advanced Clean Trucks (ACT)
- AB 1493: Pavley Fuel Efficiency Standards
- Title 20 California Code of Regulations (CCR): Appliance Energy Efficiency Standards
- Title 24, Part 6, CCR: Building and Energy Efficiency Standards
- Title 24, Part 11, CCR: Green Building Standards Code

AIR POLLUTANTS OF CONCERN

Criteria Air Pollutants

The air pollutants emitted into the ambient air by stationary and mobile sources are regulated by federal and state law. Air pollutants are categorized as primary or secondary pollutants. Primary air pollutants are those that are emitted directly from sources and include CO, VOC, NO_2, SO_X, PM_{10}, $PM_{2.5}$, and Pb. Of these, CO, SO_2, NO_2, PM_{10}, and $PM_{2.5}$ are "criteria air pollutants," which means that ambient air quality standards (AAQS) have been established for them. VOC and oxides of nitrogen (NO_x) are air pollutant precursors that form secondary criteria pollutants through chemical and photochemical reactions in the atmosphere. Ozone

(O_3) and NO_2 are the principal secondary pollutants. A description of each of the primary and secondary criteria air pollutants and their known health effects is presented below.

Carbon Monoxide (CO) is a colorless, odorless, toxic gas produced by incomplete combustion of carbon substances, such as gasoline or diesel fuel. CO is a primary criteria air pollutant. CO concentrations tend to be the highest during winter mornings with little to no wind, when surface-based inversions trap the pollutant at ground levels. Because CO is emitted directly from internal combustion, engines and motor vehicles operating at slow speeds are the primary source of CO in the SoCAB. The highest ambient CO concentrations are generally found near traffic-congested corridors and intersections. The primary adverse health effect associated with CO is interference with normal oxygen transfer to the blood, which may result in tissue oxygen deprivation (South Coast AQMD 2005; US EPA 2023). The SoCAB is designated as being in attainment under the California AAQS and attainment (serious maintenance) under the National AAQS (CARB 2023a).

Volatile Organic Compounds (VOC) are composed primarily of hydrogen and carbon atoms. Internal combustion associated with motor vehicle usage is the major source of VOCs. Other sources include evaporative emissions from paints and solvents, asphalt paving, and household consumer products such as aerosols (South Coast AQMD 2005). There are no AAQS for VOCs. However, because they contribute to the formation of O_3, South Coast AQMD has established a significance threshold (South Coast AQMD 2019). The health effects for ozone are described later in this section.

Nitrogen Oxides (NO_X) are a by-product of fuel combustion and contribute to the formation of ground-level O_3, PM_{10}, and $PM_{2.5}$. The two major forms of NO_X are nitric oxide (NO) and nitrogen dioxide (NO_2). NO is a colorless, odorless gas formed from atmospheric nitrogen and oxygen when combustion takes place under high temperature and/or high pressure. The principal form of NO_X produced by combustion is NO, but NO reacts quickly with oxygen to form NO_2, creating the mixture of NO and NO_2 commonly called NO_X. NO_2 is an acute irritant and more injurious than NO in equal concentrations. At atmospheric concentrations, however, NO_2 is only potentially irritating. NO_2 absorbs blue light; the result is a brownish-red cast to the atmosphere and reduced visibility. NO_2 exposure concentrations near roadways are of particular concern for susceptible individuals, including asthmatics, children, and the elderly. Current scientific evidence links short-term NO_2 exposures, ranging from 30 minutes to 24 hours, with adverse respiratory effects, including airway inflammation in healthy people and increased respiratory symptoms in people with asthma. Also, studies show a connection between elevated short-term NO_2 concentrations and increased visits to emergency departments and hospital admissions for respiratory issues, especially asthma (South Coast AQMD 2005; USEPA 2023a). On February 21, 2019, CARB's Board approved the separation of the area that runs along the State Route 60 corridor through portions of Riverside, San Bernardino, and Los Angeles counties from the remainder of the SoCAB for state nonattainment designation purposes. The Board designated this corridor as nonattainment.[1] The remainder of the SoCAB is designated in attainment (maintenance) under the National AAQS and attainment under the California AAQS (CARB 2023a).

[1] CARB is proposing to redesignate SR-60 Near-Road Portion of San Bernardino, Riverside, and Los Angeles Counties in the SoCAB as attainment for NO_2 at the February 24, 2022 Board Hearing (CARB 2023d).

Sulfur Dioxide (SO_2) is a colorless, pungent, irritating gas formed by the combustion of sulfurous fossil fuels. It enters the atmosphere as a result of burning high-sulfur-content fuel oils and coal and chemical processes at plants and refineries. Gasoline and natural gas have very low sulfur content and do not release significant quantities of SO_2. When sulfur dioxide forms sulfates (SO_4) in the atmosphere, together these pollutants are referred to as sulfur oxides (SO_X). Thus, SO_2 is both a primary and secondary criteria air pollutant. At sufficiently high concentrations, SO_2 may irritate the upper respiratory tract. Current scientific evidence links short-term exposures to SO_2, ranging from 5 minutes to 24 hours, with an array of adverse respiratory effects, including bronchoconstriction and increased asthma symptoms. These effects are particularly adverse for asthmatics at elevated ventilation rates (e.g., while exercising or playing) at lower concentrations and when combined with particulates, SO_2 may do greater harm by injuring lung tissue. Studies also show a connection between short-term exposure and increased visits to emergency facilities and hospital admissions for respiratory illnesses, particularly in at-risk populations such as children, the elderly, and asthmatics (South Coast AQMD 2005; US EPA 2023). The SoCAB is designated as attainment under the California and National AAQS (CARB 2023a).

Suspended Particulate Matter (PM_{10} and $PM_{2.5}$) consists of finely divided solids or liquids such as soot, dust, aerosols, fumes, and mists. Two forms of fine particulates are now recognized and regulated. Inhalable coarse particles, or PM_{10}, include particulate matter with an aerodynamic diameter of 10 microns or less (i.e., ≤0.01 millimeter). Inhalable fine particles, or $PM_{2.5}$, have an aerodynamic diameter of 2.5 microns or less (i.e., ≤0.002.5 millimeter). Particulate discharge into the atmosphere results primarily from industrial, agricultural, construction, and transportation activities. Both PM_{10} and $PM_{2.5}$ may adversely affect the human respiratory system, especially in people who are naturally sensitive or susceptible to breathing problems. The EPA's scientific review concluded that $PM_{2.5}$, which penetrates deeply into the lungs, is more likely than PM_{10} to contribute to health effects and at far lower concentrations. These health effects include premature death in people with heart or lung disease, nonfatal heart attacks, irregular heartbeat, aggravated asthma, decreased lung function, and increased respiratory symptoms (e.g., irritation of the airways, coughing, or difficulty breathing) (South Coast AQMD 2005). There has been emerging evidence that ultrafine particulates, which are even smaller particulates with an aerodynamic diameter of <0.1 microns or less (i.e., ≤0.0001 millimeter) have human health implications because their toxic components may initiate or facilitate biological processes that may lead to adverse effects to the heart, lungs, and other organs (South Coast AQMD 2013). However, the EPA and the California Air Resources Board (CARB) have not adopted AAQS to regulate these particulates. Diesel particulate matter is classified by CARB as a carcinogen (CARB 2023e). Particulate matter can also cause environmental effects such as visibility impairment,[2] environmental damage,[3] and aesthetic damage[4] (South Coast AQMD 2005; US EPA 2023). The SoCAB is a nonattainment area for $PM_{2.5}$ under

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2 $PM_{2.5}$ is the main cause of reduced visibility (haze) in parts of the United States.

3 Particulate matter can be carried over long distances by wind and then settle on ground or water, making lakes and streams acidic; changing the nutrient balance in coastal waters and large river basins; depleting the nutrients in soil; damaging sensitive forests and farm crops; and affecting the diversity of ecosystems.

4 Particulate matter can stain and damage stone and other materials, including culturally important objects such as statues and monuments.

California and National AAQS and a nonattainment area for PM_{10} under the California AAQS (CARB 2023a).[5]

Ozone (O_3) is a key ingredient of "smog" and is a gas that is formed when VOCs and NO_X, both by-products of internal combustion engine exhaust, undergo photochemical reactions in sunlight. O_3 is a secondary criteria air pollutant. O_3 concentrations are generally highest during the summer months when direct sunlight, light winds, and warm temperatures create favorable conditions for its formation. O_3 poses a health threat to those who already suffer from respiratory diseases as well as to healthy people. Breathing O_3 can trigger a variety of health problems, including chest pain, coughing, throat irritation, and congestion. It can worsen bronchitis, emphysema, and asthma. Ground-level O_3 also can reduce lung function and inflame the linings of the lungs. Repeated exposure may permanently scar lung tissue. O_3 also affects sensitive vegetation and ecosystems, including forests, parks, wildlife refuges, and wilderness areas. In particular, O_3 harms sensitive vegetation during the growing season (South Coast AQMD 2005; US EPA 2023). The SoCAB is designated extreme nonattainment under the California AAQS (1-hour and 8-hour) and National AAQS (8-hour) (CARB 2023a).

Lead (Pb) is a metal found naturally in the environment as well as in manufactured products. Once taken into the body, lead distributes throughout the body in the blood and accumulates in the bones. Depending on the level of exposure, lead can adversely affect the nervous system, kidney function, immune system, reproductive and developmental systems, and the cardiovascular system. Lead exposure also affects the oxygen-carrying capacity of the blood. The effects of lead most commonly encountered in current populations are neurological effects in children and cardiovascular effects in adults (e.g., high blood pressure and heart disease). Infants and young children are especially sensitive to even low levels of lead, which may contribute to behavioral problems, learning deficits, and lowered IQ (South Coast AQMD 2005; USEPA 2018). The major sources of lead emissions have historically been mobile and industrial sources. As a result of the EPA's regulatory efforts to remove lead from gasoline, emissions of lead from the transportation sector dramatically declined by 95 percent between 1980 and 1999, and levels of lead in the air decreased by 94 percent between 1980 and 1999. Today, the highest levels of lead in air are usually found near lead smelters. The major sources of lead emissions today are ore and metals processing and piston-engine aircraft operating on leaded aviation gasoline. However, in 2008 the EPA and CARB adopted more strict lead standards, and special monitoring sites immediately downwind of lead sources recorded very localized violations of the new state and federal standards.[6] As a result of these violations, the Los Angeles County portion of the SoCAB is designated as nonattainment under the National AAQS for lead (South Coast AQMD 2012; CARB 2023a). However, lead concentrations in this nonattainment area have been below the level of the federal standard since December 2011 (South Coast AQMD 2012). CARB's State

5 CARB approved the South Coast AQMD's request to redesignate the SoCAB from serious nonattainment for PM_{10} to attainment for PM_{10} under the National AAQS on March 25, 2010, because the SoCAB did not violate federal 24-hour PM_{10} standards from 2004 to 2007. The EPA approved the State of California's request to redesignate the South Coast PM_{10} nonattainment area to attainment of the PM_{10} National AAQS, effective on July 26, 2013.

6 Source-oriented monitors record concentrations of lead at lead-related industrial facilities in the SoCAB, which include Exide Technologies in the City of Commerce; Quemetco, Inc., in the City of Industry; Trojan Battery Company in Santa Fe Springs; and Exide Technologies in Vernon. Monitoring conducted between 2004 through 2007 showed that the Trojan Battery Company and Exide Technologies exceed the federal standards (South Coast AQMD 2012).

Implementation Plan (SIP) revision was submitted to the EPA for approval. Because emissions of lead are found only in projects that are permitted by South Coast AQMD, lead is not a pollutant of concern for the proposed project.

Toxic Air Contaminants

The public's exposure to air pollutants classified as toxic air contaminants (TACs) is a significant environmental health issue in California. In 1983, the California Legislature enacted a program to identify the health effects of TACs and to reduce exposure to these contaminants to protect the public health. The California Health and Safety Code defines a TAC as "an air pollutant which may cause or contribute to an increase in mortality or in serious illness, or which may pose a present or potential hazard to human health." A substance that is listed as a hazardous air pollutant (HAP) pursuant to Section 112(b) of the federal Clean Air Act (42 United States Code §7412[b]) is a toxic air contaminant. Under state law, the California Environmental Protection Agency (Cal/EPA), acting through CARB, is authorized to identify a substance as a TAC if it determines that the substance is an air pollutant that may cause or contribute to an increase in mortality or to an increase in serious illness, or may pose a present or potential hazard to human health.

California regulates TACs primarily through Assembly Bill (AB) 1807 (Tanner Air Toxics Act) and AB 2588 (Air Toxics "Hot Spot" Information and Assessment Act of 1987). The Tanner Air Toxics Act sets forth a formal procedure for CARB to designate substances as TACs. Once a TAC is identified, CARB adopts an "airborne toxics control measure" for sources that emit designated TACs. If there is a safe threshold for a substance (i.e., a point below which there is no toxic effect), the control measure must reduce exposure to below that threshold. If there is no safe threshold, the measure must incorporate toxics best available control technology to minimize emissions. To date, CARB has established formal control measures for 11 TACs, all of which are identified as having no safe threshold.

Air toxics from stationary sources are also regulated in California under the Air Toxics "Hot Spot" Information and Assessment Act of 1987. Under AB 2588, toxic air contaminant emissions from individual facilities are quantified and prioritized by the air quality management district or air pollution control district. High priority facilities are required to perform a health risk assessment and, if specific thresholds are exceeded, are required to communicate the results to the public in the form of notices and public meetings.

By the last update to the TAC list in December 1999, CARB had designated 244 compounds as TACs (CARB 2023d). Additionally, CARB has implemented control measures for a number of compounds that pose high risks and show potential for effective control. The majority of the estimated health risks from TACs can be attributed to relatively few compounds, the most important being particulate matter from diesel-fueled engines.

Diesel Particulate Matter

In 1998, CARB identified particulate emissions from diesel-fueled engines (diesel PM) as a TAC. Previously, the individual chemical compounds in diesel exhaust were considered TACs. Almost all diesel exhaust particle mass is 10 microns or less in diameter. Because of their extremely small size, these particles can be inhaled and eventually trapped in the bronchial and alveolar regions of the lung.

CARB has promulgated the following specific rules to limit TAC emissions:

- 13 CCR Chapter 10, Section 2485, Airborne Toxic Control Measure to Limit Diesel-Fueled Commercial Motor Vehicle Idling
- 13 CCR Chapter 10, Section 2480, Airborne Toxic Control Measure to Limit School Bus Idling and Idling at Schools
- 13 CCR Section 2477 and Article 8, Airborne Toxic Control Measure for In-Use Diesel-Fueled Transport Refrigeration Units (TRU) and TRU Generator Sets and Facilities Where TRUs Operate

Community Risk

In addition, to reduce exposure to TACs, CARB developed and approved the *Air Quality and Land Use Handbook: A Community Health Perspective* (2005) to provide guidance regarding the siting of sensitive land uses in the vicinity of freeways, distribution centers, rail yards, ports, refineries, chrome-plating facilities, dry cleaners, and gasoline-dispensing facilities. This guidance document was developed to assess compatibility and associated health risks when placing sensitive receptors near existing pollution sources. CARB's recommendations on the siting of new sensitive land uses were based on a compilation of recent studies that evaluated data on the adverse health effects from proximity to air pollution sources. The key observation in these studies is that proximity to air pollution sources substantially increases exposure and the potential for adverse health effects. There are three carcinogenic toxic air contaminants that constitute the majority of the known health risks from motor vehicle traffic, DPM from trucks, and benzene and 1,3-butadiene from passenger vehicles. CARB recommendations are based on data that show that localized air pollution exposures can be reduced by as much as 80 percent by following CARB minimum distance separations.

AIR QUALITY MANAGEMENT PLANNING

The South Coast AQMD is the agency responsible for improving air quality in the SoCAB and ensuring that the National and California AAQS are attained and maintained. South Coast AQMD is responsible for preparing the air quality management plan (AQMP) for the SoCAB in coordination with the Southern California Association of Governments (SCAG). Since 1979, a number of AQMPs have been prepared.

2022 AQMP

South Coast AQMD adopted the 2022 AQMP on December 2, 2022, which serves as an update to the 2017 AQMP. On October 1, 2015, the EPA strengthened the National AAQS for ground-level ozone, lowering the primary and secondary ozone standard levels to 70 parts per billion (ppb) (2015 Ozone National AAQS.). The SoCAB is currently classified as an "extreme" nonattainment for the 2015 Ozone National AAQS. Meeting the 2015 federal ozone standard requires reducing NO_x emissions, the key pollutant that creates ozone, by 67 percent more than is required by adopted rules and regulations in 2037. The only way to achieve the required NO_X reductions is through extensive use of zero emission (ZE) technologies across all stationary and mobile sources. South Coast AQMD's primary authority is over stationary sources which account for approximately 20 percent of NO_x emissions. The overwhelming majority of NO_X emissions are from heavy-duty trucks, ships and other State and federally regulated mobile sources that are mostly beyond the South Coast AQMD's control. The region will not meet the standard absent significant federal action. In addition to federal action, the 2022 AQMP requires substantial reliance on future deployment of advanced technologies to meet the standard. The control strategy for the 2022 AQMP includes aggressive new regulations and the development of incentive programs to support early deployment of advanced technologies. The two key areas for incentive programs are (1) promoting widespread deployment of available ZE and low-NO_X technologies and (2) developing new ZE and ultra-low NO_x technologies for use in cases where the technology is not currently available. South Coast AQMD is prioritizing distribution of incentive funding in Environmental Justice areas and seeking opportunities to focus benefits on the most disadvantaged communities (South Coast AQMD 2022).

Lead State Implementation Plan

In 2008, EPA designated the Los Angeles County portion of the SoCAB nonattainment under the federal lead (Pb) classification due to the addition of source-specific monitoring under the new federal regulation. This designation was based on two source-specific monitors in Vernon and the City of Industry exceeding the new standard. The rest of the SoCAB, outside the Los Angeles County nonattainment area remains in attainment of the new standard. On May 24, 2012, CARB approved the SIP revision for the federal lead standard, which the EPA revised in 2008. Lead concentrations in this nonattainment area have been below the level of the federal standard since December 2011. The SIP revision was submitted to EPA for approval.

South Coast AQMD PM2.5 Redesignation Request and Maintenance Plan

In 1997, the EPA adopted the 24-hour fine $PM_{2.5}$ standard of 65 micrograms per cubic meter ($\mu g/m^3$). In 2006, this standard was lowered to a more health-protective level of 35 $\mu g/m^3$. The SoCAB is designated nonattainment for both the 65 and 35 $\mu g/m^3$ 24-hour $PM_{2.5}$ standards (24-hour $PM_{2.5}$ standards). In 2020, monitored data demonstrated that the SoCAB attained both 24-hour $PM_{2.5}$ standards. The South Coast AQMD has developed the 2021 Redesignation Request and Maintenance Plan for the 1997 and 2006 24-hour $PM_{2.5}$ Standards demonstrating that the SoCAB has met the requirements to be redesignated to attainment for the 24-hour $PM_{2.5}$ standards (South Coast AQMD 2021b).

AB 617, Community Air Protection Program

Assembly Bill (AB) 617 (C. Garcia, Chapter 136, Statutes of 2017) requires local air districts to monitor and implement air pollution control strategies that reduce localized air pollution in communities that bear the greatest burdens. In response to AB 617, CARB has established the Community Air Protection Program.

Air districts are required to host workshops to help identify disadvantaged communities disproportionately affected by poor air quality. Once the criteria for identifying the highest priority locations have been identified and the communities have been selected, new community monitoring systems would be installed to track and monitor community-specific air pollution goals. In 2018 CARB prepared an air monitoring plan (Community Air Protection Blueprint), that evaluates the availability and effectiveness of air monitoring technologies and existing community air monitoring networks. Under AB 617, the Blueprint is required to be updated every five years.

Under AB 617, CARB is also required to prepare a statewide strategy to reduce TACs and criteria pollutants in impacted communities; provide a statewide clearinghouse for best available retrofit control technology; adopt new rules requiring the latest best available retrofit control technology for all criteria pollutants for which an area has not achieved attainment of California AAQS; and provide uniform, statewide reporting of emissions inventories. Air districts are required to adopt a community emissions reduction program to achieve reductions for the communities impacted by air pollution that CARB identifies.

Existing Conditions

CLIMATE/METEOROLOGY

South Coast Air Basin

The project site lies in the South Coast Air Basin (SoCAB), which includes all of Orange County and the non-desert portions of Los Angeles, Riverside, and San Bernardino Counties. The SoCAB is in a coastal plain with connecting broad valleys and low hills and is bounded by the Pacific Ocean in the southwest quadrant, with high mountains forming the remainder of the perimeter. The general region lies in the semi-permanent high-pressure zone of the eastern Pacific. As a result, the climate is mild, tempered by cool sea breezes. This usually mild weather pattern is interrupted infrequently by periods of extremely hot weather, winter storms, and Santa Ana winds (South Coast AQMD 2005).

Temperature and Precipitation

The annual average temperature varies little throughout the SoCAB, ranging from the low to middle 60s, measured in degrees Fahrenheit (°F). With a more pronounced oceanic influence, coastal areas show less variability in annual minimum and maximum temperatures than inland areas. The lowest average temperature is reported at 47.4°F in December, and the highest average temperature is 84.5°F in August (USA.Com 2023).

In contrast to a very steady pattern of temperature, rainfall is seasonally and annually highly variable. Almost all rain falls from October through April. Summer rainfall is normally restricted to widely scattered thundershowers near the coast, with slightly heavier shower activity in the east and over the mountains. Rainfall averages 14.58 inches per year in the vicinity of the area (USA.Com 2023).

Humidity

Although the SoCAB has a semiarid climate, the air near the earth's surface is typically moist because of the presence of a shallow marine layer. Except for infrequent periods when dry, continental air is brought into the SoCAB by offshore winds, the "ocean effect" is dominant. Periods of heavy fog, especially along the coast, are frequent. Low clouds, often referred to as high fog, are a characteristic climatic feature. Annual average humidity is 70 percent at the coast and 57 percent in the eastern portions of the (South Coast AQMD 2005).

Wind

Wind patterns across the south coastal region are characterized by westerly or southwesterly onshore winds during the day and by easterly or northeasterly breezes at night. Wind speed is somewhat greater during the dry summer months than during the rainy winter season.

Between periods of wind, periods of air stagnation may occur, both in the morning and evening hours. Air stagnation is one of the critical determinants of air quality conditions on any given day. During the winter and fall months, surface high-pressure systems over the SoCAB, combined with other meteorological conditions, can result in very strong, downslope Santa Ana winds. These winds normally continue a few days before predominant meteorological conditions are reestablished.

The mountain ranges to the east affect the transport and diffusion of pollutants by inhibiting their eastward transport. Air quality in the SoCAB generally ranges from fair to poor and is similar to air quality in most of coastal southern California. The entire region experiences heavy concentrations of air pollutants during prolonged periods of stable atmospheric conditions (South Coast AQMD 2005).

Inversions

In conjunction with the two characteristic wind patterns that affect the rate and orientation of horizontal pollutant transport, there are two similarly distinct types of temperature inversions that control the vertical depth through which pollutants are mixed. These are the marine/subsidence inversion and the radiation inversion. The combination of winds and inversions are critical determinants in leading to the highly degraded air quality in summer and the generally good air quality in the winter in the project area (South Coast AQMD 2005).

AREA DESIGNATIONS

The AQMP provides the framework for air quality basins to achieve attainment of the state and federal ambient air quality standards through the State Implementation Plan (SIP). Areas are classified as attainment or nonattainment areas for particular pollutants, depending on whether they meet ambient air quality standards. Severity classifications for ozone nonattainment range in magnitude from marginal, moderate, and serious to severe and extreme.

- **Unclassified:** a pollutant is designated unclassified if the data are incomplete and do not support a designation of attainment or nonattainment.
- **Attainment:** a pollutant is in attainment if the CAAQS for that pollutant was not violated at any site in the area during a three-year period.
- **Nonattainment:** a pollutant is in nonattainment if there was at least one violation of a state AAQS for that pollutant in the area.

- **Nonattainment/Transitional:** a subcategory of the nonattainment designation. An area is designated nonattainment/transitional to signify that the area is close to attaining the AAQS for that pollutant.

The attainment status for the SoCAB is shown in Table 2, *Attainment Status of Criteria Pollutants in the South Coast Air Basin*.

Table 2 Attainment Status of Criteria Pollutants in the South Coast Air Basin

Pollutant	State	Federal
Ozone – 1-hour	Extreme Nonattainment	No Federal Standard
Ozone – 8-hour	Extreme Nonattainment	Extreme Nonattainment
PM_{10}	Serious Nonattainment	Attainment
$PM_{2.5}$	Nonattainment	Nonattainment[2]
CO	Attainment	Attainment
NO_2	Nonattainment (SR-60 Near Road only)[1]	Attainment/Maintenance
SO_2	Attainment	Attainment
Lead	Attainment	Nonattainment (Los Angeles County only)[3]
All others	Attainment/Unclassified	Attainment/Unclassified

Source: CARB 2023c.

1 On February 21, 2019, CARB's Board approved the separation of the area that runs along State Route 60 corridor through portions of Riverside, San Bernardino, and Los Angeles counties from the remainder of the SoCAB for State nonattainment designation purposes. The Board designated this corridor as nonattainment. The remainder of the SoCAB remains in attainment for NO_2 (CARB 2019). CARB is proposing to redesignate SR-60 Near-Road Portion of San Bernardino, Riverside, and Los Angeles Counties in the SoCAB as attainment for NO_2 at the February 24, 2022 Board Hearing (CARB 2023c).

2 The SoCAB is pending a resignation request from nonattainment to attainment for the 24-hour federal $PM_{2.5}$ standards. The 2021 $PM_{2.5}$ Redesignation Request and Maintenance Plan demonstrates that the South Coast meets the requirements of the CAA to allow US EPA to redesignate the SoCAB to attainment for the 65 $\mu g/m^3$ and 35 $\mu g/m^3$ 24-hour $PM_{2.5}$ standards. CARB will submit the 2021 $PM_{2.5}$ Redesignation Request to the US EPA as a revision to the California SIP (CARB 2021).

3 In 2010, the Los Angeles portion of the SoCAB was designated nonattainment for lead under the new 2008 federal AAQS as a result of large industrial emitters. Remaining areas in the SoCAB are unclassified.

EXISTING AMBIENT AIR QUALITY

Existing levels of ambient air quality and historical trends and projections in the vicinity of the project site are best documented by measurements taken by the South Coast AQMD. The project site is located within Source Receptor Area (SRA) 17: Central Orange County. The air quality monitoring station closest to the proposed project is the Anaheim-Pampas Lane Monitoring Station, which is one of 31 monitoring stations South Coast AQMD operates and maintains within the SoCAB.[7] Data from this station includes O_3, $PM_{2.5}$, NO_2 and PM_{10} and is summarized in Table 3, *Ambient Air Quality Monitoring Summary*. The data show that the area regularly exceeds the state and federal one-hour and eight-hour O_3 standards, the state PM_{10} standards, and the federal $PM_{2.5}$ standards.

7 Locations of the SRAs and monitoring stations are shown here: http://www.aqmd.gov/docs/default-source/default-document-library/map-of-monitoring-areas.pdf.

Table 3 Ambient Air Quality Monitoring Summary

Pollutant/Standard	Number of Days Threshold Were Exceeded and Maximum Levels during Such Violations[1,2] 2017	2018	2019	2020	2021
Ozone (O_3)					
State 1-Hour ≥ 0.09 ppm (days exceed threshold)	0	1	1	6	0
State & Federal 8-hour ≥ 0.070 ppm (days exceed threshold)	4	1	1	15	0
Max. 1-Hour Conc. (ppm)	0.090	0.112	0.096	0.142	0.089
Max. 8-Hour Conc. (ppm)	0.076	0.071	0.082	0.097	0.068
Nitrogen Dioxide (NO_2)					
State 1-Hour ≥ 0.18 ppm (days exceed threshold)	0	0	0	0	0
Max. 1-Hour Conc. (ppb)	0.0812	0.0660	0.0594	0.0709	0.0671
Coarse Particulates (PM_{10})					
State 24-Hour > 50 μg/m^3 (days exceed threshold)	5	2	4	5	1
Federal 24-Hour > 150 μg/m^3 (days exceed threshold)	0	0	0	0	0
Max. 24-Hour Conc. (μg/m^3)	95.7	94.6	127.6	74.8	63.6
Fine Particulates ($PM_{2.5}$)					
Federal 24-Hour > 35 μg/m^3 (days exceed threshold)	8	7	4	12	10
Max. 24-Hour Conc. (μg/m^3)	53.9	63.1	36.1	60.2	54.4

Source: CARB 2023b.
Notes: ppm = parts per million; ppb = parts per billion; μg/m^3 = micrograms per cubic meter; * = Data not available
[1] Data for O_3, $PM_{2.5}$, NO_2 and PM_{10} obtained from the Anaheim-Pampas Lane Monitoring Station.
[2] Most recent data available as of May 2023.

MULTIPLE AIR TOXICS EXPOSURE STUDY V

The Multiple Air Toxics Exposure Study (MATES) is a monitoring and evaluation study on existing ambient concentrations of TACs and the potential health risks from air toxics in the SoCAB. In April 2021, South Coast AQMD released the latest update to the MATES study, MATES V. The first MATES analysis, MATES I, began in 1986 but was limited because of the technology available at the time. Conducted in 1998, MATES II was the first MATES iteration to include a comprehensive monitoring program, an air toxics emissions inventory, and a modeling component. MATES III was conducted in 2004 to 2006, with MATES IV following in 2012 to 2013.

MATES V uses measurements taken during 2018 and 2019, with a comprehensive modeling analysis and emissions inventory based on 2018 data. The previous MATES studies quantified the cancer risks based on the inhalation pathway only. MATES V includes information on the chronic noncancer risks from inhalation and non-inhalation pathways for the first time. Cancer risks and chronic noncancer risks from MATES II through IV measurements have been re-examined using current Office of Environmental Health Hazards Assessment (OEHHA) and CalEPA risk assessment methodologies and modern statistical methods to examine the trends over time.

The MATES V study showed that cancer risk in the SoCAB decreased to 454 in a million from 997 in a million in the MATES IV study. Overall, air toxics cancer risk in the SoCAB decreased by 54 percent since 2012 when MATES IV was conducted. MATES V showed the highest risk locations near the Los Angeles International Airport and the Ports of Long Beach and Los Angeles. Diesel particulate matter continues to be the major contributor to air toxics cancer risk (approximately 72 percent of the total cancer risk). Goods movement and transportation corridors have the highest cancer risk. Transportation sources account for 88 percent of carcinogenic air toxics emissions, and the remainder is from stationary sources, which include large industrial operations such as refineries and power plants as well as smaller businesses such as gas stations and chrome-plating facilities. (South Coast AQMD 2021a).

SENSITIVE RECEPTORS

Some land uses are considered more sensitive to air pollution than others due to the types of population groups or activities involved. Sensitive population groups include children, the elderly, the acutely ill, and the chronically ill, especially those with cardio-respiratory diseases.

Residential areas are also considered to be sensitive receptors to air pollution because residents (including children and the elderly) tend to be at home for extended periods of time, resulting in sustained exposure to any pollutants present. Schools are also considered sensitive receptors, as children are present for extended durations and engage in regular outdoor activities. Recreational land uses are considered moderately sensitive to air pollution. Although exposure periods are generally short, exercise places a high demand on respiratory functions, which can be impaired by air pollution. In addition, noticeable air pollution can detract from the enjoyment of recreation. Industrial and commercial areas are considered the least sensitive to air pollution. Exposure periods are relatively short and intermittent, as the majority of the workers tend to stay indoors most of the time. In addition, the working population is generally the healthiest segment of the public. The nearest offsite sensitive receptors are the single-family residences along El Dorado Way to the southeast, Fenley Drive to the north, Humbolt Street to the east of the project site. The nearest onsite sensitive receptors are the students and staff attending Los Alamitos High School (LAHS) campus during construction period.

Thresholds of Significance

The analysis of the proposed project's air quality impacts follows the guidance and methodologies recommended in South Coast AQMD's *CEQA Air Quality Handbook* and the significance thresholds on South Coast AQMD's website (South Coast AQMD 1993). CEQA allows the significance criteria established by the applicable air quality management or air pollution control district to be used to assess impacts of a project on air quality. South Coast AQMD has established thresholds of significance for regional air quality emissions for construction activities and project operation. In addition to the daily thresholds listed above, projects are also subject to the AAQS. These are addressed though an analysis of localized CO impacts and localized significance thresholds (LSTs).

REGIONAL SIGNIFICANCE THRESHOLDS

The South Coast AQMD has adopted regional construction and operational emissions thresholds to determine a project's cumulative impact on air quality in the SoCAB. Table 4, *South Coast AQMD Significance Thresholds*, lists South Coast AQMD's regional significance thresholds that are applicable for all projects uniformly regardless of size or scope. There is growing evidence that although ultrafine particulates contribute a very small portion of the overall atmospheric mass concentration, they represent a greater proportion of the health risk from PM. However, the EPA or CARB have not yet adopted AAQS to regulate ultrafine particulates; therefore, South Coast AQMD has not developed thresholds for them.

Table 4 South Coast AQMD Significance Thresholds

Air Pollutant	Construction Phase	Operational Phase
Reactive Organic Gases (ROGs)/ Volatile Organic Compounds (VOCs)	75 lbs/day	55 lbs/day
Nitrogen Oxides (NO_X)	100 lbs/day	55 lbs/day
Carbon Monoxide (CO)	550 lbs/day	550 lbs/day
Sulfur Oxides (SO_X)	150 lbs/day	150 lbs/day
Particulates (PM_{10})	150 lbs/day	150 lbs/day
Particulates ($PM_{2.5}$)	55 lbs/day	55 lbs/day

Source: South Coast AQMD 2023.

Projects that exceed the regional significance threshold contribute to the nonattainment designation of the SoCAB. The attainment designations are based on the AAQS, which are set at levels of exposure that are determined to not result in adverse health. Exposure to fine particulate pollution and ozone causes myriad health impacts, particularly to the respiratory and cardiovascular systems:

- Linked to increased cancer risk ($PM_{2.5}$, TACs)
- Aggravates respiratory disease (O_3, $PM_{2.5}$)
- Increases bronchitis (O_3, $PM_{2.5}$)
- Causes chest discomfort, throat irritation, and increased effort to take a deep breath (O_3)
- Reduces resistance to infections and increases fatigue (O_3)
- Reduces lung growth in children ($PM_{2.5}$)
- Contributes to heart disease and heart attacks ($PM_{2.5}$)
- Contributes to premature death (O_3, $PM_{2.5}$)
- Linked to lower birth weight in newborns ($PM_{2.5}$) (South Coast AQMD 2015a)

Exposure to fine particulates and ozone aggravates asthma attacks and can amplify other lung ailments such as emphysema and chronic obstructive pulmonary disease. Exposure to current levels of $PM_{2.5}$ is responsible for an estimated 4,300 cardiopulmonary-related deaths per year in the SoCAB. In addition, University of Southern California scientists responsible for a landmark children's health study found that lung growth improved as air pollution declined for children aged 11 to 15 in five communities in the SoCAB (South Coast AQMD 2015b).

South Coast AQMD is the primary agency responsible for ensuring the health and welfare of sensitive individuals exposed to elevated concentrations of air pollutants in the SoCAB and has established thresholds that would be protective of these individuals. To achieve the health-based standards established by the EPA, South Coast AQMD prepares an AQMP that details regional programs to attain the AAQS. Mass emissions thresholds shown in Table 4 are not correlated with concentrations of air pollutants but contribute to the cumulative air quality impacts in the SoCAB. These thresholds are based on the trigger levels for the federal

New Source Review Program, which was created to ensure projects are consistent with attainment of health-based federal AAQS. Regional emissions from a single project do not trigger a regional health impact, and it is speculative to identify how many more individuals in the air basin would be affected by the health effects listed previously. Projects that do not exceed the South Coast AQMD regional significance thresholds in Table 4 would not violate any air quality standards or contribute substantially to an existing or projected air quality violation.

If projects exceed the emissions levels presented in Table 4, then those emissions would cumulatively contribute to the nonattainment status of the air basin and would contribute to elevating health effects associated with these criteria air pollutants. Known health effects related to ozone include worsening of bronchitis, asthma, and emphysema and a decrease in lung function. Health effects associated with particulate matter include premature death of people with heart or lung disease, nonfatal heart attacks, irregular heartbeat, decreased lung function, and increased respiratory symptoms. Reducing emissions would contribute to reducing possible health effects related to criteria air pollutants. However, for projects that exceed the emissions in Table 4, it is speculative to determine how exceeding the regional thresholds would affect the number of days the region is in nonattainment, because mass emissions are not correlated with concentrations of emissions or how many additional individuals in the air basin would be affected by the health effects cited previously.

South Coast AQMD has not provided methodology to assess the specific correlation between mass emissions generated and the effect on health to address the issue raised in *Sierra Club v. County of Fresno* (Friant Ranch, L.P.) (2018) 6 Cal.5th 502, Case No. S21978. South Coast AQMD currently does not have methodologies that would provide the District with a consistent, reliable, and meaningful analysis to correlate specific health impacts that may result from a Proposed Project's mass emissions.[8] Ozone concentrations are dependent on a variety of complex factors, including the presence of sunlight and precursor pollutants, natural topography, nearby structures that cause building downwash, atmospheric stability, and wind patterns. Because of the complexities of predicting ground-level ozone concentrations in relation to the National and California AAQS, and the absence of modeling tools that could provide statistically valid data and meaningful additional information regarding health effects from criteria air pollutants generated by individual projects, it is not possible to link specific health risks to the magnitude of emissions exceeding the significance thresholds. However, if a project in the SoCAB exceeds the regional significance thresholds, the project could contribute to an increase in health effects in the basin until the attainment standards are met in the SoCAB.

[8] In April 2019, the Sacramento Metropolitan Air Quality Management District (SMAQMD) published an Interim Recommendation on implementing Sierra Club v. County of Fresno (2018) 6 Cal.5th 502 ("Friant Ranch") in the review and analysis of proposed projects under CEQA in Sacramento County. Consistent with the expert opinions submitted to the court in Friant Ranch by the San Joaquin Valley Air Pollution Control District (SJVAPCD) and South Coast AQMD, the SMAQMD guidance confirms the absence of an acceptable or reliable quantitative methodology that would correlate the expected criteria air pollutant emissions of projects to likely health consequences for people from project-generated criteria air pollutant emissions. The SMAQMD guidance explains that while it is in the process of developing a methodology to assess these impacts, lead agencies should follow the Friant Court's advice to explain in meaningful detail why this analysis is not yet feasible. Since this interim memorandum SMAQMD has provided methodology to address health impacts. However, a similar analysis is not available for projects within the South Coast AQMD region.

CO HOTSPOTS

Areas of vehicle congestion have the potential to create pockets of CO called hot spots. These pockets have the potential to exceed the state one-hour standard of 20 ppm or the eight-hour standard of 9 ppm. Because CO is produced in greatest quantities from vehicle combustion and does not readily disperse into the atmosphere, adherence to ambient air quality standards is typically demonstrated through an analysis of localized CO concentrations. Hot spots are typically produced at intersections, where traffic congestion is highest because vehicles queue for longer periods and are subject to reduced speeds. With the turnover of older vehicles, introduction of cleaner fuels, and implementation of control technology on industrial facilities, CO concentrations in the SoCAB and in the state have steadily declined.

In 2007, the SoCAB was designated in attainment for CO under both the California AAQS and National AAQS. The CO hotspot analysis conducted for the attainment by the South Coast AQMD for busiest intersections in Los Angeles during the peak morning and afternoon periods plan did not predict a violation of CO standards.[9] As identified in the South Coast AQMD's 2003 AQMP and the 1992 Federal Attainment Plan for Carbon Monoxide (1992 CO Plan), peak carbon monoxide concentrations in the SoCAB in previous years, prior to redesignation, were a result of unusual meteorological and topographical conditions and not a result of congestion at a particular intersection. Under existing and future vehicle emission rates, a project would have to increase traffic volumes at a single intersection to more than 44,000 vehicles per hour—or 24,000 vehicles per hour where vertical and/or horizontal air does not mix—in order to generate a significant CO impact (BAAQMD 2023).

LOCALIZED SIGNIFICANCE THRESHOLDS

The South Coast AQMD developed LSTs for emissions of NO_2, CO, PM_{10}, and $PM_{2.5}$ generated at the project site (offsite mobile-source emissions are not included in the LST analysis). LSTs represent the maximum emissions at a project site that are not expected to cause or contribute to an exceedance of the most stringent federal or state AAQS and are shown in Table 5, *South Coast AQMD Localized Significance Thresholds*.

[9] The four intersections were: Long Beach Boulevard and Imperial Highway; Wilshire Boulevard and Veteran Avenue; Sunset Boulevard and Highland Avenue; and La Cienega Boulevard and Century Boulevard. The busiest intersection evaluated (Wilshire and Veteran) had a daily traffic volume of approximately 100,000 vehicles per day with LOS E in the morning peak hour and LOS F in the evening peak hour.

Table 5 South Coast AQMD Localized Significance Thresholds

Air Pollutant (Relevant AAQS)	Concentration
1-Hour CO Standard (CAAQS)	20 ppm
8-Hour CO Standard (CAAQS)	9.0 ppm
1-Hour NO_2 Standard (CAAQS)	0.18 ppm
Annual NO_2 Standard (CAAQS)	0.03 ppm
24-Hour PM_{10} Standard – Construction (South Coast AQMD)[1]	10.4 μg/m^3
24-Hour $PM_{2.5}$ Standard – Construction (South Coast AQMD)[1]	10.4 μg/m^3
24-Hour PM_{10} Standard – Operation (South Coast AQMD)[1]	2.5 μg/m^3
24-Hour $PM_{2.5}$ Standard – Operation (South Coast AQMD)[1]	2.5 μg/m^3

Source: South Coast AQMD 2023.
ppm – parts per million; μg/m^3 – micrograms per cubic meter
1 Threshold is based on South Coast AQMD Rule 403. Since the SoCAB is in nonattainment for PM_{10} and $PM_{2.5}$, the threshold is established as an allowable change in concentration. Therefore, background concentration is irrelevant.

To assist lead agencies, South Coast AQMD developed screening-level LSTs to back-calculate the mass amount (lbs. per day) of emissions generated onsite that would trigger the levels shown in Table 5 for projects under 5-acres. These "screening-level" LSTs tables are the localized significance thresholds for all projects of five acres and less; however, it can be used as screening criteria for larger projects to determine whether or not dispersion modeling may be required to compare concentrations of air pollutants generated by the project to the localized concentrations shown in Table 5.

In accordance with South Coast AQMD's LST methodology, the screening-level construction LSTs are based on the acreage disturbed per day based on equipment use. The screening-level construction LSTs for the project site in SRA 17 are shown in Table 6, *South Coast AQMD Screening-Level Localized Significance Thresholds,* for sensitive receptors within 82 feet for NO_X and CO and 270 feet for PM_{10} and $PM_{2.5}$.

Table 6 South Coast AQMD Screening-Level Localized Significance Thresholds

	Threshold (lbs/day)[1]			
Acreage Disturbed	Nitrogen Oxides (NO_X)	Carbon Monoxide (CO)	Coarse Particulates (PM_{10})	Fine Particulates ($PM_{2.5}$)
<u><</u>1.00 Acres Disturbed Per Day	81	485	22.33	7.23
1.40 Acres Disturbed Per Day	95	577	25.13	8.03

Source: South Coast AQMD 2008 and 2011.
1 . LSTs are based on sensitive receptors within 82 ft receptor for NO_X and CO and 270 ft receptor for PM_{10} and $PM_{2.5}$ of the project site in Source Receptor Area (SRA) 17.

HEALTH RISK

Whenever a project would require use of chemical compounds that have been identified in South Coast AQMD Rule 1401, placed on CARB's air toxics list pursuant to AB 1807, or placed on the EPA's National Emissions Standards for Hazardous Air Pollutants, a health risk assessment is required by the South Coast AQMD. Table 7, *South Coast AQMD Toxic Air Contaminants Incremental Risk Thresholds*, lists the TAC incremental risk thresholds for operation of a project. The type of land uses that typically generate substantial quantities of criteria air pollutants and TACs from operations include industrial (stationary sources) and warehousing (truck idling) land uses (CARB 2005). School uses do not use substantial quantities of TACs, thus these thresholds are typically applied to new industrial projects only. Additionally, the purpose of this environmental evaluation is to identify the significant effects of the proposed project on the environment, not the significant effects of the environment on the proposed project (*California Building Industry Association v. Bay Area Air Quality Management District* (2015) 62 Cal.4th 369 (Case No. S213478)).

Table 7 South Coast AQMD Toxic Air Contaminants Incremental Risk Thresholds

Maximum Incremental Cancer Risk	≥ 10 in 1 million
Hazard Index (project increment)	≥ 1.0
Cancer Burden in areas ≥ 1 in 1 million	> 0.5 excess cancer cases

Source: South Coast AQMD 2023.

GREENHOUSE GAS EMISSIONS

Scientists have concluded that human activities are contributing to global climate change by adding large amounts of heat-trapping gases, known as GHG, to the atmosphere. Climate change is the variation of Earth's climate over time, whether due to natural variability or as a result of human activities. The primary source of these GHG is fossil fuel use. The Intergovernmental Panel on Climate Change (IPCC) has identified four major GHG—water vapor,[10] carbon (CO_2), methane (CH_4), and ozone (O_3)—that are the likely cause of an increase in global average temperatures observed within the 20th and 21st centuries. Other GHG identified by the IPCC that contribute to global warming to a lesser extent include nitrous oxide (N_2O), sulfur hexafluoride (SF_6), hydrofluorocarbons, perfluorocarbons, and chlorofluorocarbons (IPCC 2001).[11] The major GHG are briefly described below.

- **Carbon dioxide (CO_2)** enters the atmosphere through the burning of fossil fuels (oil, natural gas, and coal), solid waste, trees and wood products, and respiration, and also as a result of other chemical reactions (e.g. manufacture of cement). Carbon dioxide is removed from the atmosphere (sequestered) when it is absorbed by plants as part of the biological carbon cycle.

- **Methane (CH_4)** is emitted during the production and transport of coal, natural gas, and oil. Methane emissions also result from livestock and other agricultural practices and from the decay of organic waste in municipal landfills and water treatment facilities.

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10 Water vapor (H_2O) is the strongest GHG and the most variable in its phases (vapor, cloud droplets, ice crystals). However, water vapor is not considered a pollutant, but part of the feedback loop rather than a primary cause of change.

11 Black carbon contributes to climate change both directly, by absorbing sunlight, and indirectly, by depositing on snow (making it melt faster) and by interacting with clouds and affecting cloud formation. Black carbon is the most strongly light-absorbing component of particulate matter (PM) emitted from burning fuels such as coal, diesel, and biomass. Reducing black carbon emissions globally can have immediate economic, climate, and public health benefits. California has been an international leader in reducing emissions of black carbon, with close to 95 percent control expected by 2020 due to existing programs that target reducing PM from diesel engines and burning activities (CARB 2017a). However, state and national GHG inventories do not yet include black carbon due to ongoing work resolving the precise global warming potential of black carbon. Guidance for CEQA documents does not yet include black carbon.

- **Nitrous oxide (N_2O)** is emitted during agricultural and industrial activities as well as during combustion of fossil fuels and solid waste.

- **Fluorinated gases** are synthetic, strong GHGs that are emitted from a variety of industrial processes. Fluorinated gases are sometimes used as substitutes for ozone-depleting substances. These gases are typically emitted in smaller quantities, but because they are potent GHGs, they are sometimes referred to as high global-warming-potential (GWP) gases.

  - ***Chlorofluorocarbons (CFCs***) are GHGs covered under the 1987 Montreal Protocol and used for refrigeration, air conditioning, packaging, insulation, solvents, or aerosol propellants. Since they are not destroyed in the lower atmosphere (troposphere, stratosphere), CFCs drift into the upper atmosphere where, given suitable conditions, they break down ozone. These gases are also ozone-depleting gases and are therefore being replaced by other compounds that are GHGs covered under the Kyoto Protocol.

  - ***Perfluorocarbons (PFCs)*** are a group of human-made chemicals composed of carbon and fluorine only. These chemicals (predominantly perfluoromethane [CF_4] and perfluoroethane [C_2F_6]) were introduced as alternatives, along with HFCs, to the ozone-depleting substances. In addition, PFCs are emitted as by-products of industrial processes and are used in manufacturing. PFCs do not harm the stratospheric ozone layer, but they have a high global warming potential.

  - ***Sulfur Hexafluoride (SF_6)*** is a colorless gas soluble in alcohol and ether, slightly soluble in water. SF_6 is a strong GHG used primarily in electrical transmission and distribution systems as an insulator.

  - ***Hydrochlorofluorocarbons (HCFCs)*** contain hydrogen, fluorine, chlorine, and carbon atoms. Although ozone-depleting substances, they are less potent at destroying stratospheric ozone than CFCs. They have been introduced as temporary replacements for CFCs and are also GHGs.

  - ***Hydrofluorocarbons (HFCs)*** contain only hydrogen, fluorine, and carbon atoms. They were introduced as alternatives to ozone-depleting substances to serve many industrial, commercial, and personal needs. HFCs are emitted as by-products of industrial processes and are also used in manufacturing. They do not significantly deplete the stratospheric ozone layer, but they are strong GHGs (IPCC 2001; USEPA 2023b).

GHGs are dependent on the lifetime or persistence of the gas molecule in the atmosphere. Some GHGs have stronger greenhouse effects than others. These are referred to as high GWP gases. The GWP of GHG emissions are shown in Table 8, *GHG Emissions and Their Relative Global Warming Potential Compared to CO_2*. The GWP is used to convert GHGs to CO_2-equivalence (CO_2e) to show the relative potential that different GHGs have to retain infrared radiation in the atmosphere and contribute to the greenhouse effect. For example, under IPCC's Fourth Assessment Report (AR4) GWP values for CH_4, a project that generates 10 MT of CH_4 would be equivalent to 250 MT of CO_2.[12]

Table 8 GHG Emissions and Their Relative Global Warming Potential Compared to CO_2

GHGs	Second Assessment Report (SAR) Global Warming Potential Relative to CO_2[1]	Fourth Assessment Report (AR4) Global Warming Potential Relative to CO_2[1]	Fifth Assessment Report (AR5) Global Warming Potential Relative to CO_2[1]
Carbon Dioxide (CO_2)	1	1	1
Methane[2] (CH_4)	21	25	28
Nitrous Oxide (N_2O)	310	298	265

Source: IPCC 1995, 2007, 2013.

Notes: The IPCC published updated GWP values in its Fifth Assessment Report (AR5) that reflect new information on atmospheric lifetimes of GHGs and an improved calculation of the radiative forcing of CO_2. However, GWP values identified in AR4 are used by South Coast AQMD to maintain consistency in statewide GHG emissions modeling. In addition, the 2017 Scoping Plan Update was based on the GWP values in AR4.

1 Based on 100-year time horizon of the GWP of the air pollutant compared to CO_2.

2 The methane GWP includes direct effects and indirect effects due to the production of tropospheric ozone and stratospheric water vapor. The indirect effect due to the production of CO_2 is not included.

GHG Regulatory Setting

REGULATION OF GHG EMISSIONS ON A NATIONAL LEVEL

The US Environmental Protection Agency (EPA) announced on December 7, 2009, that GHG emissions threaten the public health and welfare of the American people and that GHG emissions from on-road vehicles contribute to that threat. The EPA's final findings respond to the 2007 U.S. Supreme Court decision that GHG emissions fit within the Clean Air Act definition of air pollutants. The findings do not in and of themselves impose any emission reduction requirements but allow the EPA to finalize the GHG standards proposed in 2009 for new light-duty vehicles as part of the joint rulemaking with the Department of Transportation (USEPA 2009).

To regulate GHGs from passenger vehicles, EPA was required to issue an endangerment finding. The finding identifies emissions of six key GHGs—CO_2, CH_4, N_2O, hydrofluorocarbons, perfluorocarbons, and SF_6—that have been the subject of scrutiny and intense analysis for decades by scientists in the United States and around the world. The first three are applicable to the project's GHG emissions inventory because they constitute the majority of GHG emissions and, per South Coast AQMD guidance, are the GHG emissions that should be evaluated as part of a project's GHG emissions inventory.

US Mandatory Report Rule for GHGs (2009)

In response to the endangerment finding, the EPA issued the Mandatory Reporting of GHG Rule that requires substantial emitters of GHG emissions (large stationary sources, etc.) to report GHG emissions data. Facilities that emit 25,000 MT or more of CO_2 per year are required to submit an annual report.

12 The global warming potential of a GHG is dependent on the lifetime, or persistence, of the gas molecule in the atmosphere.

Update to Corporate Average Fuel Economy Standards (2021 to 2026)

The federal government issued new Corporate Average Fuel Economy (CAFE) standards in 2012 for model years 2017 to 2025, which required a fleet average of 54.5 miles per gallon in 2025. On March 30, 2020, the EPA finalized an updated CAFE and GHG emissions standards for passenger cars and light trucks and established new standards covering model years 2021 through 2026, known as the Safer Affordable Fuel Efficient (SAFE) Vehicles Final Rule for Model Years 2021 to 2026. Under SAFE, the fuel economy standards will increase 1.5 percent per year compared to the 5 percent per year under the CAFE standards established in 2012. Overall, SAFE requires a fleet average of 40.4 MPG for model year 2026 vehicles (85 Federal Register 24174 (April 30, 2020)).

On December 21, 2021, under direction of Executive Order (EO) 13990 issued by President Biden, the National Highway Traffic Safety Administration repealed Safer Affordable Fuel Efficient Vehicles Rule Part One, which had preempted state and local laws related to fuel economy standards. In addition, on March 31, 2022, the National Highway Traffic Safety Administration finalized new fuel standards in response to EO 13990. Fuel efficiency under the standards proposed will increase 8 percent annually for model years 2024 to 2025 and 10 percent annual for model year 2026. Overall, the new CAFE standards require a fleet average of 49 MPG for passenger vehicles and light trucks for model year 2026, which would be a 10 MPG increase relative to model year 2021 (NHTSA 2022).

EPA Regulation of Stationary Sources under the Clean Air Act (Ongoing)

Pursuant to its authority under the Clean Air Act, the EPA has developed regulations for new, large, stationary sources of emissions, such as power plants and refineries. Under former President Obama's 2013 Climate Action Plan, the EPA was directed to develop regulations for existing stationary sources as well. On June 19, 2019, the EPA issued the final Affordable Clean Energy (ACE) rule, which became effective on August 19, 2019. The ACE rule was crafted under the direction of President Trump's Energy Independence EO. It officially rescinded the Clean Power Plan rule issued during the Obama Administration and set emissions guidelines for states in developing plans to limit CO_2 emissions from coal-fired power plants. The Affordable Clean Energy rule was vacated by the United States Court of Appeals for the District of Columbia Circuit on January 19, 2021. The Biden Administration is assessing options on potential future regulations.

REGULATION OF GHG EMISSIONS ON A STATE LEVEL

Current State of California guidance and goals for reductions in GHG emissions are generally embodied in EO S-03-05 and EO B-30-15, EO B-55-18, Assembly Bill 32 (AB 32), Senate Bill 32 (SB 32), and SB 375.

Executive Order S-3-05

Executive Order S-3-05, signed June 1, 2005. Executive Order S-3-05 set the following GHG reduction targets for the State:

- 2000 levels by 2010
- 1990 levels by 2020

- 80 percent below 1990 levels by 2050

Assembly Bill 32, the Global Warming Solutions Act (2006)

AB 32 was passed by the California state legislature on August 31, 2006, to place the state on a course toward reducing its contribution of GHG emissions. AB 32 follows the 2020 tier of emissions reduction targets established in EO S-03-05. CARB prepared the 2008 Scoping Plan to outline a plan to achieve the GHG emissions reduction targets of AB 32.

Executive Order B-30-15

EO B-30-15, signed April 29, 2015, set a goal of reducing GHG emissions within the state to 40 percent of 1990 levels by year 2030. EO B-30-15 also directed CARB to update the Scoping Plan to quantify the 2030 GHG reduction goal for the state and requires state agencies to implement measures to meet the interim 2030 goal as well as the long-term goal for 2050 in EO S-03-05. It also requires the Natural Resources Agency to conduct triennial updates of the California adaption strategy, “Safeguarding California”, in order to ensure climate change is accounted for in state planning and investment decisions.

Senate Bill 32 and Assembly Bill 197

In September 2016, Governor Brown signed SB 32 and AB 197 into law, making the Executive Order goal for year 2030 into a statewide mandated legislative target. AB 197 established a joint legislative committee on climate change policies and requires the CARB to prioritize direction emissions reductions rather than the market-based cap-and-trade program for large stationary, mobile, and other sources.

Executive Order B-55-18

Executive Order B-55-18, signed September 10, 2018, set a goal “to achieve carbon neutrality as soon as possible, and no later than 2045, and achieve and maintain net negative emissions thereafter.” Executive Order B-55-18 directs CARB to work with relevant state agencies to ensure that future Scoping Plans identify and recommend measures to achieve the carbon neutrality goal. The goal of carbon neutrality by 2045 is in addition to other statewide goals, meaning that not only should emissions be reduced to 80 percent below 1990 levels by 2050, but that, by no later than 2045, the remaining emissions should be offset by equivalent net removals of CO_2e from the atmosphere, including through sequestration in forests, soils, and other natural landscapes.

Assembly Bill 1279

AB 1279, signed by Governor Newsom in September 2022, codified the carbon neutrality targets of EO B-55-18 for year 2045 and sets a new legislative target for year 2045 of 85 percent below 1990 levels for anthropogenic GHG emissions. SB 1279 also requires CARB to update the Scoping Plan to address these new targets.

2022 Climate Change Scoping Plan

CARB adopted the *2022 Scoping Plan for Achieving Carbon Neutrality* (2022 Scoping Plan) on December 15, 2022, which lays out a path to achieve carbon neutrality by 2045 or earlier and to reduce the State’s anthropogenic GHG emissions (CARB 2022). The Scoping Plan provides updates to the previously adopted

2017 Scoping Plan and addresses the carbon neutrality goals of EO B-55-18 (discussed below) and the ambitious GHG reduction target as directed by AB 1279. Previous Scoping Plans focused on specific GHG reduction targets for our industrial, energy, and transportation sectors—to meet 1990 levels by 2020, and then the more aggressive 40 percent below that for the 2030 target. The 2022 Scoping Plan updates the target of reducing anthropogenic emissions to 85 percent below 1990 levels by 2045. Carbon neutrality takes it one step further by expanding actions to capture and store carbon including through natural and working lands and mechanical technologies, while drastically reducing anthropogenic sources of carbon pollution at the same time.

The path forward was informed by the recent Sixth Assessment Report (AR6) of the IPCC and the measures would achieve 85 percent below 1990 levels by 2045 in accordance AB 1279. CARB's 2022 Scoping Plan identifies strategies as shown in Table 11, *Priority Strategies for Local Government Climate Action Plans*, that would be most impactful at the local level for ensuring substantial process towards the State's carbon neutrality goals.

Table 11 Priority Strategies for Local Government Climate Action Plans

Priority Area	Priority Strategies
Transportation Electrification	Convert local government fleets to zero-emission vehicles (ZEV) and provide EV charging at public sites.
	Create a jurisdiction-specific ZEV ecosystem to support deployment of ZEVs statewide (such as building standards that exceed state building codes, permit streamlining, infrastructure siting, consumer education, preferential parking policies, and ZEV readiness plans).
VMT Reduction	Reduce or eliminate minimum parking standards.
	Implement Complete Streets policies and investments, consistent with general plan circulation element requirements.
	Increase access to public transit by increasing density of development near transit, improving transit service by increasing service frequency, creating bus priority lanes, reducing or eliminating fares, microtransit, etc.
	Increase public access to clean mobility options by planning for and investing in electric shuttles, bike share, car share, and walking
	Implement parking pricing or transportation demand management pricing strategies.
	Amend zoning or development codes to enable mixed-use, walkable, transit-oriented, and compact infill development (such as increasing allowable density of the neighborhood).
	Preserve natural and working lands by implementing land use policies that guide development toward infill areas and do not convert "greenfield" land to urban uses (e.g., green belts, strategic conservation easements)
Building Decarbonization	Adopt all-electric new construction reach codes for residential and commercial uses.
	Adopt policies and incentive programs to implement energy efficiency retrofits for existing buildings, such as weatherization, lighting upgrades, and replacing energy-intensive appliances and equipment with more efficient systems (such as Energy Star-rated equipment and equipment controllers).
	Adopt policies and incentive programs to electrify all appliances and equipment in existing buildings such as appliance rebates, existing building reach codes, or time of sale electrification ordinances.
	Facilitate deployment of renewable energy production and distribution and energy storage on privately owned land uses (e.g., permit streamlining, information sharing).
	Deploy renewable energy production and energy storage directly in new public projects and on existing public facilities (e.g., solar photovoltaic systems on rooftops of municipal buildings and on

Table 11 Priority Strategies for Local Government Climate Action Plans

Priority Area	Priority Strategies
	canopies in public parking lots, battery storage systems in municipal buildings).
Source: CARB 2022	

Based on Appendix D of the 2022 CARB Climate Change Scoping Plan, for residential and mixed-use development projects, CARB recommends first demonstrating that these land use development projects are aligned with State climate goals based on the attributes of land use development that reduce operational GHG emissions while simultaneously advancing fair housing. Attributes that accommodate growth in a manner consistent with the GHG and equity goals of SB 32 have all the following attributes:

- Transportation Electrification
  - Provide EV charging infrastructure that, at a minimum, meets the most ambitious voluntary standards in the California Green Building Standards Code at the time of project approval.
- VMT Reduction
  - Is located on infill sites that are surrounded by existing urban uses and reuses or redevelops previously undeveloped or underutilized land that is presently served by existing utilities and essential public services (e.g., transit, streets, water, sewer).
  - Does not result in the loss or conversion of the State's natural and working lands;
  - Consists of transit-supportive densities (minimum of 20 residential dwelling units/acre), or is in proximity to existing transit stops (within a half mile), or satisfies more detailed and stringent criteria specified in the region's Sustainable Communities Strategy (SCS);
  - Reduces parking requirements by:
    - Eliminating parking requirements or including maximum allowable parking ratios (i.e., the ratio of parking spaces to residential units or square feet); or
    - Providing residential parking supply at a ratio of <1 parking space per dwelling unit; or
    - For multifamily residential development, requiring parking costs to be unbundled from costs to rent or own a residential unit.
  - At least 20 percent of the units are affordable to lower-income residents;
  - Result in no net loss of existing affordable units.
- Building Decarbonization
  - Use all electric appliances without any natural gas connections and does not use propane or other fossil fuels for space heating, water heating, or indoor cooking (CARB 2022).

If the first approach to demonstrating consistency is not applicable (such as in the case of this school modernization project), the second approach to project-level alignment with state climate goals is to achieve net zero GHG emissions. The third approach to demonstrating project-level alignment with state climate goals is to align with GHG thresholds of significance, which many local air quality management (AQMDs) and air pollution control districts (APCDs) have developed or adopted (CARB 2022).

Senate Bill 375

In 2008, SB 375, the Sustainable Communities and Climate Protection Act, was adopted to connect the GHG emissions reductions targets established in the 2008 Scoping Plan for the transportation sector to local land use decisions that affect travel behavior. Its intent is to reduce GHG emissions from light-duty trucks and automobiles (excludes emissions associated with goods movement) by aligning regional long-range transportation plans, investments, and housing allocations to local land use planning to reduce VMT and vehicle trips. Specifically, SB 375 required CARB to establish GHG emissions reduction targets for each of the 18 metropolitan planning organizations (MPO). The Southern California Association of Governments (SCAG) is the MPO for the Southern California region, which includes the counties of Los Angeles, Orange, San Bernardino, Riverside, Ventura, and Imperial.

Pursuant to the recommendations of the Regional Transportation Advisory Committee, CARB adopted per capita reduction targets for each of the MPOs rather than a total magnitude reduction target. SCAG's targets are an 8 percent per capita reduction from 2005 GHG emission levels by 2020 and a 13 percent per capita reduction from 2005 GHG emission levels by 2035 (CARB 2010). The 2020 targets are smaller than the 2035 targets because a significant portion of the built environment in 2020 is defined by decisions that have already been made. In general, the 2020 scenarios reflect that more time is needed for large land use and transportation infrastructure changes. Most of the reductions in the interim are anticipated to come from improving the efficiency of the region's transportation network. The targets would result in 3 $MMTCO_2e$ of reductions by 2020 and 15 $MMTCO_2e$ of reductions by 2035. Based on these reductions, the passenger vehicle target in CARB's Scoping Plan (for AB 32) would be met (CARB 2010).

2017 Update to the SB 375 Targets

CARB is required to update the targets for the MPOs every eight years. CARB adopted revised SB 375 targets for the MPOs in March 2018. The updated targets became effective in October2018. All SCSs adopted after October 1, 2018, are subject to these new targets. CARB's updated SB 375 targets for the SCAG region were an 8 percent per capita GHG reduction in 2020 from 2005 levels (unchanged from the 2010 target) and a 19 percent per capita GHG reduction in 2035 from 2005 levels (compared to the 2010 target of 13 percent) (CARB 2018).

The targets consider the need to further reduce VMT, as identified in the 2017 Scoping Plan Update (for SB 32), while balancing the need for additional and more flexible revenue sources to incentivize positive planning and action toward sustainable communities. Like the 2010 targets, the updated SB 375 targets are in units of "percent per capita" reductions in GHG emissions from automobiles and light trucks relative to 2005; this excludes reductions anticipated from implementation of state technology and fuels strategies and any potential future state strategies, such as statewide road user pricing. The proposed targets call for greater per-capita GHG emission reductions from SB 375 than are currently in place, which for 2035 translate into proposed targets that either match or exceed the emission reduction levels in the MPOs' currently adopted SCSs to achieve the SB 375 targets. CARB foresees that the additional GHG emissions reductions in 2035 may be achieved from land use changes, transportation investment, and technology strategies (CARB 2018).

SCAG's Regional Transportation Plan / Sustainable Communities Strategy

SB 375 requires each MPO to prepare a sustainable communities strategy in its regional transportation plan. For the SCAG region, the 2020-2045 RTP/SCS (Connect SoCal) was adopted on September 3, 2020, and is an update to the 2016-2040 RTP/SCS. In general, the SCS outlines a development pattern for the region that, when integrated with the transportation network and other transportation measures and policies, would reduce vehicle miles traveled from automobiles and light duty trucks and thereby reduce GHG emissions from these sources.

Connect SoCal focuses on the continued efforts of the previous RTP/SCSs to integrate transportation and land use strategies in development of the SCAG region through horizon year 2045 (SCAG 2020). Connect SoCal forecasts that the SCAG region will meet its GHG per capita reduction targets of 8 percent by 2020 and 19 percent by 2035. Additionally, Connect SoCal also forecasts that implementation of the plan will reduce VMT per capita in year 2045 by 4.1 percent compared to baseline conditions for that year. Connect SoCal includes a "Core Vision" that centers on maintaining and better managing the transportation network for moving people and goods while expanding mobility choices by locating housing, jobs, and transit closer together and increasing investments in transit and complete streets (SCAG 2020).

Transportation Sector Specific Regulations

Advanced Clean Fleets and Advanced Clean Trucks

CARB adopted the Advanced Clean Fleets (ACF) regulation in 2023 to accelerate the transition to zero-emission medium- and heavy-duty vehicles. In conjunction with the Advanced Clean Trucks (ACT) regulation, the ACF regulations helps to ensure that medium- and heavy-duty zero-emission vehicles (ZEV) are brought to the market, by requiring certain fleets to purchase zero emission vehicles (ZEVs). The ACF ZEV phase-in approach which provides initial focus where the best fleet electrification opportunities exist, sets clear targets for regulated fleets to make a full conversion to ZEVs, and creates a catalyst to accelerate development of a heavy-duty public charging infrastructure network.

Assembly Bill 1493

California vehicle GHG emission standards were enacted under AB 1493 (Pavley I). Pavley I is a clean-car standard that reduces GHG emissions from new passenger vehicles (light-duty auto to medium-duty vehicles) from 2009 through 2016 and is anticipated to reduce GHG emissions from new passenger vehicles by 30 percent in 2016. California implements the Pavley I standards through a waiver granted to California by the EPA. In 2012, the EPA issued a Final Rulemaking that sets even more stringent fuel economy and GHG emissions standards for model years 2017 through 2025 light-duty vehicles. (See also the discussion on the update to the Corporate Average Fuel Economy standards at the beginning of this Section 5.5.2 under "Federal.") In January 2012, CARB approved the Advanced Clean Cars program (formerly known as Pavley

II) for model years 2017 through 2025. The program combines the control of smog, soot, and GHGs with requirements for greater numbers of ZE vehicles into a single package of standards. Under California's Advanced Clean Car program, by 2025 new automobiles will emit 34 percent less GHG emissions and 75 percent less smog-forming emissions.

Executive Order S-01-07

On January 18, 2007, the state set a new LCFS for transportation fuels sold in the state. Executive Order S-01-07 sets a declining standard for GHG emissions measured in CO_2e gram per unit of fuel energy sold in California. The LCFS required a reduction of 2.5 percent in the carbon intensity of California's transportation fuels by 2015 and a reduction of at least 10 percent by 2020. The standard applies to refiners, blenders, producers, and importers of transportation fuels, and uses market-based mechanisms to allow these providers to choose how they reduce emissions during the "fuel cycle" using the most economically feasible methods.

Executive Order B-16-2012

On March 23, 2012, the state identified that CARB, the California Energy Commission (CEC), the Public Utilities Commission, and other relevant agencies worked with the Plug-in Electric Vehicle Collaborative and the California Fuel Cell Partnership to establish benchmarks to accommodate ZE vehicles in major metropolitan areas, including infrastructure to support them (e.g., electric vehicle charging stations). The executive order also directed the number of ZE vehicles in California's state vehicle fleet to increase through the normal course of fleet replacement so that at least 10 percent of fleet purchases of light-duty vehicles are ZE by 2015 and at least 25 percent by 2020. The executive order also establishes a target for the transportation sector of reducing GHG emissions to 80 percent below 1990 levels.

Executive Order N-79-20

On September 23, 2020, Governor Newsom signed Executive Order N-79-20, whose goal is that 100 percent of in-state sales of new passenger cars and trucks will be ZE by 2035. Additionally, the fleet goals for trucks are that 100 percent of drayage trucks are ZE by 2035, and 100 percent of medium- and heavy-duty vehicles in the state are ZE by 2045, where feasible. The Executive Order's goal for the State is to transition to 100 percent ZE off-road vehicles and equipment by 2035, where feasible.

Renewables Portfolio: Carbon Neutrality Regulations

Senate Bills 1078, 107, and X1-2 and Executive Order S-14-08

A major component of California's Renewable Energy Program is the renewables portfolio standard established under Senate Bills 1078 (Sher) and 107 (Simitian). Under the RPS, certain retail sellers of electricity were required to increase the amount of renewable energy each year by at least 1 percent in order to reach at least 20 percent by December 30, 2010. Executive Order S-14-08, signed in November 2008, expanded the state's renewable energy standard to 33 percent renewable power by 2020. This standard was adopted by the legislature in 2011 (SB X1-2). Renewable sources of electricity include wind, small hydropower, solar, geothermal, biomass, and biogas. The increase in renewable sources for electricity production will decrease indirect GHG emissions from development projects because electricity production from renewable sources is generally considered carbon neutral.

Senate Bill 350

Senate Bill 350 (de Leon) was signed into law September 2015 and establishes tiered increases to the RPS—40 percent by 2024, 45 percent by 2027, and 50 percent by 2030. SB 350 also set a new goal to double the energy-efficiency savings in electricity and natural gas through energy efficiency and conservation measures.

Senate Bill 100

On September 10, 2018, Governor Brown signed SB 100. Under SB 100, the RPS for public-owned facilities and retail sellers consist of 44 percent renewable energy by 2024, 52 percent by 2027, and 60 percent by 2030. SB 100 also established a new RPS requirement of 50 percent by 2026. Furthermore, the bill establishes an overall state policy that eligible renewable energy resources and zero-carbon resources supply 100 percent of all retail sales of electricity to California end-use customers and 100 percent of electricity procured to serve all state agencies by December 31, 2045. Under the bill, the state cannot increase carbon emissions elsewhere in the western grid or allow resource shuffling to achieve the 100 percent carbon-free electricity target.

Senate Bill 1020

Senate Bill 1020 was signed into law on September 16, 2022. It requires renewable energy and zero-carbon resources to supply 90 percent of all retail electricity sales by 2035 and 95 percent by 2040. Additionally, SB 1020 requires all state agencies to procure 100 percent of electricity from renewable energy and zero-carbon resources by 2035.

Energy Efficiency Regulations

California Building Code: Building Energy Efficiency Standards

Energy conservation standards for new residential and nonresidential buildings were adopted by the California Energy Resources Conservation and Development Commission (now the CEC) in June 1977 (Title 24, Part 6, of the California Code of Regulations [CCR]). Title 24 requires the design of building shells and building components to conserve energy. The standards are updated periodically to allow for consideration and possible incorporation of new energy efficiency technologies and methods.

On August 11, 2021, the CEC adopted the 2022 Building Energy Efficiency Standards, which were subsequently approved by the California Building Standards Commission in December 2021. The 2022 standards went into effect on January 1, 2023, replacing the existing 2019 standards. The 2022 standards would require mixed-fuel single-family homes to be electric-ready to accommodate replacement of gas appliances with electric appliances. In addition, the new standards also include prescriptive photovoltaic system and battery requirements for high-rise, multifamily buildings (i.e., more than three stories) and noncommercial buildings such as hotels, offices, medical offices, restaurants, retail stores, schools, warehouses, theaters, and convention centers (CEC 2021).

California Building Code: CALGreen

On July 17, 2008, the California Building Standards Commission adopted the nation's first green building standards. The California Green Building Standards Code (24 CCR, Part 11, known as "CALGreen") was adopted as part of the California Building Standards Code. CALGreen established planning and design standards for sustainable site development, energy efficiency (in excess of the California Energy Code requirements), water conservation, material conservation, and internal air contaminants.[13] The mandatory provisions of CALGreen became effective January 1, 2011. In 2021, the CEC approved the 2022 CALGreen, which went into effect on January 1, 2023, replacing the existing 2019 standards.

2006 Appliance Efficiency Regulations

The 2006 Appliance Efficiency Regulations (20 CCR §§ 1601–1608) were adopted by the CEC on October 11, 2006, and approved by the California Office of Administrative Law on December 14, 2006. The regulations include standards for both federally regulated appliances and non–federally regulated appliances. Though these regulations are now often viewed as "business as usual," they exceed the standards imposed by all other states, and they reduce GHG emissions by reducing energy demand.

Solid Waste Diversion Regulations

AB 939: Integrated Waste Management Act of 1989

California's Integrated Waste Management Act of 1989 (AB 939, Public Resources Code §§ 40050 et seq.) set a requirement for cities and counties throughout the state to divert 50 percent of all solid waste from landfills by January 1, 2000, through source reduction, recycling, and composting. In 2008, the requirements were modified to reflect a per capita requirement rather than tonnage. To help achieve this, the act requires that each city and county prepare and submit a source reduction and recycling element. AB 939 also established the goal for all California counties to provide at least 15 years of ongoing landfill capacity.

AB 341

AB 341 (Chapter 476, Statutes of 2011) increased the statewide goal for waste diversion to 75 percent by 2020 and requires recycling of waste from commercial and multifamily residential land uses. Section 5.408 of CALGreen also requires that at least 65 percent of the nonhazardous construction and demolition waste from nonresidential construction operations be recycled and/or salvaged for reuse.

AB 1327

The California Solid Waste Reuse and Recycling Access Act (AB 1327, Public Resources Code §§ 42900 et seq.) requires areas to be set aside for collecting and loading recyclable materials in development projects. The act required the California Integrated Waste Management Board to develop a model ordinance for adoption by any local agency requiring adequate areas for collection and loading of recyclable materials as part of development projects. Local agencies are required to adopt the model or an ordinance of their own.

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13 The green building standards became mandatory in the 2010 edition of the code.

AB 1826

In October of 2014, Governor Brown signed AB 1826 requiring businesses to recycle their organic waste on and after April 1, 2016, depending on the amount of waste they generate per week. This law also requires that on and after January 1, 2016, local jurisdictions across the state implement an organic waste recycling program to divert organic waste generated by businesses and multifamily residential dwellings with five or more units. Organic waste means food waste, green waste, landscape and pruning waste, nonhazardous wood waste, and food-soiled paper waste that is mixed with food waste.

Water Efficiency Regulations

SBX7-7

The 20x2020 Water Conservation Plan was issued by the Department of Water Resources (DWR) in 2010 pursuant to Senate Bill 7, which was adopted during the 7th Extraordinary Session of 2009–2010 and therefore dubbed "SBX7-7." SBX7-7 mandated urban water conservation and authorized the DWR to prepare a plan implementing urban water conservation requirements (20x2020 Water Conservation Plan). In addition, it required agricultural water providers to prepare agricultural water management plans, measure water deliveries to customers, and implement other efficiency measures. SBX7-7 required urban water providers to adopt a water conservation target of 20 percent reduction in urban per capita water use by 2020 compared to 2005 baseline use.

AB 1881: Water Conservation in Landscaping Act

The Water Conservation in Landscaping Act of 2006 (AB 1881) requires local agencies to adopt the updated DWR model ordinance or an equivalent. AB 1881 also requires the CEC to consult with the DWR to adopt, by regulation, performance standards and labeling requirements for landscape irrigation equipment, including irrigation controllers, moisture sensors, emission devices, and valves to reduce the wasteful, uneconomic, inefficient, or unnecessary consumption of energy or water.

Short-Lived Climate Pollutant Reduction Strategy

Senate Bill 1383

On September 19, 2016, the Governor signed SB 1383 to supplement the GHG reduction strategies in the Scoping Plan to consider short-lived climate pollutants, including black carbon and CH_4. Black carbon is the light-absorbing component of fine particulate matter produced during the incomplete combustion of fuels. SB 1383 required the state board, no later than January 1, 2018, to approve and begin implementing a comprehensive strategy to reduce emissions of short-lived climate pollutants to achieve a reduction in methane by 40 percent, hydrofluorocarbon gases by 40 percent, and anthropogenic black carbon by 50 percent below 2013 levels by 2030. The bill also established targets for reducing organic waste in landfills. On March 14, 2017, CARB adopted the Short-Lived Climate Pollutant Reduction Strategy, which identifies the state's approach to reducing anthropogenic and biogenic sources of short-lived climate pollutants. Anthropogenic sources of black carbon include on- and off-road transportation, residential wood burning, fuel combustion (charbroiling), and industrial processes. According to CARB, ambient levels of black carbon in California are 90 percent lower than in the early 1960s, despite the tripling of diesel fuel use (CARB

2017b). In-use on-road rules were expected to reduce black carbon emissions from on-road sources by 80 percent between 2000 and 2020. South Coast AQMD is one of the air districts that requires air pollution control technologies for chain-driven broilers, which reduces particulate emissions from these charbroilers by over 80 percent (CARB 2017b). Additionally, South Coast AQMD Rule 445 limits installation of new fireplaces in the South Coast Air Basin.

Existing Conditions

CALIFORNIA'S GREENHOUSE GAS SOURCES AND RELATIVE CONTRIBUTION

In 2021, the statewide GHG emissions inventory was updated for 2000 to 2019 emissions using the GWPs in IPCC's AR4 (IPCC 2013). Based on these GWPs, California produced 418.2 $MMTCO_2e$ GHG emissions in 2019. California's transportation sector was the single largest generator of GHG emissions, producing 39.7 percent of the state's total emissions. Industrial sector emissions made up 21.1 percent, and electric power generation made up 14.1 percent of the state's emissions inventory. Other major sectors of GHG emissions include commercial and residential (10.5 percent), agriculture and forestry (7.6 percent), high GWP (4.9 percent), and recycling and waste (2.1 percent) (CARB 2021).

Since the peak level in 2004, California's GHG emission shave generally followed a decreasing trend. In 2016, California statewide GHG emissions dropped below the AB 32 target for year 2020 of 431 $MMTCO_2e$ and have remained below this target since then. In 2019, emissions from routine GHG-emitting activities statewide were almost 13 $MMTCO_2e$ lower than the AB 32 target for year 2020. Per-capita GHG emissions in California have dropped from a 2001 peak of 14.0 $MTCO_2e$ per person to 10.5 $MTCO_2e$ per person in 2019, a 25 percent decrease.

Transportation emissions continued to decline in 2019 statewide as they had done in 2018, with even more substantial reductions due to a significant increase in renewable diesel. Since 2008, California's electricity sector has followed an overall downward trend in emissions. In 2019, solar power generation continued its rapid growth since 2013. Emissions from high-GWP gases comprised 4.9 percent of California's emissions in 2019. This continues the increasing trend as the gases replace ozone-depleting substances being phased out under the 1987 Montreal Protocol. Overall trends in the inventory also demonstrate that the carbon intensity of California's economy (the amount of carbon pollution per million dollars of gross domestic product) has declined 45 percent since the 2001 peak, though the state's gross domestic product grew 63 percent during this period (CARB 2021).

Thresholds of Significance

The CEQA Guidelines recommend that a lead agency consider the following when assessing the significance of impacts from GHG emissions on the environment:

1. The extent to which the project may increase (or reduce) GHG emissions as compared to the existing environmental setting;

2. Whether the project emissions exceed a threshold of significance that the lead agency determines applies to the project;
3. The extent to which the project complies with regulations or requirements adopted to implement an adopted statewide, regional, or local plan for the reduction or mitigation of GHG emissions.[14]

SOUTH COAST AQMD WORKING GROUP

To provide guidance to local lead agencies on determining significance for GHG emissions in their CEQA documents, South Coast AQMD convened a GHG CEQA Significance Threshold Working Group (Working Group). The South Coast AQMD Working Group (Meeting No. 15) identified a tiered approach for evaluating GHG emissions for development projects where South Coast AQMD is not the lead agency (South Coast AQMD 2010):

- **Tier 1.** If a project is exempt from CEQA, project-level and cumulative GHG emissions are less than significant.
- **Tier 2.** If the project complies with a GHG emissions reduction plan or mitigation program that avoids or substantially reduces GHG emissions in the project's geographic area (i.e., city or county), project-level and cumulative GHG emissions are less than significant.
- **Tier 3.** If GHG emissions are less than the screening-level threshold, project-level and cumulative GHG emissions are less than significant.

  For projects that are not exempt or where no qualifying GHG reduction plans are directly applicable, South Coast AQMD requires an assessment of GHG emissions. The South Coast AQMD Working Group identified a screening-level threshold of 3,000 $MTCO_2e$ annually for all land use types or the following land-use-specific thresholds: 1,400 $MTCO_2e$ for commercial projects, 3,500 $MTCO_2e$ for residential projects, or 3,000 $MTCO_2e$ for mixed-use projects. These bright-line thresholds are based on a review of the Governor's Office of Planning and Research database of CEQA projects. Based on their review of 711 CEQA projects, 90 percent of CEQA projects would exceed the bright-line thresholds identified above. Therefore, projects that do not exceed the bright-line threshold would have a nominal, and therefore, less than cumulatively considerable impact on GHG emissions:

- **Tier 4.** If emissions exceed the screening threshold, a more detailed review of the project's GHG emissions is warranted.

[14] The Governor's Office of Planning and Research recommendations include a requirement that such a plan must be adopted through a public review process and include specific requirements that reduce or mitigate the project's incremental contribution of GHG emissions. If there is substantial evidence that the possible effects of a particular project are still cumulatively considerable, notwithstanding compliance with the adopted regulations or requirements, an EIR must be prepared for the project.

> The South Coast AQMD Working Group has identified an efficiency target for projects that exceed the screening threshold of 4.8 $MTCO_2e$ per year per service population ($MTCO_2e$/year/SP) for project-level analyses and 6.6 $MTCO_2e$/year/SP for plan level projects (e.g., program-level projects such as general plans) for the year 2020.[15] The per capita efficiency targets are based on the AB 32 GHG reduction target and 2020 GHG emissions inventory prepared for CARB's 2008 Scoping Plan.

The bright-line screening-level criterion of 3,000 $MTCO_2e$/yr is used as the significance threshold for this project. Therefore, if the project operation-phase emissions exceed the 3,000 $MTCO_2e$/yr threshold, GHG emissions would be considered potentially significant in the absence of mitigation measures.

[15] It should be noted that the Working Group also considered efficiency targets for 2035 for the first time in this Working Group meeting.

BIBLIOGRAPHY

Bay Area Air Quality Management District (BAAQMD). 2023, April. California Environmental Quality Act Air Quality Guidelines. https://www.baaqmd.gov/plans-and-climate/california-environmental-quality-act-ceqa/updated-ceqa-guidelines.

California Air Pollution Control Officers Association (CAPCOA). 2022. California Emissions Estimator Model (CalEEMod). Version 2022.1.1.13. Prepared by: ICF in collaboration with Sacramento Metropolitan Air Quality Management District.

California Air Resources Board (CARB). 2010, September. Staff Report Proposed Regional Greenhouse Gas Emission Reduction Targets for Automobiles and Light Trucks Pursuant to Senate Bill 375. https://ww3.arb.ca.gov/board/res/2010/res10-31.pdf.

———. 2016, October 1. Ambient Air Quality Standards. https://ww2.arb.ca.gov/sites/default/files/2020-07/aaqs2.pdf.

———. 2017a, March 14. Final Proposed Short-Lived Climate Pollutant Reduction Strategy. https://ww2.arb.ca.gov/sites/default/files/2018-12/final_slcp_report%20Final%202017.pdf.

———. 2017b, November. California's 2017 Climate Change Scoping Plan: The Strategy for Achieving California's 2030 Greenhouse Gas Target. https://www.arb.ca.gov/cc/scopingplan/scoping_plan_2017.pdf.

———. 2018, February. Proposed Update to the SB 375 Greenhouse Gas Emission Reduction Targets. https://ww2.arb.ca.gov/sites/default/files/2020-06/SB375_Updated_Final_Target_Staff_Report_2018.pdf

———. 2019, July 25. California and major automakers reach groundbreaking framework agreement on clean emission standards. https://ww2.arb.ca.gov/news/california-and-major-automakers-reach-groundbreaking-framework-agreement-clean-emission.

———. 2022, December 15. CARB Draft Scoping Plan: AB32 Source Emissions Initial Modeling Results. https://ww2.arb.ca.gov/our-work/programs/ab-32-climate-change-scoping-plan/2022-scoping-plan-documents.

———. 2023a, May 21 (accessed). Area Designations Maps/State and National. https://ww2.arb.ca.gov/resources/documents/maps-state-and-federal-area-designations.

———. 2023b, May 21 (accessed). Air Pollution Data Monitoring Cards (2017, 2018, 2019, 2020, and 2021). https://www.arb.ca.gov/adam/topfour/topfour1.php.

———. 2023c, May 25 (accessed). Common Air Pollutants. https://ww2.arb.ca.gov/resources/common-air-pollutants.

———. 2023d, May 25 (accessed). Toxic Air Contaminant Identification Reports. https://ww2.arb.ca.gov/resources/documents/toxic-air-contaminant-identification-reports.

California Energy Commission (CEC). 2021, May 19. Amendments to the Building Energy Efficiency Standards (2022 Energy Code) Draft Environmental Report. CEC-400-2021-077-D.

Intergovernmental Panel on Climate Change (IPCC). 1995. Second Assessment Report: Climate Change 1995. https://www.ipcc.ch/site/assets/uploads/2018/02/ipcc_sar_wg_I_full_report.pdf.

———. 2001. Third Assessment Report: Climate Change 2001. New York: Cambridge University Press. https://www.ipcc.ch/site/assets/uploads/2018/03/WGI_TAR_full_report.pdf.

———. 2007. Fourth Assessment Report: Climate Change 2007. New York: Cambridge University Press. https://www.ipcc.ch/site/assets/uploads/2018/02/ar4_syr_full_report.pdf.

———. 2013. Fifth Assessment Report: Climate Change 2013. New York: Cambridge University Press. https://www.ipcc.ch/site/assets/uploads/2018/02/WG1AR5_all_final.pdf.

National Highway Traffic Safety Administration. 2022, April 1. USDOT Announces New Vehicle Fuel Economy Standards for Model year 2024-2026. https://www.nhtsa.gov/press-releases/usdot-announces-new-vehicle-fuel-economy-standards-model-year-2024-2026, accessed on May 23, 2023.

South Coast Air Quality Management District (South Coast AQMD). 1993. *California Environmental Quality Act Air Quality Handbook*. https://www.aqmd.gov/home/rules-compliance/ceqa/air-quality-analysis-handbook/ceqa-air-quality-handbook-(1993).

———.1996. Final Carbon Monoxide Redesignation Request and Maintenance Plan for Ten Federal Planning Areas. https://ww2.arb.ca.gov/resources/documents/final-carbon-monoxide-redesignation-request-and-maintenance-plan-ten-federal-0.

———. 2003, August. 2003 Air Quality Management Plan. Appendix V. https://www.aqmd.gov/home/air-quality/clean-air-plans/air-quality-mgt-plan/2003-aqmp.

———. 2005, May. Guidance Document for Addressing Air Quality Issues in General Plans and Local Planning. http://www.aqmd.gov/docs/default-source/planning/air-quality-guidance/complete -guidance-document.pdf.

———. 2008, July. Final Localized Significance Threshold Methodology.

———. 2010, September 28. Greenhouse Gases (GHG) CEQA Significance Thresholds Working Group Meeting 15. http://www.aqmd.gov/docs/default-source/ceqa/handbook/greenhouse-gases-(ghg)-ceqa-significance-thresholds/year-2008-2009/ghg-meeting-15/ghg-meeting-15-main-presentation.pdf.

———. 2012, May 4. Final 2012 Lead State Implementation Plan: Los Angeles County. http://www3.aqmd.gov/hb/attachments/2011-2015/2012May/2012-May4-030.pdf.

———. 2013, February. 2012 Final Air Quality Management Plan. https://www.aqmd.gov/docs/default-source/clean-air-plans/air-quality-management-plans/2012-air-quality-management-plan/final-2012-aqmp-(february-2013)/main-document-final-2012.pdf.

———. 2015a. Health Effects of Air Pollution. http://www.aqmd.gov/docs/default-source/publications/brochures/the-health-effects-of-air-pollution-brochure.pdf.

———. 2015b, October. "Blueprint for Clean Air: 2016 AQMP White Paper." 2016 AQMP White Papers Web Page. https://www.aqmd.gov/docs/default-source/Agendas/aqmp/white-paper-working-groups/wp-blueprint-final.pdf?sfvrsn=2.

———. 2021a, August. Final Report, Multiple Air Toxics Exposure Study V (MATES V). http://www.aqmd.gov/home/air-quality/air-quality-studies/health-studies/mates-v.

———. 2021b, October. Draft Final 2021 Redesignation Request and Maintenance Plan for the 2006 and 1997 24-Hour PM2.5 Standards for South Coast Air Basin. https://ww2.arb.ca.gov/sites/default/files/2021-10/draft-final-pm2-5-redesignation-request-and-maintenance-plan.pdf

———. 2022, December. Final 2022 Air Quality Management Plan. https://www.scaqmd.gov/home/air-quality/clean-air-plans/2022-aqmp-archive

———. 2023, March (revised). South Coast AQMD Air Quality Significance Thresholds. https://www.aqmd.gov/docs/default-source/ceqa/handbook/south-coast-aqmd-air-quality-significance-thresholds.pdf?sfvrsn=25.

Southern California Association of Governments (SCAG). 2020, September 3. Connect SoCal Plan: The 2020-2045 Regional Transportation Plan / Sustainable Communities Strategy of The Southern California Association of Governments. https://scag.ca.gov/post/connect-socal-2020.

US Environmental Protection Agency (USEPA). 2009, December. EPA: Greenhouse Gases Threaten Public Health and the Environment. Science overwhelmingly shows greenhouse gas concentrations at unprecedented levels due to human activity. https://archive.epa.gov/epapages/newsroom_archive/newsreleases/08d11a451131bca585257685005bf252.html.

———. 2023a, May 22 (accessed). Criteria Air Pollutants. https://www.epa.gov/criteria-air-pollutants.

———. 2023b, May 22 (accessed). Overview of Greenhouse Gases. http://www3.epa.gov/climatechange/ghgemissions/gases.html.

USA.Com. 2023, March 28 (accessed). Los Alamitos, CA Weather. http://www.usa.com/los-alamitos-ca-weather.htm.

Assumptions Worksheet

CalEEMod Inputs-Los Alamitos HS Gymnasium Project, Construction

Name: Los Alamitos HS Gymnasium Project, Construction
Project Number: LAUS-05
Project Location: 3591 West Cerritos Ave Los Alamitos, CA 90720
County/Air Basin: Orange County
Climate Zone: 8
Land Use Setting: Urban
Operational Year: 2025
Utility Company: Southern California Edison
Air Basin: South Coast Air Basin
Air District: South Coast AQMD
SRA: 17 - Central Orange County

Project Site Acreage 50
Disturbed Site Acreage 1.40

Project Components	SQFT	Amount of Debris		
Demolition				
Asphalt Demolition (Tons)	50,000	741		
	SQFT	**Building Footprint**	**Acres**	**Number of Stories**
Construction				
Gymnasium	32,000	32,000	0.73	1
Surface Work				
Asphalt Surfaces		28,984	NA	0.67

Land Use Type	Land Use Subtype	Unit Amount	Size Metric	Lot Acreage	Land Use Square Feet
Educational	High School	32	1000 sqft	0.735	32,000
Parking	Other Asphalt Surfaces	28.984	1000 sqft	0.67	28,984
				1.40	

Demolition

Component	Amount to be Demolished	Haul Truck Capacity[1]	Haul Distance (miles)[1]	Total Trip Ends	Duration (days)	Trip Ends Per Day
Asphalt (Tons)	741	20	20	75	21	4
Total						**4**

Notes
[1] CalEEMod default used.

Soil Haul [1]

Construction Activities	Volume (CY)	Haul Truck Capacity (CY)	Haul Distance (miles)	Total Trip Ends	Trip Ends per Day	Duration (days)
Rough Grading Export	100	10	30	20	4	5

Notes

[1] Soil Haul, Truck Capacity, and Haul Distance to Frank R. Bowerman Landfill provided by the District.

Architectural Coating

	Percent Painted
Interior Painted:	100%
Exterior Painted:	100%

Notes

[1] Provided by the District.

Rule 1113

Interior Non-Residential Paint VOC content:	100	grams per liter
Exterior Non-Residential Paint VOC content:	100	grams per liter

Structures	Land Use Square Feet	CalEEMod Factor[2]	Total Paintable Surface Area	Paintable Interior Area[1]	Paintable Exterior Area[1]
Non-Residential Structures					
High School	32,000	2.0	64,000	48,000	16,000
				48,000	**16,000**
Parking					
Asphalt Surfaces	28,984	6%	1,739	-	1,739
					1,739

Notes

[1] CalEEMod methodology calculates the paintable interior and exterior areas by multiplying the total paintable surface area by 75 and 25 percent, respectively.

[2] The program assumes the total surface for painting equals 2.0 times the floor square footage for nonresidential square footage defined by the user.

[3] Assumes that all parking and non-parking asphalt will be striped. CalEEMod methodology assumes 6% of surface area is striped.

Construction Mitigation

Water Exposed Area	Frequency:	2	per day
	PM10:	61	% Reduction
	PM25:	61	% Reduction
Unpaved Roads	Vehicle Speed:	25	mph
SCAQMD Rule 1186			
	Clean Paved Road	9	% PM Reduction

Pavement Volume to Weight Conversion

Component	Total SF of Area[1]	Assumed Thickness (foot)[2]	Debris Volume (cu. ft)	Weight of Crushed Asphalt (lbs/cf)[3]	AC Mass (lbs)	AC Mass (tons)
Asphalt Demolition	50,000	0.333	16,667	89	1,481,481	740.74
Total	50,000					741

[1] Based on aerial image of existing project site.

[2] Gibbons, Jim. 1999. Pavements and Surface Materials. Nonpoint Education for Municipal Officials, Technical Paper Number 8. University of Connecticut Cooperative Extension System. https://www.uni-groupusa.org/PDF/NEMO_tech_8.pdf

[3] CalRecycle. 2019. Solid Waste Cleanup Program Weights and Volumes for Project Estimates. https://www.delmar.ca.us/DocumentCenter/View/5668/CalRecycle-Conversion-Table

Construction Activities and Schedule Assumptions

* based on schedule provided by the District

		Construction Schedule		
Construction Activities	**Phase Type**	**Start Date**	**End Date**	**CalEEMod Duration (Workday)**
Asphalt Demolition	Demolition	9/23/2023	10/23/2023	21
Site Preparation	Site Preparation	9/23/2023	12/22/2023	65
Grading	Grading	11/23/2023	12/22/2023	22
Utility Trenching	Trenching	12/23/2023	1/1/2024	6
Building Construction	Building Construction	1/1/2024	3/1/2025	305
Paving	Paving	1/1/2025	3/1/2025	43
Architectural Coating[1]	Paving	2/15/2025	3/1/2025	10

Notes:

[1] CalEEMod default duration used when duration not provided.

Overlapping Construction Schedule (CalEEMod)

Construction Activities	**Start Date**	**End Date**	**CalEEMod Duration (Workday)**
Asphalt Demolition and Site Preparation	9/23/2023	10/23/2023	21
Site Preparation	10/24/2023	11/22/2023	22
Site Preparation and Grading	11/23/2023	12/22/2023	22
Site Preparation, Grading, and Utility Trenching	12/23/2023	12/23/2023	0
Utility Trenching	12/24/2023	12/31/2023	5
Utility Trenching and Building Construction	1/1/2024	1/1/2024	1
Building Construction	1/2/2024	12/31/2024	261
Building Construction and Paving	1/1/2025	2/14/2025	33
Building Construction, Paving, and Architectural Coating	2/15/2025	3/1/2025	10

CalEEMod Construction Off-Road Equipment Inputs

Based on information from District where indicated. CalEEMod default worker and vendor trips have been used for all construction activities. Where information has not been provided by the District, CalEEMod defaults have been used.

Construction Equipment Details						
Equipment	# of Equipment	hr/day	hp	load factor	total trips per day	On-Site Water Truck Travel Distance (miles/day)
Asphalt Demolition[1]						
Tractors/Loaders/Backhoes	2	8	84	0.37		
Concrete/Industrial Saws	1	8	33	0.73		
Cranes	1	8	367	0.29		
Worker Trips					10	
Vendor Trips					0	
Hauling Trips					36	
Water Trucks		Acres Disturbed:	1.00		6	0.83
Site Preparation						
Graders	1	8	148	0.41		
Rubber Tired Dozers	1	8	367	0.4		
Tractors/Loaders/Backhoes	1	8	84	0.37		
Worker Trips					8	
Vendor Trips					0	
Hauling Trips					0	
Water Trucks		Acres Disturbed:	1.50		8	1.24
Grading						
Tractors/Loaders/Backhoes	1	7	84	0.37		
Worker Trips					3	
Vendor Trips					0	
Hauling Trips					4	
Water Trucks		Acres Disturbed:	0.44		4	0.36

Building Construction						
Cranes	1	6	367	0.29		
Forklifts	1	6	82	0.2		
Generator Sets	1	8	14	0.74		
Tractors/Loaders/Backhoes	1	8	84	0.37		
Welders	3	8	46	0.45		
Worker Trips					13	
Vendor Trips					5	
Hauling Trips					0	
Paving						
Pavers	1	6	81	0.42		
Paving Equipment	1	8	89	0.36		
Rollers	1	7	36	0.38		
Cement and Mortar Mixers	1	6	10	0.56		
Worker Trips					10	
Vendor Trips					0	
Hauling Trips					0	
Architectural Coating						
Air Compressors	1	6	37	0.48		
Worker Trips					3	
Vendor Trips					0	
Hauling Trips					0	
Utilities Trenching [2]						
Excavators	1	8	36	0.38		
Tractors/Loaders/Backhoes	1	8	84	0.37		
Worker Trips					5	
Vendor Trips					0	
Hauling Trips					0	

Notes:

[1] For demolition phase, included 2 haul trips/truck for each of the 15 containers to be removed offsite. Also, included a crane and a truck to relocate 8 portable classrooms on campus.

[2] Construction equipment based on previous gymnasium project.

Water Truck Vendor Trip Calculation

Amount of Water (gal/ acre/ day)[1]	Water Truck Capacity (gallons)[2]
10,000	4,000

Notes:

[1] Based on data provided in Guidance for Application for Dust Control Permit https://www.epa.gov/sites/default/files/2019-04/documents/mr_guidanceforapplicationfordustcontrolpermit.pdf)

[2] Based on standard water truck capacity:
McLellan Industries. 2022, January (access). Water Trucks. https://www.mclellanindustries.com/trucks/water-trucks/

[3] Assumes that dozers, tractors/loaders/backhoes, and graders can disturb 0.50 acres per day and scrapers can disturb 1 acre per day.

Phase Name	Worker Trip Ends Per Day	Vendor Trip Ends Per Day	Haul Truck Trip Ends Per Day	Start Date	End Date	Workdays
Asphalt Demolition	10	6	36	9/23/2023	10/23/2023	21
Site Preparation	8	8	0	9/23/2023	12/23/2023	65
Grading	3	4	4	11/23/2023	12/23/2023	22
Utility Trenching	5	0	0	12/23/2023	1/1/2024	6
Building Construction	13	5	0	1/1/2024	3/1/2025	305
Paving	10	0	0	1/1/2025	3/1/2025	43
Architectural Coating	3	0	0	2/15/2025	3/1/2025	10

Construction Activity (Overlapping)	Worker Trip Ends Per Day	Vendor Trip Ends Per Day	Haul Truck Trip Ends Per Day	Start Date	End Date	Workdays
Asphalt Demolition and Site Preparation	18	14	36	9/23/2023	10/23/2023	21
Site Preparation	8	8	0	10/24/2023	11/22/2023	22
Site Preparation and Grading	11	12	4	11/23/2023	12/22/2023	22
Site Preparation, Grading, and Utility Trenching	16	12	4	12/23/2023	12/23/2023	0
Utility Trenching	5	0	0	12/24/2023	12/31/2023	5
Utility Trenching and Building Construction	18	5	0	1/1/2024	1/1/2024	1
Building Construction	13	5	0	1/2/2024	12/31/2024	261
Building Construction and Paving	23	5	0	1/1/2025	2/14/2025	33
Building Construction, Paving, and Architectural Coating	26	5	0	2/15/2025	3/1/2025	10
	18	**14**	**36**			

CalEEMod Inputs-Los Alamitos HS Gymnasium Project, Operation

Name:	Los Alamitos HS Gymnasium Project, Operation
Project Number:	LAUS-05
Project Location:	3591 West Cerritos Ave Los Alamitos, CA 90720
County/Air Basin:	Orange County
Climate Zone:	8
Land Use Setting:	Urban
Operational Year:	2025
Utility Company:	Southern California Edison
Air Basin:	South Coast Air Basin
Air District:	South Coast AQMD
SRA:	17 - Central Orange County

Project Site Acreage	50
Disturbed Site Acreage	1.40

CalEEMod Land Use Inputs

Land Use Type	Land Use Subtype	Unit Amount	Size Metric	Lot Acreage	Land Use Square Feet
Educational	High School	32	1000 sqft	0.73	32,000
Parking	Other Asphalt Surfaces	29	1000 sqft	0.67	28,984

Electricity (Buildings)

Default CalEEMod Energy Use

Land Use Subtype	Total Annual Electricity Consumption (kWh/year)	Total Annual Natural Gas Consumption (kBTU/year)	Title-24 Electricity Energy Intensity (kWhr/size/year)*	Title-24 Natural Gas Energy Intensity (KBTU/size/year)*	Nontitle-24 Electricity Energy Intensity (kWhr/size/year)	Nontitle-24 Natural Gas Energy Intensity (KBTU/size/year)
High School	200,139.07	671,356.51	**173,018.29**	**341,488.78**	27,120.78	329,867.73

Architectural Coating

***see Construction assumptions**

Southern California Edison Carbon Intensity Factors[1]

	Forecasetd Factors 2023-2025	
CO_2:	348.64	pounds per megawatt hour
CH_4:	0.033	pound per megawatt hour
N_2O:	0.004	pound per megawatt hour

Notes:

[1] CalEEMod default values.

CalEEMod Construction and Operation Model

LAUS-05 Custom Report

Table of Contents

1. Basic Project Information

1.1. Basic Project Information

Data Field	Value
Project Name	LAUS-05
Construction Start Date	9/25/2023
Operational Year	2025
Lead Agency	—
Land Use Scale	Project/site
Analysis Level for Defaults	County
Windspeed (m/s)	2.30
Precipitation (days)	6.20
Location	3591 W Cerritos Ave, Los Alamitos, CA 90720, USA
County	Orange
City	Los Alamitos
Air District	South Coast AQMD
Air Basin	South Coast
TAZ	5876
EDFZ	7
Electric Utility	Southern California Edison
Gas Utility	Southern California Gas
App Version	2022.1.1.13

1.2. Land Use Types

Land Use Subtype	Size	Unit	Lot Acreage	Building Area (sq ft)	Landscape Area (sq ft)	Special Landscape Area (sq ft)	Population	Description

High School	32.0	1000sqft	0.73	32,000	0.00	0.00	—	—
Other Asphalt Surfaces	29.0	1000sqft	0.67	0.00	0.00	—	—	—

1.3. User-Selected Emission Reduction Measures by Emissions Sector

No measures selected

2. Emissions Summary

2.1. Construction Emissions Compared Against Thresholds

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Un/Mit.	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Unmit.	3.43	2.68	28.9	26.6	0.06	1.17	5.00	6.18	1.08	1.75	2.83	—	7,354	7,354	0.42	0.51	7.67	7,525
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Unmit.	3.43	32.2	29.0	26.5	0.06	1.17	5.00	6.18	1.08	1.75	2.83	—	7,343	7,343	0.42	0.51	0.20	7,507
Average Daily (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Unmit.	1.05	1.03	7.16	8.18	0.02	0.28	0.71	0.88	0.25	0.28	0.43	—	1,591	1,591	0.06	0.04	0.37	1,602
Annual (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Unmit.	0.19	0.19	1.31	1.49	< 0.005	0.05	0.13	0.16	0.05	0.05	0.08	—	263	263	0.01	0.01	0.06	265

2.2. Construction Emissions by Year, Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Year	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily - Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
2023	3.43	2.68	28.9	26.6	0.06	1.17	5.00	6.18	1.08	1.75	2.83	—	7,354	7,354	0.42	0.51	7.67	7,525
2024	1.47	1.22	9.97	11.5	0.02	0.39	0.22	0.61	0.35	0.05	0.41	—	2,226	2,226	0.09	0.04	1.21	2,243
Daily - Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
2023	3.43	2.68	29.0	26.5	0.06	1.17	5.00	6.18	1.08	1.75	2.83	—	7,343	7,343	0.42	0.51	0.20	7,507
2024	1.75	1.45	12.1	14.6	0.03	0.47	0.29	0.75	0.43	0.07	0.50	—	2,714	2,714	0.11	0.05	0.04	2,732
2025	2.05	32.2	13.9	17.6	0.03	0.53	0.39	0.91	0.49	0.09	0.58	—	3,206	3,206	0.12	0.06	0.05	3,226
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
2023	0.46	0.37	3.85	3.57	0.01	0.17	0.71	0.88	0.15	0.28	0.43	—	788	788	0.04	0.04	0.28	801
2024	1.05	0.87	7.16	8.18	0.02	0.28	0.16	0.43	0.25	0.04	0.29	—	1,591	1,591	0.06	0.03	0.37	1,602
2025	0.23	1.03	1.56	1.96	< 0.005	0.06	0.04	0.10	0.05	0.01	0.06	—	362	362	0.01	0.01	0.08	365
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
2023	0.08	0.07	0.70	0.65	< 0.005	0.03	0.13	0.16	0.03	0.05	0.08	—	130	130	0.01	0.01	0.05	133
2024	0.19	0.16	1.31	1.49	< 0.005	0.05	0.03	0.08	0.05	0.01	0.05	—	263	263	0.01	0.01	0.06	265
2025	0.04	0.19	0.28	0.36	< 0.005	0.01	0.01	0.02	0.01	< 0.005	0.01	—	60.0	60.0	< 0.005	< 0.005	0.01	60.4

2.4. Operations Emissions Compared Against Thresholds

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Un/Mit.	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Unmit.	0.27	1.01	0.19	1.54	< 0.005	0.02	0.00	0.02	0.02	0.00	0.02	0.00	412	412	0.04	< 0.005	0.12	414

Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Unmit.	0.02	0.78	0.18	0.15	< 0.005	0.01	0.00	0.01	0.01	0.00	0.01	0.00	406	406	0.04	< 0.005	0.12	408
Average Daily (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Unmit.	0.19	0.94	0.19	1.10	< 0.005	0.01	0.00	0.01	0.02	0.00	0.02	0.00	410	410	0.04	< 0.005	0.12	412
Annual (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Unmit.	0.03	0.17	0.03	0.20	< 0.005	< 0.005	0.00	< 0.005	< 0.005	0.00	< 0.005	0.00	67.9	67.9	0.01	< 0.005	0.02	68.2

2.5. Operations Emissions by Sector, Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Sector	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Mobile	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Area	0.25	1.00	0.01	1.39	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	5.72	5.72	< 0.005	< 0.005	—	5.74
Energy	0.02	0.01	0.18	0.15	< 0.005	0.01	—	0.01	0.01	—	0.01	—	406	406	0.04	< 0.005	—	408
Water	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	0.00	—	0.00
Waste	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	0.00	—	0.00
Refrig.	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	0.12	0.12
Total	0.27	1.01	0.19	1.54	< 0.005	0.02	0.00	0.02	0.02	0.00	0.02	0.00	412	412	0.04	< 0.005	0.12	414
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Mobile	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Area	—	0.77	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Energy	0.02	0.01	0.18	0.15	< 0.005	0.01	—	0.01	0.01	—	0.01	—	406	406	0.04	< 0.005	—	408
Water	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	0.00	—	0.00
Waste	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	0.00	—	0.00
Refrig.	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	0.12	0.12
Total	0.02	0.78	0.18	0.15	< 0.005	0.01	0.00	0.01	0.01	0.00	0.01	0.00	406	406	0.04	< 0.005	0.12	408
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Mobile	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Area	0.17	0.93	0.01	0.95	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	3.92	3.92	< 0.005	< 0.005	—	3.93
Energy	0.02	0.01	0.18	0.15	< 0.005	0.01	—	0.01	0.01	—	0.01	—	406	406	0.04	< 0.005	—	408
Water	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	0.00	—	0.00
Waste	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	0.00	—	0.00
Refrig.	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	0.12	0.12
Total	0.19	0.94	0.19	1.10	< 0.005	0.01	0.00	0.01	0.02	0.00	0.02	0.00	410	410	0.04	< 0.005	0.12	412
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Mobile	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Area	0.03	0.17	< 0.005	0.17	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	0.65	0.65	< 0.005	< 0.005	—	0.65
Energy	< 0.005	< 0.005	0.03	0.03	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	67.3	67.3	0.01	< 0.005	—	67.6
Water	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	0.00	—	0.00
Waste	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	0.00	—	0.00
Refrig.	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	0.02	0.02
Total	0.03	0.17	0.03	0.20	< 0.005	< 0.005	0.00	< 0.005	< 0.005	0.00	< 0.005	0.00	67.9	67.9	0.01	< 0.005	0.02	68.2

3. Construction Emissions Details

3.1. Demolition (2023) - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Onsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	1.03	0.86	8.37	8.90	0.02	0.35	—	0.35	0.32	—	0.32	—	1,815	1,815	0.07	0.01	—	1,822
Demolition	—	—	—	—	—	—	0.48	0.48	—	0.07	0.07	—	—	—	—	—	—	—
Onsite truck	< 0.005	< 0.005	0.02	0.01	< 0.005	< 0.005	0.30	0.30	< 0.005	0.03	0.03	—	4.58	4.58	< 0.005	< 0.005	0.01	4.84
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	1.03	0.86	8.37	8.90	0.02	0.35	—	0.35	0.32	—	0.32	—	1,815	1,815	0.07	0.01	—	1,822
Demolition	—	—	—	—	—	—	0.48	0.48	—	0.07	0.07	—	—	—	—	—	—	—
Onsite truck	< 0.005	< 0.005	0.02	0.01	< 0.005	< 0.005	0.30	0.30	< 0.005	0.03	0.03	—	4.60	4.60	< 0.005	< 0.005	< 0.005	4.85
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.06	0.05	0.48	0.51	< 0.005	0.02	—	0.02	0.02	—	0.02	—	104	104	< 0.005	< 0.005	—	105
Demolition	—	—	—	—	—	—	0.03	0.03	—	< 0.005	< 0.005	—	—	—	—	—	—	—
Onsite truck	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	0.02	0.02	< 0.005	< 0.005	< 0.005	—	0.26	0.26	< 0.005	< 0.005	< 0.005	0.28
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.01	0.01	0.09	0.09	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	17.3	17.3	< 0.005	< 0.005	—	17.4
Demolition	—	—	—	—	—	—	0.01	0.01	—	< 0.005	< 0.005	—	—	—	—	—	—	—

Onsite truck	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	—	0.04	0.04	< 0.005	< 0.005	< 0.005	0.05
Offsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.04	0.04	0.04	0.65	0.00	0.00	0.13	0.13	0.00	0.03	0.03	—	138	138	0.01	< 0.005	0.61	141
Vendor	0.02	0.01	0.21	0.11	< 0.005	< 0.005	0.05	0.05	< 0.005	0.01	0.02	—	197	197	0.01	0.03	0.52	205
Hauling	0.28	0.05	3.30	1.43	0.02	0.03	0.65	0.68	0.03	0.18	0.21	—	2,591	2,591	0.22	0.41	5.36	2,723
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.04	0.04	0.05	0.56	0.00	0.00	0.13	0.13	0.00	0.03	0.03	—	132	132	0.01	< 0.005	0.02	133
Vendor	0.02	0.01	0.22	0.11	< 0.005	< 0.005	0.05	0.05	< 0.005	0.01	0.02	—	197	197	0.01	0.03	0.01	205
Hauling	0.27	0.05	3.41	1.44	0.02	0.03	0.65	0.68	0.03	0.18	0.21	—	2,592	2,592	0.22	0.41	0.14	2,719
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	< 0.005	0.03	0.00	0.00	0.01	0.01	0.00	< 0.005	< 0.005	—	7.67	7.67	< 0.005	< 0.005	0.02	7.78
Vendor	< 0.005	< 0.005	0.01	0.01	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	—	11.3	11.3	< 0.005	< 0.005	0.01	11.8
Hauling	0.02	< 0.005	0.20	0.08	< 0.005	< 0.005	0.04	0.04	< 0.005	0.01	0.01	—	149	149	0.01	0.02	0.13	157
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	< 0.005	0.01	0.00	0.00	< 0.005	< 0.005	0.00	< 0.005	< 0.005	—	1.27	1.27	< 0.005	< 0.005	< 0.005	1.29
Vendor	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	—	1.87	1.87	< 0.005	< 0.005	< 0.005	1.95
Hauling	< 0.005	< 0.005	0.04	0.02	< 0.005	< 0.005	0.01	0.01	< 0.005	< 0.005	< 0.005	—	24.7	24.7	< 0.005	< 0.005	0.02	25.9

3.3. Site Preparation (2023) - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Onsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	2.01	1.69	16.6	14.8	0.02	0.79	—	0.79	0.72	—	0.72	—	2,236	2,236	0.09	0.02	—	2,243
Dust From Material Movement	—	—	—	—	—	—	2.76	2.76	—	1.34	1.34	—	—	—	—	—	—	—
Onsite truck	< 0.005	< 0.005	0.02	0.01	< 0.005	< 0.005	0.45	0.45	< 0.005	0.05	0.05	—	6.03	6.03	< 0.005	< 0.005	0.01	6.35
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	2.01	1.69	16.6	14.8	0.02	0.79	—	0.79	0.72	—	0.72	—	2,236	2,236	0.09	0.02	—	2,243
Dust From Material Movement	—	—	—	—	—	—	2.76	2.76	—	1.34	1.34	—	—	—	—	—	—	—
Onsite truck	< 0.005	< 0.005	0.02	0.01	< 0.005	< 0.005	0.45	0.45	< 0.005	0.05	0.05	—	6.05	6.05	< 0.005	< 0.005	< 0.005	6.36
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.36	0.30	2.95	2.64	< 0.005	0.14	—	0.14	0.13	—	0.13	—	398	398	0.02	< 0.005	—	399
Dust From Material Movement	—	—	—	—	—	—	0.49	0.49	—	0.24	0.24	—	—	—	—	—	—	—
Onsite truck	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	0.08	0.08	< 0.005	0.01	0.01	—	1.07	1.07	< 0.005	< 0.005	< 0.005	1.13
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.07	0.05	0.54	0.48	< 0.005	0.03	—	0.03	0.02	—	0.02	—	65.9	65.9	< 0.005	< 0.005	—	66.1

Dust From Material Movement	—	—	—	—	—	—	0.09	0.09	—	0.04	0.04	—	—	—	—	—	—	—
Onsite truck	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	0.01	0.01	< 0.005	< 0.005	< 0.005	—	0.18	0.18	< 0.005	< 0.005	< 0.005	0.19
Offsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.03	0.03	0.03	0.49	0.00	0.00	0.10	0.10	0.00	0.02	0.02	—	104	104	< 0.005	< 0.005	0.46	105
Vendor	0.02	0.01	0.29	0.15	< 0.005	< 0.005	0.07	0.07	< 0.005	0.02	0.02	—	262	262	0.01	0.04	0.70	274
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.03	0.03	0.04	0.42	0.00	0.00	0.10	0.10	0.00	0.02	0.02	—	98.7	98.7	< 0.005	< 0.005	0.01	99.9
Vendor	0.02	0.01	0.30	0.15	< 0.005	< 0.005	0.07	0.07	< 0.005	0.02	0.02	—	262	262	0.01	0.04	0.02	273
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.01	0.01	0.01	0.08	0.00	0.00	0.02	0.02	0.00	< 0.005	< 0.005	—	17.8	17.8	< 0.005	< 0.005	0.04	18.1
Vendor	< 0.005	< 0.005	0.05	0.03	< 0.005	< 0.005	0.01	0.01	< 0.005	< 0.005	< 0.005	—	46.7	46.7	< 0.005	0.01	0.05	48.7
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	< 0.005	0.01	0.00	0.00	< 0.005	< 0.005	0.00	< 0.005	< 0.005	—	2.95	2.95	< 0.005	< 0.005	0.01	2.99
Vendor	< 0.005	< 0.005	0.01	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	—	7.73	7.73	< 0.005	< 0.005	0.01	8.06
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00

3.5. Grading (2023) - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Onsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.13	0.11	1.11	1.67	< 0.005	0.05	—	0.05	0.05	—	0.05	—	254	254	0.01	< 0.005	—	255
Dust From Material Movement	—	—	—	—	—	—	< 0.005	< 0.005	—	< 0.005	< 0.005	—	—	—	—	—	—	—
Onsite truck	< 0.005	< 0.005	0.02	0.01	< 0.005	< 0.005	0.13	0.13	< 0.005	0.01	0.01	—	2.95	2.95	< 0.005	< 0.005	< 0.005	3.12
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.01	0.01	0.07	0.10	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	15.3	15.3	< 0.005	< 0.005	—	15.4
Dust From Material Movement	—	—	—	—	—	—	< 0.005	< 0.005	—	< 0.005	< 0.005	—	—	—	—	—	—	—
Onsite truck	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	0.01	0.01	< 0.005	< 0.005	< 0.005	—	0.18	0.18	< 0.005	< 0.005	< 0.005	0.19
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	< 0.005	< 0.005	0.01	0.02	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	2.54	2.54	< 0.005	< 0.005	—	2.54
Dust From Material Movement	—	—	—	—	—	—	< 0.005	< 0.005	—	< 0.005	< 0.005	—	—	—	—	—	—	—

Onsite truck	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	—	0.03	0.03	< 0.005	< 0.005	< 0.005	0.03
Offsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.01	0.01	0.01	0.14	0.00	0.00	0.03	0.03	0.00	0.01	0.01	—	32.9	32.9	< 0.005	< 0.005	< 0.005	33.3
Vendor	0.01	< 0.005	0.15	0.07	< 0.005	< 0.005	0.03	0.04	< 0.005	0.01	0.01	—	131	131	0.01	0.02	0.01	137
Hauling	0.03	0.01	0.38	0.16	< 0.005	< 0.005	0.07	0.08	< 0.005	0.02	0.02	—	288	288	0.02	0.05	0.02	302
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	< 0.005	0.01	0.00	0.00	< 0.005	< 0.005	0.00	< 0.005	< 0.005	—	2.01	2.01	< 0.005	< 0.005	< 0.005	2.04
Vendor	< 0.005	< 0.005	0.01	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	—	7.91	7.91	< 0.005	< 0.005	0.01	8.24
Hauling	< 0.005	< 0.005	0.02	0.01	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	—	17.4	17.4	< 0.005	< 0.005	0.02	18.2
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	< 0.005	< 0.005	0.00	0.00	< 0.005	< 0.005	0.00	< 0.005	< 0.005	—	0.33	0.33	< 0.005	< 0.005	< 0.005	0.34
Vendor	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	—	1.31	1.31	< 0.005	< 0.005	< 0.005	1.36
Hauling	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	—	2.87	2.87	< 0.005	< 0.005	< 0.005	3.02

3.7. Building Construction (2024) - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Onsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Off-Road Equipment	1.40	1.16	9.74	10.6	0.02	0.38	—	0.38	0.35	—	0.35	—	1,874	1,874	0.08	0.02	—	1,880
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	1.40	1.16	9.74	10.6	0.02	0.38	—	0.38	0.35	—	0.35	—	1,874	1,874	0.08	0.02	—	1,880
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	1.00	0.83	6.98	7.58	0.01	0.28	—	0.28	0.25	—	0.25	—	1,342	1,342	0.05	0.01	—	1,347
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.18	0.15	1.27	1.38	< 0.005	0.05	—	0.05	0.05	—	0.05	—	222	222	0.01	< 0.005	—	223
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Offsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.06	0.05	0.05	0.81	0.00	0.00	0.18	0.18	0.00	0.04	0.04	—	182	182	< 0.005	0.01	0.75	185
Vendor	0.01	< 0.005	0.18	0.09	< 0.005	< 0.005	0.04	0.05	< 0.005	0.01	0.01	—	170	170	0.01	0.02	0.46	178
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.06	0.05	0.06	0.70	0.00	0.00	0.18	0.18	0.00	0.04	0.04	—	173	173	< 0.005	0.01	0.02	175

Vendor	0.01	< 0.005	0.19	0.09	< 0.005	< 0.005	0.04	0.05	< 0.005	0.01	0.01	—	170	170	0.01	0.02	0.01	177
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.04	0.04	0.04	0.52	0.00	0.00	0.13	0.13	0.00	0.03	0.03	—	126	126	< 0.005	< 0.005	0.23	128
Vendor	0.01	< 0.005	0.14	0.07	< 0.005	< 0.005	0.03	0.03	< 0.005	0.01	0.01	—	122	122	0.01	0.02	0.14	127
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.01	0.01	0.01	0.10	0.00	0.00	0.02	0.02	0.00	0.01	0.01	—	20.8	20.8	< 0.005	< 0.005	0.04	21.1
Vendor	< 0.005	< 0.005	0.02	0.01	< 0.005	< 0.005	0.01	0.01	< 0.005	< 0.005	< 0.005	—	20.2	20.2	< 0.005	< 0.005	0.02	21.0
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00

3.9. Building Construction (2025) - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Onsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	1.31	1.09	9.22	10.5	0.02	0.34	—	0.34	0.31	—	0.31	—	1,874	1,874	0.08	0.02	—	1,880
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.15	0.13	1.08	1.23	< 0.005	0.04	—	0.04	0.04	—	0.04	—	220	220	0.01	< 0.005	—	221

Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.03	0.02	0.20	0.23	< 0.005	0.01	—	0.01	0.01	—	0.01	—	36.4	36.4	< 0.005	< 0.005	—	36.6
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Offsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.05	0.05	0.05	0.65	0.00	0.00	0.18	0.18	0.00	0.04	0.04	—	170	170	< 0.005	0.01	0.02	172
Vendor	0.01	< 0.005	0.18	0.09	< 0.005	< 0.005	0.04	0.05	< 0.005	0.01	0.01	—	167	167	0.01	0.02	0.01	174
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.01	0.01	0.01	0.08	0.00	0.00	0.02	0.02	0.00	< 0.005	< 0.005	—	20.2	20.2	< 0.005	< 0.005	0.03	20.5
Vendor	< 0.005	< 0.005	0.02	0.01	< 0.005	< 0.005	0.01	0.01	< 0.005	< 0.005	< 0.005	—	19.6	19.6	< 0.005	< 0.005	0.02	20.5
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	< 0.005	0.01	0.00	0.00	< 0.005	< 0.005	0.00	< 0.005	< 0.005	—	3.35	3.35	< 0.005	< 0.005	0.01	3.39
Vendor	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	—	3.25	3.25	< 0.005	< 0.005	< 0.005	3.39
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00

3.11. Paving (2025) - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e

Onsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.46	0.39	3.53	4.59	0.01	0.16	—	0.16	0.15	—	0.15	—	701	701	0.03	0.01	—	704
Paving	—	0.04	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.05	0.05	0.42	0.54	< 0.005	0.02	—	0.02	0.02	—	0.02	—	82.6	82.6	< 0.005	< 0.005	—	82.9
Paving	—	< 0.005	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.01	0.01	0.08	0.10	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	13.7	13.7	< 0.005	< 0.005	—	13.7
Paving	—	< 0.005	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Offsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.04	0.04	0.04	0.48	0.00	0.00	0.13	0.13	0.00	0.03	0.03	—	126	126	< 0.005	< 0.005	0.01	128

Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	< 0.005	0.06	0.00	0.00	0.02	0.02	0.00	< 0.005	< 0.005	—	15.1	15.1	< 0.005	< 0.005	0.03	15.3
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	< 0.005	0.01	0.00	0.00	< 0.005	< 0.005	0.00	< 0.005	< 0.005	—	2.50	2.50	< 0.005	< 0.005	< 0.005	2.53
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00

3.13. Architectural Coating (2025) - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Onsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.15	0.13	0.88	1.14	< 0.005	0.03	—	0.03	0.03	—	0.03	—	134	134	0.01	< 0.005	—	134
Architectural Coatings	—	30.5	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Off-Road Equipment	< 0.005	< 0.005	0.02	0.03	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	3.66	3.66	< 0.005	< 0.005	—	3.67
Architectural Coatings	—	0.84	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	< 0.005	< 0.005	< 0.005	0.01	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	0.61	0.61	< 0.005	< 0.005	—	0.61
Architectural Coatings	—	0.15	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Offsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.01	0.01	0.01	0.13	0.00	0.00	0.04	0.04	0.00	0.01	0.01	—	34.0	34.0	< 0.005	< 0.005	< 0.005	34.4
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	< 0.005	< 0.005	0.00	0.00	< 0.005	< 0.005	0.00	< 0.005	< 0.005	—	0.94	0.94	< 0.005	< 0.005	< 0.005	0.96
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	< 0.005	< 0.005	0.00	0.00	< 0.005	< 0.005	0.00	< 0.005	< 0.005	—	0.16	0.16	< 0.005	< 0.005	< 0.005	0.16

Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00

3.15. Trenching (2023) - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Onsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.28	0.23	2.14	2.93	< 0.005	0.09	—	0.09	0.09	—	0.09	—	432	432	0.02	< 0.005	—	433
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	< 0.005	< 0.005	0.04	0.05	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	7.61	7.61	< 0.005	< 0.005	—	7.63
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	< 0.005	< 0.005	0.01	0.01	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	1.26	1.26	< 0.005	< 0.005	—	1.26
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Offsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.02	0.02	0.02	0.28	0.00	0.00	0.07	0.07	0.00	0.02	0.02	—	65.8	65.8	< 0.005	< 0.005	0.01	66.6
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	< 0.005	0.01	0.00	0.00	< 0.005	< 0.005	0.00	< 0.005	< 0.005	—	1.17	1.17	< 0.005	< 0.005	< 0.005	1.19
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	< 0.005	< 0.005	0.00	0.00	< 0.005	< 0.005	0.00	< 0.005	< 0.005	—	0.19	0.19	< 0.005	< 0.005	< 0.005	0.20
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00

3.17. Trenching (2024) - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Onsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.26	0.22	2.05	2.93	< 0.005	0.08	—	0.08	0.08	—	0.08	—	432	432	0.02	< 0.005	—	434
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00

Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	< 0.005	< 0.005	< 0.005	0.01	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	0.85	0.85	< 0.005	< 0.005	—	0.85
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	0.14	0.14	< 0.005	< 0.005	—	0.14
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Offsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.02	0.02	0.02	0.26	0.00	0.00	0.07	0.07	0.00	0.02	0.02	—	64.5	64.5	< 0.005	< 0.005	0.01	65.2
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	< 0.005	< 0.005	0.00	0.00	< 0.005	< 0.005	0.00	< 0.005	< 0.005	—	0.13	0.13	< 0.005	< 0.005	< 0.005	0.13
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	< 0.005	< 0.005	0.00	0.00	< 0.005	< 0.005	0.00	< 0.005	< 0.005	—	0.02	0.02	< 0.005	< 0.005	< 0.005	0.02
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00

4. Operations Emissions Details

4.2. Energy

4.2.1. Electricity Emissions By Land Use - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Land Use	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
High School	—	—	—	—	—	—	—	—	—	—	—	—	191	191	0.02	< 0.005	—	192
Other Asphalt Surfaces	—	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	—	0.00
Total	—	—	—	—	—	—	—	—	—	—	—	—	191	191	0.02	< 0.005	—	192
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
High School	—	—	—	—	—	—	—	—	—	—	—	—	191	191	0.02	< 0.005	—	192
Other Asphalt Surfaces	—	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	—	0.00
Total	—	—	—	—	—	—	—	—	—	—	—	—	191	191	0.02	< 0.005	—	192
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
High School	—	—	—	—	—	—	—	—	—	—	—	—	31.6	31.6	< 0.005	< 0.005	—	31.8
Other Asphalt Surfaces	—	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	—	0.00

Total	—	—	—	—	—	—	—	—	—	—	—	—	31.6	31.6	< 0.005	< 0.005	—	31.8

4.2.3. Natural Gas Emissions By Land Use - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Land Use	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
High School	0.02	0.01	0.18	0.15	< 0.005	0.01	—	0.01	0.01	—	0.01	—	215	215	0.02	< 0.005	—	216
Other Asphalt Surfaces	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	—	0.00	—	0.00	0.00	0.00	0.00	—	0.00
Total	0.02	0.01	0.18	0.15	< 0.005	0.01	—	0.01	0.01	—	0.01	—	215	215	0.02	< 0.005	—	216
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
High School	0.02	0.01	0.18	0.15	< 0.005	0.01	—	0.01	0.01	—	0.01	—	215	215	0.02	< 0.005	—	216
Other Asphalt Surfaces	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	—	0.00	—	0.00	0.00	0.00	0.00	—	0.00
Total	0.02	0.01	0.18	0.15	< 0.005	0.01	—	0.01	0.01	—	0.01	—	215	215	0.02	< 0.005	—	216
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
High School	< 0.005	< 0.005	0.03	0.03	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	35.6	35.6	< 0.005	< 0.005	—	35.7
Other Asphalt Surfaces	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	—	0.00	—	0.00	0.00	0.00	0.00	—	0.00
Total	< 0.005	< 0.005	0.03	0.03	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	35.6	35.6	< 0.005	< 0.005	—	35.7

4.3. Area Emissions by Source

4.3.2. Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Source	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Consumer Products	—	0.69	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Architectural Coatings	—	0.08	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Landscape Equipment	0.25	0.23	0.01	1.39	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	5.72	5.72	< 0.005	< 0.005	—	5.74
Total	0.25	1.00	0.01	1.39	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	5.72	5.72	< 0.005	< 0.005	—	5.74
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Consumer Products	—	0.69	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Architectural Coatings	—	0.08	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	0.77	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Consumer Products	—	0.13	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Architectural	—	0.02	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Landscape Equipment	0.03	0.03	< 0.005	0.17	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	0.65	0.65	< 0.005	< 0.005	—	0.65
Total	0.03	0.17	< 0.005	0.17	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	0.65	0.65	< 0.005	< 0.005	—	0.65

5. Activity Data

5.1. Construction Schedule

Phase Name	Phase Type	Start Date	End Date	Days Per Week	Work Days per Phase	Phase Description
Demolition	Demolition	9/23/2023	10/23/2023	5.00	21.0	—
Site Preparation	Site Preparation	9/23/2023	12/22/2023	5.00	65.0	—
Grading	Grading	11/23/2023	12/22/2023	5.00	22.0	—
Building Construction	Building Construction	1/1/2024	3/1/2025	5.00	305	—
Paving	Paving	1/1/2025	3/1/2025	5.00	43.0	—
Architectural Coating	Architectural Coating	2/15/2025	3/1/2025	5.00	10.0	—
Utility Trenching	Trenching	12/23/2023	1/1/2024	5.00	6.00	—

5.2. Off-Road Equipment

5.2.1. Unmitigated

Phase Name	Equipment Type	Fuel Type	Engine Tier	Number per Day	Hours Per Day	Horsepower	Load Factor
Demolition	Tractors/Loaders/Backhoes	Diesel	Average	2.00	8.00	84.0	0.37
Demolition	Concrete/Industrial Saws	Diesel	Average	1.00	8.00	33.0	0.73
Demolition	Cranes	Diesel	Average	1.00	8.00	367	0.29

Site Preparation	Graders	Diesel	Average	1.00	8.00	148	0.41
Site Preparation	Rubber Tired Dozers	Diesel	Average	1.00	8.00	367	0.40
Site Preparation	Tractors/Loaders/Backhoes	Diesel	Average	1.00	8.00	84.0	0.37
Grading	Tractors/Loaders/Backhoes	Diesel	Average	1.00	7.00	84.0	0.37
Building Construction	Cranes	Diesel	Average	1.00	6.00	367	0.29
Building Construction	Forklifts	Diesel	Average	1.00	6.00	82.0	0.20
Building Construction	Generator Sets	Diesel	Average	1.00	8.00	14.0	0.74
Building Construction	Tractors/Loaders/Backhoes	Diesel	Average	1.00	8.00	84.0	0.37
Building Construction	Welders	Diesel	Average	3.00	8.00	46.0	0.45
Paving	Pavers	Diesel	Average	1.00	6.00	81.0	0.42
Paving	Paving Equipment	Diesel	Average	1.00	8.00	89.0	0.36
Paving	Rollers	Diesel	Average	1.00	7.00	36.0	0.38
Paving	Cement and Mortar Mixers	Diesel	Average	1.00	6.00	10.0	0.56
Architectural Coating	Air Compressors	Diesel	Average	1.00	6.00	37.0	0.48
Utility Trenching	Excavators	Diesel	Average	1.00	8.00	36.0	0.38
Utility Trenching	Tractors/Loaders/Backhoes	Diesel	Average	1.00	8.00	84.0	0.37

5.3. Construction Vehicles

5.3.1. Unmitigated

Phase Name	Trip Type	One-Way Trips per Day	Miles per Trip	Vehicle Mix
Demolition	—	—	—	—
Demolition	Worker	10.0	18.5	LDA,LDT1,LDT2
Demolition	Vendor	6.00	10.2	HHDT,MHDT

Demolition	Hauling	36.0	20.0	HHDT
Demolition	Onsite truck	1.00	0.83	HHDT
Site Preparation	—	—	—	—
Site Preparation	Worker	7.50	18.5	LDA,LDT1,LDT2
Site Preparation	Vendor	8.00	10.2	HHDT,MHDT
Site Preparation	Hauling	0.00	20.0	HHDT
Site Preparation	Onsite truck	1.00	1.24	HHDT
Grading	—	—	—	—
Grading	Worker	2.50	18.5	LDA,LDT1,LDT2
Grading	Vendor	4.00	10.2	HHDT,MHDT
Grading	Hauling	4.00	20.0	HHDT
Grading	Onsite truck	1.00	0.36	HHDT
Building Construction	—	—	—	—
Building Construction	Worker	13.4	18.5	LDA,LDT1,LDT2
Building Construction	Vendor	5.24	10.2	HHDT,MHDT
Building Construction	Hauling	0.00	20.0	HHDT
Building Construction	Onsite truck	—	—	HHDT
Paving	—	—	—	—
Paving	Worker	10.0	18.5	LDA,LDT1,LDT2
Paving	Vendor	—	10.2	HHDT,MHDT
Paving	Hauling	0.00	20.0	HHDT
Paving	Onsite truck	—	—	HHDT
Architectural Coating	—	—	—	—
Architectural Coating	Worker	2.69	18.5	LDA,LDT1,LDT2
Architectural Coating	Vendor	—	10.2	HHDT,MHDT
Architectural Coating	Hauling	0.00	20.0	HHDT
Architectural Coating	Onsite truck	—	—	HHDT

Utility Trenching	—	—	—	—
Utility Trenching	Worker	5.00	18.5	LDA,LDT1,LDT2
Utility Trenching	Vendor	—	10.2	HHDT,MHDT
Utility Trenching	Hauling	0.00	20.0	HHDT
Utility Trenching	Onsite truck	—	—	HHDT

5.4. Vehicles

5.4.1. Construction Vehicle Control Strategies

Control Strategies Applied	PM10 Reduction	PM2.5 Reduction
Water unpaved roads twice daily	55%	55%
Limit vehicle speeds on unpaved roads to 25 mph	44%	44%
Sweep paved roads once per month	9%	9%

5.5. Architectural Coatings

Phase Name	Residential Interior Area Coated (sq ft)	Residential Exterior Area Coated (sq ft)	Non-Residential Interior Area Coated (sq ft)	Non-Residential Exterior Area Coated (sq ft)	Parking Area Coated (sq ft)
Architectural Coating	0.00	0.00	48,000	16,000	1,739

5.6. Dust Mitigation

5.6.1. Construction Earthmoving Activities

Phase Name	Material Imported (cy)	Material Exported (cy)	Acres Graded (acres)	Material Demolished (Ton of Debris)	Acres Paved (acres)
Demolition	0.00	0.00	0.00	741	—
Site Preparation	—	—	65.0	0.00	—
Grading	—	100	8.00	0.00	—

Paving	0.00	0.00	0.00	0.00	0.67

5.6.2. Construction Earthmoving Control Strategies

Control Strategies Applied	Frequency (per day)	PM10 Reduction	PM2.5 Reduction
Water Exposed Area	2	61%	61%
Water Demolished Area	2	36%	36%

5.7. Construction Paving

Land Use	Area Paved (acres)	% Asphalt
High School	0.00	0%
Other Asphalt Surfaces	0.67	100%

5.8. Construction Electricity Consumption and Emissions Factors

kWh per Year and Emission Factor (lb/MWh)

Year	kWh per Year	CO2	CH4	N2O
2023	0.00	349	0.03	< 0.005
2024	0.00	349	0.03	< 0.005
2025	0.00	349	0.03	< 0.005

5.10. Operational Area Sources

5.10.2. Architectural Coatings

Residential Interior Area Coated (sq ft)	Residential Exterior Area Coated (sq ft)	Non-Residential Interior Area Coated (sq ft)	Non-Residential Exterior Area Coated (sq ft)	Parking Area Coated (sq ft)
0	0.00	48,000	16,000	1,739

5.11. Operational Energy Consumption

5.11.1. Unmitigated

Electricity (kWh/yr) and CO_2 and CH_4 and N_2O and Natural Gas (kBTU/yr)

Land Use	Electricity (kWh/yr)	CO2	CH4	N2O	Natural Gas (kBTU/yr)
High School	200,139	349	0.0330	0.0040	671,357
Other Asphalt Surfaces	0.00	349	0.0330	0.0040	0.00

8. User Changes to Default Data

Screen	Justification
Construction: Construction Phases	Based on schedule provided by District
Construction: Off-Road Equipment	Construction equipment mix for utilities trenching phase based on similar land use development project, shared equipment, see assumptions file
Construction: Dust From Material Movement	Based on District information, see assumptions file
Construction: Trips and VMT	Included water trucks as vendor trips and calculated on-site truck trip length, included haul trips associated with relocation of portable classrooms and removal of 15 containers, included a crane in demolition phase to relocated portable classrooms, see assumptions file
Operations: Water and Waste Water	Student capacity is not anticipated to increase, will not model water use
Operations: Vehicle Data	Student capacity is not anticipated to increase, will not model trips
Operations: Solid Waste	Student capacity is not anticipated to increase, will not model solid waste

Emissions Worksheet

Regional Construction Emissions Worksheet:

3.1. Asphalt Demolition (2023)

	ROG	NOx	CO	SO_2	PM_{10} Total	$PM_{2.5}$Total
Onsite						
Off-Road Equipment	0.86	8.37	8.90	0.02	0.35	0.32
Demolition					0.48	0.07
Onsite truck	0.01	0.02	0.01	0.01	0.30	0.03
Total	**0.87**	**8.39**	**8.91**	**0.03**	**1.13**	**0.42**
Offsite						
Worker	0.04	0.04	0.65	0.00	0.13	0.03
Vendor	0.01	0.21	0.11	0.01	0.05	0.02
Hauling	0.05	3.30	1.43	0.02	0.68	0.21
Total	**0.10**	**3.55**	**2.19**	**0.03**	**0.86**	**0.26**
TOTAL	***0.97***	***11.94***	***11.10***	***0.05***	***1.99***	***0.68***

3.3. Site Preparation (2023)

	ROG	NOx	CO	SO_2	PM10 Total	PM2.5Total
Onsite						
Off-Road Equipment	1.69	16.60	14.80	0.02	0.79	0.72
Demolition					2.76	1.34
Onsite truck	0.01	0.02	0.01	0.01	0.45	0.05
Total	**1.70**	**16.62**	**14.81**	**0.03**	**4.00**	**2.11**
Offsite						
Worker	0.03	0.03	0.49	0.00	0.10	0.02
Vendor	0.01	0.29	0.15	0.01	0.07	0.02
Hauling	0.00	0.00	0.00	0.00	0.00	0.00
Total	**0.04**	**0.32**	**0.64**	**0.01**	**0.17**	**0.04**
TOTAL	***1.74***	***16.94***	***15.45***	***0.03***	***4.17***	***2.15***

3.5. Grading (2023)

	ROG	NOx	CO	SO_2	PM10 Total	PM2.5Total
Onsite						
Off-Road Equipment	0.11	1.11	1.67	0.01	0.05	0.05
Demolition					0.01	0.01
Onsite truck	0.01	0.02	0.01	0.01	0.13	0.01
Total	**0.12**	**1.13**	**1.68**	**0.01**	**0.19**	**0.07**
Offsite						
Worker	0.01	0.01	0.14	0.00	0.03	0.01
Vendor	0.01	0.15	0.07	0.01	0.04	0.01
Hauling	0.01	0.38	0.16	0.01	0.08	0.02
Total	**0.03**	**0.54**	**0.37**	**0.01**	**0.15**	**0.04**
TOTAL	***0.14***	***1.67***	***2.05***	***0.02***	***0.34***	***0.11***

3.7. Building Construction (2024)

		ROG	NOx	CO	SO2	PM10 Total	PM2.5 Total
Onsite							
	Off-Road Equipment	1.16	9.74	10.60	0.02	0.38	0.35
	Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00
	Total	**1.16**	**9.74**	**10.60**	**0.02**	**0.38**	**0.35**
Offsite							
	Worker	0.05	0.05	0.81	0.00	0.18	0.04
	Vendor	0.01	0.18	0.09	0.01	0.05	0.01
	Hauling	0.00	0.00	0.00	0.00	0.00	0.00
	Total	**0.06**	**0.23**	**0.90**	**0.01**	**0.23**	**0.05**
TOTAL		***1.22***	***9.97***	***11.50***	***0.03***	***0.61***	***0.40***

3.9. Building Construction (2025)

		ROG	NOx	CO	SO2	PM10 Total	PM2.5 Total
Onsite							
	Off-Road Equipment	1.09	9.22	10.50	0.02	0.34	0.31
	Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00
	Total	**1.09**	**9.22**	**10.50**	**0.02**	**0.34**	**0.31**
Offsite							
	Worker	0.05	0.05	0.65	0.00	0.18	0.04
	Vendor	0.01	0.18	0.09	0.01	0.05	0.01
	Hauling	0.00	0.00	0.00	0.00	0.00	0.00
	Total	**0.06**	**0.23**	**0.74**	**0.01**	**0.23**	**0.05**
TOTAL		***1.15***	***9.45***	***11.24***	***0.03***	***0.57***	***0.36***

3.11. Paving (2025)

		ROG	NOx	CO	SO2	PM10 Total	PM2.5 Total
Onsite							
	Off-Road Equipment	0.39	3.53	4.59	0.01	0.16	0.15
	Paving	0.04					
	Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00
	Total	**0.43**	**3.53**	**4.59**	**0.01**	**0.16**	**0.15**
Offsite							
	Worker	0.04	0.04	0.48	0.00	0.13	0.03
	Vendor	0.00	0.00	0.00	0.00	0.00	0.00
	Hauling	0.00	0.00	0.00	0.00	0.00	0.00
	Total	**0.04**	**0.04**	**0.48**	**0.00**	**0.13**	**0.03**
TOTAL		***0.47***	***3.57***	***5.07***	***0.01***	***0.29***	***0.18***

3.13. Architectural Coating (2025)

		ROG	NOx	CO	SO2	PM10 Total	PM2.5 Total
Onsite							
	Off-Road Equipment	0.13	0.88	1.14	0.01	0.03	0.03
	Architectural Coating	30.50					
	Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00
	Total	**30.63**	**0.88**	**1.14**	**0.01**	**0.03**	**0.03**
Offsite							
	Worker	0.01	0.01	0.13	0.00	0.04	0.01
	Vendor	0.00	0.00	0.00	0.00	0.00	0.00
	Hauling	0.00	0.00	0.00	0.00	0.00	0.00
	Total	**0.01**	**0.01**	**0.13**	**0.00**	**0.04**	**0.01**
TOTAL		***30.64***	***0.89***	***1.27***	***0.01***	***0.07***	***0.04***

3.15. Trenching (2023)

		ROG	NOx	CO	SO2	PM10 Total	PM2.5 Total
Onsite							
	Off-Road Equipment	0.23	2.14	2.93	0.01	0.09	0.09
	Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00
	Total	**0.23**	**2.14**	**2.93**	**0.01**	**0.09**	**0.09**
Offsite							
	Worker	0.02	0.02	0.28	0.00	0.07	0.02
	Vendor	0.00	0.00	0.00	0.00	0.00	0.00
	Hauling	0.00	0.00	0.00	0.00	0.00	0.00
	Total	**0.02**	**0.02**	**0.28**	**0.00**	**0.07**	**0.02**
TOTAL		***0.25***	***2.16***	***3.21***	***0.01***	***0.16***	***0.11***

	ROG	NOx	CO	SO2	PM10 Total	PM2.5 Total
Asphalt Demolition and Site Preparation	***3***	***29***	***27***	***0.08***	***6.16***	***2.83***
Site Preparation	***2***	***17***	***15***	***0.03***	***4.17***	***2.15***
Site Preparation and Grading	***2***	***19***	***18***	***0.05***	***4.51***	***2.26***
Site Preparation, Grading, and Utility Trenching	***2***	***21***	***21***	***0.06***	***4.67***	***2.37***
Utility Trenching	***0***	***2***	***3***	***0.01***	***0.16***	***0.11***
Utility Trenching and Building Construction	***1***	***12***	***15***	***0.03***	***0.77***	***0.51***
Building Construction (2024)	***1***	***10***	***12***	***0.03***	***0.61***	***0.40***
Building Construction (2025) and Paving	***2***	***13***	***16***	***0.04***	***0.86***	***0.54***
Building Construction, Paving, and Architectural Coating	***32***	***14***	***18***	***0.04***	***0.93***	***0.58***
MAX DAILY	**32**	**29**	**27**	**0.08**	**6.16**	**2.83**
Regional Thresholds	**75**	**100**	**550**	**150**	**150**	**55**
Exceeds Thresholds?	No	No	No	No	No	No

Construction LST Worksheet:

3.1. Asphalt Demolition (2023)	NOx	CO	PM_{10} Total	$PM_{2.5}$Total
Onsite				
Off-Road Equipment	8.37	8.90	0.35	0.32
Demolition			0.48	0.07
Onsite truck	0.02	0.01	0.30	0.03
Total	**8.39**	**8.91**	**1.13**	**0.42**
Offsite				
Worker				
Vendor				
Hauling				
Total	**0.00**	**0.00**	**0.00**	**0.00**
TOTAL	***8.39***	***8.91***	***1.13***	***0.42***

3.3. Site Preparation (2023)	NOx	CO	PM10 Total	PM2.5Total
Onsite				
Off-Road Equipment	16.60	14.80	0.79	0.72
Demolition			2.76	1.34
Onsite truck	0.02	0.01	0.45	0.05
Total	**16.62**	**14.81**	**4.00**	**2.11**
Offsite				
Worker				
Vendor				
Hauling				
Total	**0.00**	**0.00**	**0.00**	**0.00**
TOTAL	***16.62***	***14.81***	***4.00***	***2.11***

3.5. Grading (2023)	NOx	CO	PM10 Total	PM2.5Total
Onsite				
Off-Road Equipment	1.11	1.67	0.05	0.05
Demolition			0.01	0.01
Onsite truck	0.02	0.01	0.13	0.01
Total	**1.13**	**1.68**	**0.19**	**0.07**
Offsite				
Worker				
Vendor				
Hauling				
Total	**0.00**	**0.00**	**0.00**	**0.00**
TOTAL	***1.13***	***1.68***	***0.19***	***0.07***

3.7. Building Construction (2024)				
	NOx	CO	PM10 Total	PM2.5 Total
Onsite				
Off-Road Equipment	9.74	10.60	0.38	0.35
Onsite truck	0.00	0.00	0.00	0.00
Total	**9.74**	**10.60**	**0.38**	**0.35**
Offsite				
Worker				
Vendor				
Hauling				
Total	**0.00**	**0.00**	**0.00**	**0.00**
TOTAL	***9.74***	***10.60***	***0.38***	***0.35***

3.9. Building Construction (2025)				
	NOx	CO	PM10 Total	PM2.5 Total
Onsite				
Off-Road Equipment	9.22	10.50	0.34	0.31
Onsite truck	0.00	0.00	0.00	0.00
Total	**9.22**	**10.50**	**0.34**	**0.31**
Offsite				
Worker				
Vendor				
Hauling				
Total	**0.00**	**0.00**	**0.00**	**0.00**
TOTAL	***9.22***	***10.50***	***0.34***	***0.31***

3.11. Paving (2025)				
	NOx	CO	PM10 Total	PM2.5 Total
Onsite				
Off-Road Equipment	3.53	4.59	0.16	0.15
Paving				
Onsite truck	0.00	0.00	0.00	0.00
Total	**3.53**	**4.59**	**0.16**	**0.15**
Offsite				
Worker				
Vendor				
Hauling				
Total	**0.00**	**0.00**	**0.00**	**0.00**
TOTAL	***3.53***	***4.59***	***0.16***	***0.15***

3.13. Architectural Coating (2025)

	NOx	CO	PM10 Total	PM2.5 Total
Onsite				
Off-Road Equipment	0.88	1.14	0.03	0.03
Architectural Coating				
Onsite truck	0.00	0.00	0.00	0.00
Total	**0.88**	**1.14**	**0.03**	**0.03**
Offsite				
Worker				
Vendor				
Hauling				
Total	**0.00**	**0.00**	**0.00**	**0.00**
TOTAL	***0.88***	***1.14***	***0.03***	***0.03***

3.15. Trenching (2023)

	NOx	CO	PM10 Total	PM2.5 Total
Onsite				
Off-Road Equipment	2.14	2.93	0.09	0.09
Onsite truck	0.00	0.00	0.00	0.00
Total	**2.14**	**2.93**	**0.09**	**0.09**
Offsite				
Worker				
Vendor				
Hauling				
Total	**0.00**	**0.00**	**0.00**	**0.00**
TOTAL	***2.14***	***2.93***	***0.09***	***0.09***

	NOx	CO	PM10 Total	PM2.5 Total
Asphalt Demolition and Site Preparation	***25***	***24***	***5.13***	***2.53***
1.40 Acre LST	***95***	***577***	***25.13***	***8.03***
Exceeds LST?	***no***	***no***	***no***	***no***
Site Preparation	***17***	***15***	***4.00***	***2.11***
1.40 Acre LST	***95***	***577***	***25.13***	***8.03***
Exceeds LST?	***no***	***no***	***no***	***no***
Site Preparation and Grading	***18***	***16***	***4.19***	***2.18***
1.40 Acre LST	***95***	***577***	***25.13***	***8.03***
Exceeds LST?	***no***	***no***	***no***	***no***
Site Preparation, Grading, and Utility Trenching	***20***	***19***	***4.28***	***2.27***
1.40 Acre LST	***95***	***577***	***25.13***	***8.03***
Exceeds LST?	***no***	***no***	***no***	***no***
Utility Trenching	***2***	***3***	***0.09***	***0.09***
≤ 1.00 Acre LST	***81***	***485***	***22.33***	***7.23***
Exceeds LST?	***no***	***no***	***no***	***no***
Utility Trenching and Building Construction	***11***	***13***	***0.43***	***0.40***
≤ 1.00 Acre LST	***81***	***485***	***22.33***	***7.23***
Exceeds LST?	***no***	***no***	***no***	***no***
Building Construction (2024)	***10***	***11***	***0.38***	***0.35***
≤ 1.00 Acre LST	***81***	***485***	***22.33***	***7.23***
Exceeds LST?	***no***	***no***	***no***	***no***
Building Construction (2025) and Paving	***13***	***15***	***0.50***	***0.46***
≤ 1.00 Acre LST	***81***	***485***	***22.33***	***7.23***
Exceeds LST?	***no***	***no***	***no***	***no***
Building Construction, Paving, and Architectural Coating	***14***	***16***	***0.53***	***0.49***
≤ 1.00 Acre LST	***81***	***485***	***22.33***	***7.23***
Exceeds LST?	***no***	***no***	***no***	***no***

Regional Operation Emissions Worksheet

[1] CalEEMod, Version 2022.1.1.13

Proposed Project

Summer

	ROG	NOx	CO	SO2	PM10 Total	PM2.5 Total
Mobile	0.00	0.00	0.00	0.00	0.00	0.00
Area	1.00	0.01	1.39	0.01	0.01	0.01
Energy	0.01	0.18	0.15	0.01	0.01	0.01
Total	**1.01**	**0.19**	**1.54**	**0.01**	**0.02**	**0.02**

Winter

	ROG	NOx	CO	SO2	PM10 Total	PM2.5 Total
Mobile	0.00	0.00	0.00	0.00	0.00	0.00
Area	0.77					
Energy	0.01	0.18	0.15	0.01	0.01	0.01
Total	**0.78**	**0.18**	**0.15**	**0.01**	**0.01**	**0.01**

Max Daily

	ROG	NOx	CO	SO2	PM10 Total	PM2.5 Total
Mobile	0.00	0.00	0.00	0.00	0.00	0.00
Area	1.00	0.01	1.39	0.01	0.01	0.01
Energy	0.01	0.18	0.15	0.01	0.01	0.01
Total	**1.01**	**0.19**	**1.54**	**0.01**	**0.02**	**0.02**
Regional Thresholds (lb/day)	**55**	**55**	**550**	**150**	**150**	**55**
Exceeds Thresholds?	No	No	No	No	No	No

GHG Emissions Inventory

Proposed Project Buildout

Construction[1]

	$MTCO_2e$
2023	133
2024	265
2025	60
Total Construction	**458**
30-Year Amortization[2]	**15**

Notes

1 CalEEMod, Version 2022.1.1.13

2 Total construction emissions are amortized over 30 years per SCAQMD methodology; SCAQMD. 2009, November 19. Greenhouse Gases (GHG) CEQA Significance Thresholds Working Group Meeting 14. http://www.aqmd.gov/docs/default-source/ceqa/handbook/greenhouse-gases-(ghg)-ceqa-significance-thresholds/year-2008-2009/ghg-meeting-14/ghg-meeting-14-main-presentation.pdf?sfvrsn=2.

Operations[1]

	$MTCO_2e$/Year[2]	
	Operations	**%**
Area	1	1%
Energy	68	81%
30-Year Construction Amortization	15	18%
	84	100%
South Coast AQMD Bright-Line Screening Threshold	**3,000**	
Exceed Threshold?	**No**	

Notes

1 CalEEMod, Version 2022.1.1.13

2 $MTCO_2e$=metric tons of carbon dioxide equivalent. Student capacity would not increase, did not evaluate trips, water use, or solid waste.

LST Worksheets

Construction Localized Significance Thresholds: Asphalt Demolition and Site Preparation

SRA No.	Acres	*NOx & CO* Source Receptor Distance (meters)	Source Receptor Distance (Feet)	*PM10 & PM2.5* Source Receptor Distance (meters)	Source Receptor Distance (Feet)	Construction / Project Site Size (Acres)
17	1.40	25	82	82	270	1.40

Source Receptor	**Central Orange County**	**Equipment**	**Acres/8-hr Day**		**Daily hours**	**Equipment Used**	**Acres**
Distance (meters)	25						
NOx	**95**	Tractors	0.5	0.0625	8	3	1.5
CO	**577**	Graders	0.5	0.0625	8	1	0.5
PM10	**25.13**	Dozers	0.5	0.0625	8	1	0.5
PM2.5	**8.03**	Scrapers	1	0.125			0
						Acres	2.50

	Acres	**25**	**50**	**100**	**200**	**500**
NOx	1	81	83	98	123	192
	2	115	114	125	148	205
		95	95	109	133	197
CO	1	485	753	1128	2109	6841
	2	715	1041	1547	2685	7493
		577	868	1296	2339	7102
PM10	1	4	12	28	60	158
	2	6	19	35	68	166
		5	15	31	63	161
PM2.5	1	3	4	9	22	85
	2	4	6	11	25	92
		3	5	10	23	88

Central Orange County

1.40 Acres

	25	**50**	**100**	**200**	**500**
NOx	95	95	109	133	197
CO	577	868	1296	2339	7102
PM10	5	15	31	63	161
PM2.5	3	5	10	23	88

Acre Below		**Acre Above**	
SRA No.	Acres	SRA No.	Acres
17	1	17	2
Distance Increment Below			
25			
Distance Increment Above			
25			

Updated: 10/21/2009 - Table C-1. 2006 – 2008

Construction Localized Significance Thresholds: Site Preparation

SRA No.	Acres	*NOx & CO* Source Receptor Distance (meters)	Source Receptor Distance (Feet)	*PM10 & PM2.5* Source Receptor Distance (meters)	Source Receptor Distance (Feet)	Construction / Project Site Size (Acres)
17	1.40	25	82	82	270	1.40

Source Receptor	**Central Orange County**	**Equipment**	**Acres/8-hr Day**		**Daily hours**	**Equipment Used**	**Acres**
Distance (meters)	25						
NOx	**95**	Tractors	0.5	0.0625	8	1	0.5
CO	**577**	Graders	0.5	0.0625	8	1	0.5
PM10	**25.13**	Dozers	0.5	0.0625	8	1	0.5
PM2.5	**8.03**	Scrapers	1	0.125			0
						Acres	1.50

	Acres	**25**	**50**	**100**	**200**	**500**
NOx	1	81	83	98	123	192
	2	115	114	125	148	205
		95	95	109	133	197
CO	1	485	753	1128	2109	6841
	2	715	1041	1547	2685	7493
		577	868	1296	2339	7102
PM10	1	4	12	28	60	158
	2	6	19	35	68	166
		5	15	31	63	161
PM2.5	1	3	4	9	22	85
	2	4	6	11	25	92
		3	5	10	23	88

Central Orange County

1.40 Acres

	25	**50**	**100**	**200**	**500**
NOx	95	95	109	133	197
CO	577	868	1296	2339	7102
PM10	5	15	31	63	161
PM2.5	3	5	10	23	88

Acre Below		**Acre Above**	
SRA No.	Acres	SRA No.	Acres
17	1	17	2
Distance Increment Below			
25			
Distance Increment Above			
25			

Updated: 10/21/2009 - Table C-1. 2006 – 2008

Construction Localized Significance Thresholds: Site Preparation and Grading

SRA No.	Acres	NOx & CO Source Receptor Distance (meters)	NOx & CO Source Receptor Distance (Feet)	PM10 & PM2.5 Source Receptor Distance (meters)	PM10 & PM2.5 Source Receptor Distance (Feet)	Construction / Project Site Size (Acres)
17	1.40	25	82	82	270	1.40

Source Receptor	**Central Orange County**	**Equipment**	**Acres/8-hr Day**		**Daily hours**	**Equipment Used**	**Acres**
Distance (meters)	25	Tractors	0.5	0.0625	7	1	0.4375
NOx	**95**	Tractors	0.5	0.0625	8	1	0.5
CO	**577**	Graders	0.5	0.0625	8	1	0.5
PM10	**25.13**	Dozers	0.5	0.0625	8	1	0.5
PM2.5	**8.03**	Scrapers	1	0.125			0
						Acres	1.94

	Acres	**25**	**50**	**100**	**200**	**500**
NOx	1	81	83	98	123	192
	2	115	114	125	148	205
		95	95	109	133	197
CO	1	485	753	1128	2109	6841
	2	715	1041	1547	2685	7493
		577	868	1296	2339	7102
PM10	1	4	12	28	60	158
	2	6	19	35	68	166
		5	15	31	63	161
PM2.5	1	3	4	9	22	85
	2	4	6	11	25	92
		3	5	10	23	88

Central Orange County

1.40 Acres

	25	**50**	**100**	**200**	**500**
NOx	95	95	109	133	197
CO	577	868	1296	2339	7102
PM10	5	15	31	63	161
PM2.5	3	5	10	23	88

Acre Below		**Acre Above**	
SRA No.	Acres	SRA No.	Acres
17	1	17	2
Distance Increment Below			
25			
Distance Increment Above			
25			

Updated: 10/21/2009 - Table C-1. 2006 – 2008

Construction Localized Significance Thresholds: Site Preparation, Grading, and Utility Trenching

SRA No.	Acres	*NOx & CO* Source Receptor Distance (meters)	Source Receptor Distance (Feet)	*PM10 & PM2.5* Source Receptor Distance (meters)	Source Receptor Distance (Feet)	Construction / Project Site Size (Acres)
17	1.40	25	82	82	270	1.40

Source Receptor	**Central Orange County**	**Equipment**	**Acres/8-hr Day**		**Daily hours**	**Equipment Used**	**Acres**
Distance (meters)	25	Tractors	0.5	0.0625	7	1	0.4375
NOx	**95**	Tractors	0.5	0.0625	8	2	1
CO	**577**	Graders	0.5	0.0625	8	1	0.5
PM10	**25.13**	Dozers	0.5	0.0625	8	1	0.5
PM2.5	**8.03**	Scrapers	1	0.125			0
						Acres	2.44

	Acres	**25**	**50**	**100**	**200**	**500**
NOx	1	81	83	98	123	192
	2	115	114	125	148	205
		95	95	109	133	197
CO	1	485	753	1128	2109	6841
	2	715	1041	1547	2685	7493
		577	868	1296	2339	7102
PM10	1	4	12	28	60	158
	2	6	19	35	68	166
		5	15	31	63	161
PM2.5	1	3	4	9	22	85
	2	4	6	11	25	92
		3	5	10	23	88

Central Orange County

1.40 Acres

	25	**50**	**100**	**200**	**500**
NOx	95	95	109	133	197
CO	577	868	1296	2339	7102
PM10	5	15	31	63	161
PM2.5	3	5	10	23	88

Acre Below		**Acre Above**	
SRA No.	Acres	SRA No.	Acres
17	1	17	2
Distance Increment Below			
25			
Distance Increment Above			
25			

Updated: 10/21/2009 - Table C-1. 2006 – 2008

Construction Localized Significance Thresholds: Utility Trenching

SRA No.	Acres	NOx & CO Source Receptor Distance (meters)	Source Receptor Distance (Feet)	PM10 & PM2.5 Source Receptor Distance (meters)	Source Receptor Distance (Feet)	Construction / Project Site Size (Acres)
17	0.50	25	82	82	270	1.40

Source Receptor Distance (meters)	Central Orange County	Equipment	Acres/8-hr Day		Daily hours	Equipment Used	Acres
	25						
NOx	**81**	Tractors	0.5	0.0625	8	1	0.5
CO	**485**	Graders	0.5	0.0625			0
PM10	**22.33**	Dozers	0.5	0.0625			0
PM2.5	**7.23**	Scrapers	1	0.125			0
						Acres	0.50

	Acres	**25**	**50**	**100**	**200**	**500**
NOx	1	81	83	98	123	192
	1	81	83	98	123	192
		81	83	98	123	192
CO	1	485	753	1128	2109	6841
	1	485	753	1128	2109	6841
		485	753	1128	2109	6841
PM10	1	4	12	28	60	158
	1	4	12	28	60	158
		4	12	28	60	158
PM2.5	1	3	4	9	22	85
	1	3	4	9	22	85
		3	4	9	22	85

Central Orange County

0.50 Acres

	25	**50**	**100**	**200**	**500**
NOx	81	83	98	123	192
CO	485	753	1128	2109	6841
PM10	4	12	28	60	158
PM2.5	3	4	9	22	85

Acre Below		**Acre Above**	
SRA No.	Acres	SRA No.	Acres
17	1	17	1
Distance Increment Below			
25			
Distance Increment Above			
25			

Updated: 10/21/2009 - Table C-1. 2006 – 2008

Construction Localized Significance Thresholds: Utility Trenching and Building Construction

		NOx & CO		***PM10 & PM2.5***		
SRA No.	Acres	Source Receptor Distance (meters)	Source Receptor Distance (Feet)	Source Receptor Distance (meters)	Source Receptor Distance (Feet)	Construction / Project Site Size (Acres)
17	1.00	25	82	82	270	1.40

Source Receptor Distance (meters)	**Central Orange County** 25	**Equipment**	**Acres/8-hr Day**		**Daily hours**	**Equipment Used**	**Acres**
NOx	**81**	Tractors	0.5	0.0625	8	2	1
CO	**485**	Graders	0.5	0.0625			0
PM10	**22.33**	Dozers	0.5	0.0625			0
PM2.5	**7.23**	Scrapers	1	0.125			0
						Acres	1.00

	Acres	**25**	**50**	**100**	**200**	**500**
NOx	1	81	83	98	123	192
	1	81	83	98	123	192
		81	83	98	123	192
CO	1	485	753	1128	2109	6841
	1	485	753	1128	2109	6841
		485	753	1128	2109	6841
PM10	1	4	12	28	60	158
	1	4	12	28	60	158
		4	12	28	60	158
PM2.5	1	3	4	9	22	85
	1	3	4	9	22	85
		3	4	9	22	85

Central Orange County

1.00 Acres

	25	**50**	**100**	**200**	**500**
NOx	81	83	98	123	192
CO	485	753	1128	2109	6841
PM10	4	12	28	60	158
PM2.5	3	4	9	22	85

Acre Below		**Acre Above**	
SRA No.	Acres	SRA No.	Acres
17	1	17	1

Distance Increment Below
25

Distance Increment Above
25

Updated: 10/21/2009 - Table C-1. 2006 – 2008

Construction Localized Significance Thresholds: Building Construction

SRA No.	Acres	NOx & CO Source Receptor Distance (meters)	Source Receptor Distance (Feet)	PM10 & PM2.5 Source Receptor Distance (meters)	Source Receptor Distance (Feet)	Construction / Project Site Size (Acres)
17	0.50	25	82	82	270	1.40

Source Receptor Distance (meters)	Central Orange County	Equipment	Acres/8-hr Day		Daily hours	Equipment Used	Acres
	25						
NOx	**81**	Tractors	0.5	0.0625	8	1	0.5
CO	**485**	Graders	0.5	0.0625			0
PM10	**22.33**	Dozers	0.5	0.0625			0
PM2.5	**7.23**	Scrapers	1	0.125			0
						Acres	0.50

	Acres	**25**	**50**	**100**	**200**	**500**
NOx	1	81	83	98	123	192
	1	81	83	98	123	192
		81	83	98	123	192
CO	1	485	753	1128	2109	6841
	1	485	753	1128	2109	6841
		485	753	1128	2109	6841
PM10	1	4	12	28	60	158
	1	4	12	28	60	158
		4	12	28	60	158
PM2.5	1	3	4	9	22	85
	1	3	4	9	22	85
		3	4	9	22	85

Central Orange County

0.50 Acres

	25	**50**	**100**	**200**	**500**
NOx	81	83	98	123	192
CO	485	753	1128	2109	6841
PM10	4	12	28	60	158
PM2.5	3	4	9	22	85

Acre Below		**Acre Above**	
SRA No.	Acres	SRA No.	Acres
17	1	17	1
Distance Increment Below			
25			
Distance Increment Above			
25			

Updated: 10/21/2009 - Table C-1. 2006 – 2008

Construction Localized Significance Thresholds: Building Construction and Paving

SRA No.	Acres	NOx & CO Source Receptor Distance (meters)	Source Receptor Distance (Feet)	PM10 & PM2.5 Source Receptor Distance (meters)	Source Receptor Distance (Feet)	Construction / Project Site Size (Acres)
17	0.50	25	82	82	270	1.40

Source Receptor Distance (meters)	**Central Orange County** 25	**Equipment**	**Acres/8-hr Day**		**Daily hours**	**Equipment Used**	**Acres**
NOx	**81**	Tractors	0.5	0.0625	8	1	0.5
CO	**485**	Graders	0.5	0.0625			0
PM10	**22.33**	Dozers	0.5	0.0625			0
PM2.5	**7.23**	Scrapers	1	0.125			0
						Acres	0.50

	Acres	**25**	**50**	**100**	**200**	**500**
NOx	1	81	83	98	123	192
	1	81	83	98	123	192
		81	83	98	123	192
CO	1	485	753	1128	2109	6841
	1	485	753	1128	2109	6841
		485	753	1128	2109	6841
PM10	1	4	12	28	60	158
	1	4	12	28	60	158
		4	12	28	60	158
PM2.5	1	3	4	9	22	85
	1	3	4	9	22	85
		3	4	9	22	85

Central Orange County

0.50 Acres

	25	**50**	**100**	**200**	**500**
NOx	81	83	98	123	192
CO	485	753	1128	2109	6841
PM10	4	12	28	60	158
PM2.5	3	4	9	22	85

Acre Below		**Acre Above**	
SRA No.	Acres	SRA No.	Acres
17	1	17	1
Distance Increment Below			
25			
Distance Increment Above			
25			

Updated: 10/21/2009 - Table C-1. 2006 – 2008

Construction Localized Significance Thresholds: Building Construction, Paving, and Architectural Coating

		NOx & CO		PM10 & PM2.5		
SRA No.	Acres	Source Receptor Distance (meters)	Source Receptor Distance (Feet)	Source Receptor Distance (meters)	Source Receptor Distance (Feet)	Construction / Project Site Size (Acres)
17	0.50	25	82	82	270	1.40

Source Receptor	Central Orange County	Equipment	Acres/8-hr Day		Daily hours	Equipment Used	Acres
Distance (meters)	25						
NOx	**81**	Tractors	0.5	0.0625	8	1	0.5
CO	**485**	Graders	0.5	0.0625			0
PM10	**22.33**	Dozers	0.5	0.0625			0
PM2.5	**7.23**	Scrapers	1	0.125			0
						Acres	0.50

	Acres	**25**	**50**	**100**	**200**	**500**
NOx	1	81	83	98	123	192
	1	81	83	98	123	192
		81	83	98	123	192
CO	1	485	753	1128	2109	6841
	1	485	753	1128	2109	6841
		485	753	1128	2109	6841
PM10	1	4	12	28	60	158
	1	4	12	28	60	158
		4	12	28	60	158
PM2.5	1	3	4	9	22	85
	1	3	4	9	22	85
		3	4	9	22	85

Central Orange County

0.50 Acres

	25	**50**	**100**	**200**	**500**
NOx	81	83	98	123	192
CO	485	753	1128	2109	6841
PM10	4	12	28	60	158
PM2.5	3	4	9	22	85

Acre Below		**Acre Above**	
SRA No.	Acres	SRA No.	Acres
17	1	17	1
Distance Increment Below			
25			
Distance Increment Above			
25			

Updated: 10/21/2009 - Table C-1. 2006 – 2008

Appendix B Revised Geotechnical Evaluation Los Alamitos High School New Gymnasium

Appendix

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Revised Geotechnical Evaluation

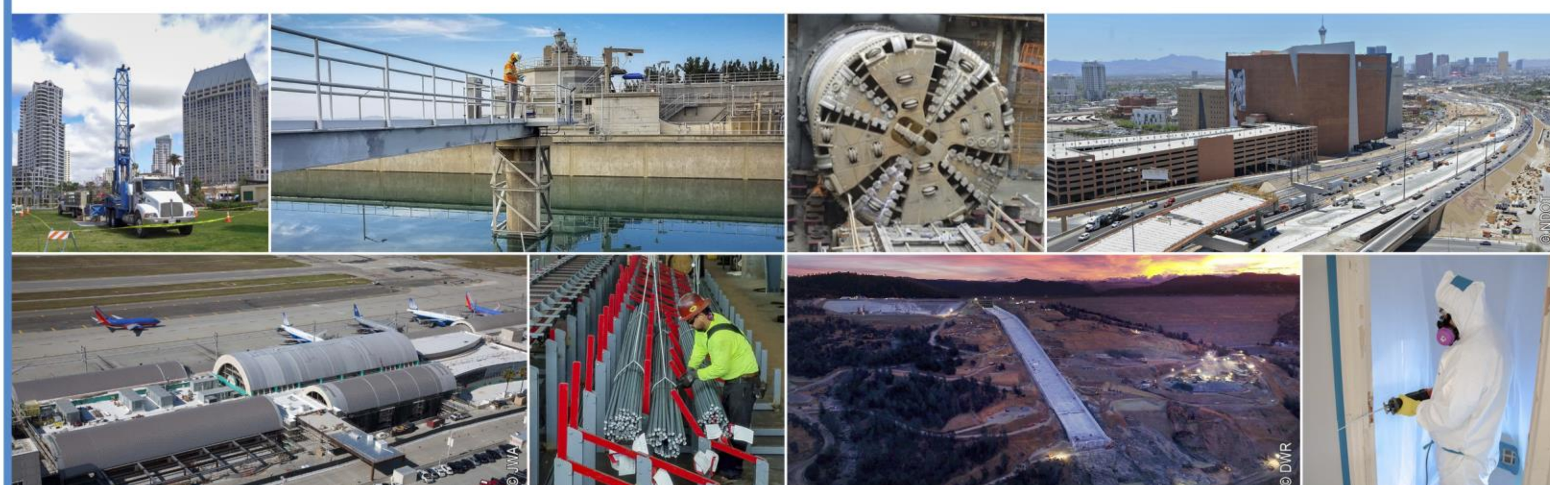
Los Alamitos High School New Gymnasium
3591 West Cerritos Avenue

Los Alamitos, California

Los Alamitos Unified School District

10293 Bloomfield Street | Los Alamitos, California 90720

September 30, 2022 | Project No. 211897001



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Geotechnical & Environmental Sciences Consultants

35+ YEARS

Revised Geotechnical Evaluation

Los Alamitos High School New Gymnasium 3591 West Cerritos Avenue

Los Alamitos, California

Mr. CJ Knowland

Los Alamitos Unified School District

10293 Bloomfield Street | Los Alamitos, California 90720

September 30, 2022 | Project No. 211897001

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1 INTRODUCTION

In accordance with your request, we have performed a geotechnical evaluation for the Los Alamitos High School New Gymnasium Project located at 3591 West Cerritos Avenue in Los Alamitos, California (Figure 1). The purpose of this study was to perform a subsurface evaluation and to provide geotechnical design recommendations for the construction of the new gymnasium in general accordance with the 2019 California Building Code (CBC) and California Geological Survey (CGS) Note 48 (2019). Upon the completion and issuance of our report on May 27, 2022, we received information from Mr. Roy Frey with Westgroup Designs regarding the conflict between the existing electrical conduit and the footings on the west side of the proposed gymnasium. Accordingly, we have revised our recommendations to mitigate the conflict.

2 SCOPE OF SERVICES

Our scope of services for this project included the following:

- Project coordination, planning, and scheduling for the subsurface exploration.
- Review of readily available background information, including in-house published geotechnical literature and geologic maps, fault and seismic hazard maps, topographic maps, and stereoscopic aerial photographs.
- Geotechnical site reconnaissance to observe the general site conditions, mark the boring and cone penetration test sounding (CPT) locations, and coordinate with Underground Service Alert for utility clearance.
- Performance a geophysical survey to clear the boring and CPT locations of underground utilities and obstructions prior to drilling.
- Acquisition of boring permits from Orange County Health Care Agency Environmental Health Division for drilling into groundwater.
- Subsurface exploration consisting of the drilling, logging, and sampling of five hollow-stem auger borings with a truck-mounted drill rig. The borings were excavated to depths ranging from approximately 31½ to 101½ feet below the ground surface. The borings were logged by a representative from our firm, and bulk and relatively undisturbed soil samples were collected at selected depth intervals for laboratory testing.
- Subsurface exploration consisting of two CPT soundings to depths of approximately 100 feet below the ground surface.
- Laboratory testing on selected soil samples, including evaluation of in-situ moisture and dry density, percentage of particles finer than the No. 200 sieve, Atterberg limits, consolidation, direct shear strength, and soil corrosivity.
- Compilation and geotechnical analyses of the information obtained from our background review, subsurface evaluation and laboratory testing.
- Preparation of this geotechnical report presenting our findings, conclusions, and recommendations for the design and construction of the proposed improvements.

3 SITE DESCRIPTION AND PROPOSED CONSTRUCTION

Los Alamitos High School is located at 3591 West Cerritos Avenue in the city of Los Alamitos, California (Figure 1). The site of the proposed gymnasium building is located on the north central portion of the campus, bounded by the football field to the east, a parking lot to the south, an existing building and pool to the west, and softball and soccer fields to the north. The site latitude and longitude are approximately 33.813297 degrees north and -118.068715 degrees west, respectively (Google Earth, 2022). Topographically, the site is relatively flat with an elevation of approximately 28 feet above mean sea level (United States Geological Survey [USGS], 2021). The concrete lined Coyote Creek, a tributary of the San Gabriel River, is located approximately 500 feet north of the project site.

The project site is currently occupied by portable classrooms and shipping containers supported on asphalt concrete pavement. We understand that the existing structures at the project site will be removed and a new, approximately 38,000 square-foot gymnasium building will be constructed. The new gymnasium building will include basketball courts, restrooms, concession areas, offices, team rooms, storage, and a weight room. Based on our discussions and review of document provided by the design group, we understand that a 6-foot-wide electrical conduit exists along the west side of the proposed Gymnasium and is inside of the building footprint with a distance of approximately 14 inches between the proposed footing and the conduit.

4 SUBSURFACE EVALUATION AND LABORATORY TESTING

Our subsurface evaluation was conducted on April 6 to 8, 2022 and consisted of the drilling, logging, and sampling of five small-diameter borings to depths ranging from approximately 31½ to 101½ feet and advancing two CPT soundings to depths of approximately 100 feet. The borings were drilled using a truck-mounted drill rig with 8-inch-diameter hollow-stem augers. The borings were drilled to evaluate the subsurface conditions and were logged by a representative from our firm. Bulk and relatively undisturbed soil samples were obtained at selected depths from the borings for laboratory testing. The CPT soundings were performed using a 30-ton truck-mounted CPT rig. Continuous soil profiles, including cone tip resistance and sleeve friction, were recorded during the soundings. Pore pressure dissipation tests were performed in both CPTs at selected depths. In addition, shear wave velocity measurement of the on-site soil was performed using a seismic cone in CPT-1. The borings and CPTs were backfilled with cement-bentonite grout in accordance with the requirements of the boring permit. The approximate locations of the borings and CPTs are presented on Figure 2. The boring and CPT sounding logs are presented in Appendices A and B, respectively.

Laboratory testing of representative soil samples was performed to evaluate in-situ moisture and dry density, percentage of particles finer than the No. 200 sieve, Atterberg limits, consolidation, direct shear strength, and soil corrosivity. The results of in-situ moisture content and dry density tests are presented on the boring logs in Appendix A. The remaining geotechnical laboratory testing results are presented in Appendix C.

5 GEOLOGY AND SUBSURFACE CONDITIONS

5.1 Regional Geology Setting

The subject site is located in the Los Angeles Basin at the southern end of the Transverse Ranges geomorphic provinces of southern California (Norris and Webb, 1990). The Los Angeles Basin has been divided into four structural blocks, which are generally bounded by prominent northwest-trending and west-trending fault systems: the northwestern, southwestern, central, and northeastern blocks. The site is located on the central block that is characterized by uplifted hills between low-lying plains resulting from anticlinal and synclinal structural features including Signal Hill, Huntington Beach Mesa, Central Plain, La Habra Valley, and Coyote Hills. The block is bounded on the west by the onshore segment of the Newport-Inglewood fault zone and on the north by the Santa Monica fault zone that is located near the base of the Santa Monica Mountains. The eastern boundary is the Whittier fault zone. The Whittier fault zone becomes uncertain from north of the city of Whittier to the Santa Monica fault zone. Near the city of Corona, the Whittier fault zone merges with the Elsinore fault zone.

Regional geologic mapping indicates that the site is underlain by young alluvial flood-plain deposits (Saucedo, 2016). The alluvial deposits are described as consisting of poorly consolidated, poorly sorted, soft clay, silt and loose to moderately dense sand and silty sand. A regional geologic map is shown on Figure 3.

5.2 Subsurface Conditions

5.2.1 Existing Pavement

Structural pavement consisting of asphalt concrete (AC) underlain by aggregate base (AB) was encountered in all five borings. The AC ranged from approximately 2 to 3 inches thick and the AB ranged from 2 to 3½ inches thick. The AB generally consisted of moist, medium dense, well-graded gravel with sand.

5.2.2 Fill

Fill soils were encountered beneath the pavement sections to depths ranging from approximately 8 to 9 feet. The fill generally consisted of light brown and yellowish brown, moist, loose to medium dense, silty sand, poorly graded sand and sandy silt.

5.2.3 Alluvium

Alluvium was encountered beneath the fill to the total depths explored of up to approximately 101½ feet. The alluvial materials generally consisted light brown, brown and gray, moist to wet, loose to very dense, silty sand and sandy silt, and firm to hard, sandy lean clay.

5.3 Groundwater

Groundwater was encountered in our exploratory borings during drilling at depths ranging from approximately 9½ to 16½ feet below the ground surface. The groundwater depth encountered during drilling is not considered a stabilized water level. Fluctuations in groundwater levels may occur due to variations in precipitation, ground surface topography, subsurface stratification, irrigation, groundwater pumping, and other factors that may not have been evident at the time of our field evaluation.

Regional maps indicate that the historic high groundwater at the site is mapped as being approximately 10 feet below the ground surface (California Division of Mines and Geology [CDMG], 1998). Review of groundwater well data from a site located on the northeast corner of Norwalk Boulevard and West Cerritos Avenue (approximately 1,200 feet southwest of the site) indicates the depth to groundwater as approximately 11 feet below the ground surface (GeoTracker, 2022).

6 FLOOD HAZARDS

Based on our review of flood insurance rate maps for the project area (Federal Emergency Management Agency [FEMA], 2009), the project site is not located in the 100-year Flood Hazard Zone. The maps indicate that the site is located within a “Zone X” area with a reduced flood risk due to a levee. Zone X is defined as an area considered to have a 0.2 percent annual chance of flood; to have a 1 percent annual chance of flood with average depth of less than 1 foot or with drainage areas less than 1 square mile; or to be in an area protected by levees from 1 percent annual chance of flood (FEMA, 2009).

7 FAULTING, SEISMICITY AND GEOLOGIC HAZARDS

The site is located in a seismically active area, as is the majority of southern California. The numerous faults in southern California include active, potentially active, and inactive faults. As defined by the California Geological Survey (CGS), active faults are faults that have ruptured within Holocene time (approximately the last 11,000 years). Potentially active faults are those that show evidence of movement during Quaternary time (approximately the last 1.6 million years), but for which evidence of Holocene movement has not been established. Inactive faults have not ruptured in the last approximately 1.6 million years.

The site is not located within a State of California Earthquake Fault Zone (formerly known as an Alquist-Priolo Special Studies Zone). Based on our review of referenced geologic literature, geologic maps, stereoscopic aerial photographs, and our geologic field reconnaissance, no active faults are known to cross the subject site. The active Newport-Inglewood fault is mapped approximately 4.2 miles (USGS, 2008) southwest of the site. The approximate locations of major active faults in the region and their geographic relationship to the site are shown on Figure 4.

An inferred buried trace of a strand of the potentially active Los Alamitos Fault has been mapped as approximately crossing the location of Los Alamitos High School (Figure 3) (Saucedo, 2016). This fault is not located on other fault maps (Figure 4) or on the State of California Seismic Hazard Zone maps (Figure 6) and is not considered to be active. Therefore, this mapped fault is not considered a hazard or constraint to the project.

Historical earthquakes, greater than magnitude 6.5 or that caused significant loss of life and property, within approximately 62 miles (100 kilometers) of the subject site are presented in Table 1. The nearest historical earthquake is the Long Beach earthquake, which occurred on March 11, 1933.

Table 1 – Historical Earthquakes

Date	Name, Location, or Region Affected	Approximate Fault to Site Distance in miles (km)	Magnitude
March 11, 1933	Long Beach	8.8 (14.1)	6.4
October 1, 1987	Whittier Narrows	17.7 (28.6)	6.0
January 17, 1994	Northridge	38.5 (61.9)	6.7
December 8, 1812	Wrightwood	45.3 (72.9)	7.3
February 9, 1971	San Fernando	45.4 (73.0)	6.6
July 22, 1899	Wrightwood	46.8 (75.3)	6.4
December 25, 1899	San Jacinto and Hemet	61.4 (98.8)	6.7
April 21, 1918	San Jacinto	61.5 (99.0)	6.8

Note:
CGS, 2022.

The principal seismic hazards that may impact the site are surface fault rupture, ground motion, liquefaction, dynamic settlement, lateral spreading, liquefaction-induced loss of bearing capacity, landsliding, and tsunamis and seiches. A brief description of these hazards and the potential for their occurrences on site are discussed in the following sections.

7.1 Surface Fault Rupture

Based on our review of the referenced literature and our site reconnaissance, no active faults are known to cross the project site. Therefore, the probability of damage from surface fault rupture is considered to be low. However, lurching or cracking of the ground surface as a result of nearby seismic events is possible.

7.2 Site Specific Ground Motion

Considering the proximity of the site to active faults capable of producing a maximum moment magnitude of 6.0 or more, the project area has a high potential for experiencing strong ground motion. The 2019 California Building Code (CBC) specifies that the risk-targeted maximum considered earthquake (MCE_R) ground motion response accelerations be used to evaluate seismic loads for design of buildings and other structures. Based on the shear wave velocity measurement performed at CPT-1, the site shear wave velocity (Vs30) is approximately 217 meters per second (m/s). Accordingly, the site is classified as Site Class D. Per the 2019 CBC, a site-specific ground motion hazard analysis shall be performed for structures on Site Class D with a mapped MCE_R 5 percent damped, spectral response acceleration parameter at a period of 1 second (S_1) greater than or equal to 0.2g in accordance with Sections 21.2 and 21.3 of the American Society of Civil Engineers (ASCE) Publication 7-16 (2016) for the Minimum Design Loads and Associated Criteria for Building and Other Structures. We calculated that the S_1 for the site is equal to 0.532g using the 2022 Applied Technology Council (ATC) seismic design tool (web-based); therefore, a site-specific ground motion hazard analysis was performed for the project area.

The site-specific ground motion hazard analysis consisted of the review of available seismologic information for nearby faults and performance of probabilistic seismic hazard analysis (PSHA) and deterministic seismic hazard analysis (DSHA) to develop acceleration response spectrum (ARS) curves corresponding to the MCE_R for 5 percent damping. The 2014 new generation attenuation (NGA) West-2 relationships were used to evaluate the site-specific ground motions. The NGA relationships that we used for developing the probabilistic and deterministic response spectra are by Chiou and Youngs (2014), Campbell and Bozorgnia (2014), Boore, Stewart, Seyhan, and Atkinson (2014), and Abrahamson, Silva, and Kamai (2014). The Open Seismic

Hazard Analysis software developed by United States Geological Survey (USGS, 2021b) was used for performing the PSHA. The Calculation of Weighted Average 2014 NGA Models spreadsheet by the Pacific Earthquake Engineering Research Center (PEER) was used for performing the DSHA (Seyhan, 2014).

PSHA was performed for earthquake hazards having a 2 percent chance of being exceeded in 50 years multiplied by the risk coefficients per ASCE 7-16. The maximum rotated components of ground motions were considered in PSHA with 5 percent damping. For the DSHA, we analyzed accelerations from characteristic earthquakes on active faults within the region using the hazard curves and deaggregation plots at the site obtained from the USGS Unified Hazard Tool application (USGS, 2022b). A magnitude 7.3 event on the Compton fault with a rupture distance of 8.8 kilometers (5.5 miles) from the site was evaluated to be the controlling earthquake. Hence, the DSHA was performed for the site using this event and corrections were made to the spectral accelerations for the 84th percentile of the maximum rotated component of ground motion with 5 percent damping.

The site-specific MCE_R response spectrum was taken as the lesser of the spectral response acceleration at any period from the PSHA and DSHA, and the site-specific general response spectrum was determined by taking two-thirds of the MCE_R response spectrum with some conditions in accordance with Section 21.3 of ASCE 7-16. Figure 5 presents the site-specific MCE_R response spectrum and the site-specific design response spectrum. The general mapped design response spectrum calculated in accordance with Section 11.4 of ASCE 7-16 is also presented on Figure 5 for comparison. The site-specific spectral response acceleration parameters, consistent with the 2019 CBC, are provided in Section 9.2 for the evaluation of seismic loads on buildings and other structures. The site-specific maximum considered earthquake geometric mean (MCE_G) peak ground acceleration, PGA_M, was calculated as 0.685g.

7.3 Liquefaction Potential

Liquefaction is the phenomenon in which loosely deposited granular soils with silt and clay contents of less than approximately 35 percent and non-plastic silts located below the water table undergo rapid loss of shear strength when subjected to strong earthquake-induced ground shaking. Ground shaking of sufficient duration results in the loss of grain-to-grain contact due to a rapid rise in pore water pressure, and causes the soil to behave as a fluid for a short period of time. Liquefaction is known generally to occur in saturated or near-saturated cohesionless soils at depths shallower than 50 feet below the ground surface. Factors known to influence liquefaction potential include composition and thickness of soil layers, grain size, relative density, groundwater level, degree of saturation, and both intensity and duration of ground shaking.

The State of California Seismic Hazard Zones Map (Figure 6) indicates the project area is located within an area mapped as subject to seismically induced liquefaction hazards (CDMG, 1999). The historic high depth to groundwater is mapped in the vicinity of the site as approximately 10 feet below the existing ground surface (CDMG, 1998). Groundwater was encountered during drilling at depths ranging from approximately 9½ to 16½ feet below the ground surface. Our review of the exploration results indicated a good agreement in correlation with borings and CPT soundings. However, due to the fact that CPT soundings provide nearly continuous subsurface soil strata data, liquefaction potential of subsurface soils was evaluated using the CPT soundings. The liquefaction analysis was based on the National Center for Earthquake Engineering Research (NCEER) procedure (Youd, et al., 2001) developed from the methods originally recommended by Seed and Idriss (1982) using the computer program LiquefyPro (CivilTech Software, 2019). A groundwater depth of 10 feet, a PGA_m of 0.685g, and a design earthquake magnitude of 7.3 were used in our analyses. Our liquefaction analysis indicates that the granular soil layers below the historic high depth to groundwater level and between depths of approximately 30 to 75 feet below the ground surface are susceptible to liquefaction during the design seismic event.

7.4 Liquefaction-Induced Settlement of Saturated Soils

As a result of seismically-induced liquefaction, the proposed gymnasium may be subject to liquefaction-induced settlement. In order to estimate the amount of post-earthquake settlement, the method proposed by Tokimatsu and Seed (1987) was used in which the seismically induced cyclic stress ratios and corrected N-values are related to the volumetric strain of the soil. The amount of soil settlement during a strong seismic event depends on the thickness of the liquefiable layers and the density and/or consistency of the soils

Under the current conditions and when using the data collected for CPT-1 and CPT-2, post-earthquake liquefaction-induced settlements of approximately 3.5 and 2.6 inches are calculated for the site, respectively. CPT-1 and CPT-2 are located at opposite ends of the proposed building, approximately 190 feet apart. Based on these test results and the guidelines presented in CGS Special Publication 117A (2008) and assuming relatively uniform subsurface stratigraphy across the site, we estimate a differential dynamic settlement on the order of 0.4 inch over a horizontal distance of 30 feet. Results of our liquefaction analysis are presented in Appendix E

With the existence of a non-liquefiable soil crust overlying liquefiable soil, the performance of a low-rise building with shallow foundations founded on the non-liquefiable soil crust during a soil liquefaction event has been observed to be generally satisfactory depending on the thickness of the non-liquefiable soil crust (Ishihara, 1995). In addition, Bouckovalas and Dakoulas (2007) have developed a design procedure to estimate the bearing capacity, the degraded post-shaking factor of safety against bearing capacity failure, and the dynamic settlement of a shallow foundation during an earthquake. Based on this procedure, our analysis indicated that the estimated dynamic settlement under a 3-foot-wide foundation footing is less than 0.1 inch for a 30-feet-thick non-liquefiable soil crust between the bottom of the footing and the underlying liquefiable soil layer at the proposed building site. Results of our dynamic settlement analysis are presented in Appendix F.

7.5 Dynamic Settlement of Dry Soils

Relatively dry soils (e.g., soils above the groundwater table) with low density or softer consistency tend to undergo dynamic settlement during a seismic event. Earthquake shaking often induces significant cyclic shear strain in a soil mass, which responds to the vibration by undergoing volumetric changes. Volumetric changes in dry soils take place primarily through changes in the void ratio (usually contraction in loose or normally consolidated, soft soils and dilation in dense or over consolidated, stiff soils) and secondarily through particle reorientation. Such volumetric changes are generally non-recoverable.

Based on our evaluation, the relatively loose soils in the upper approximately 10 feet could be susceptible to dynamic compaction of dry soils during a design earthquake. Our analysis indicated that up to approximately 1 inch of dynamic settlement of dry sand may occur during the design seismic event. However, with the remedial recommendation for overexcavation of approximately 8 feet of soil below the existing ground surface provided in Section 9.1.5 of this report, the dynamic settlement of dry sand during the design seismic event is not a design consideration.

7.6 Lateral Spread

Lateral spread of the ground surface during an earthquake usually takes place along weak shear zones that have formed within a liquefiable soil layer. Lateral spread has generally been observed to take place in the direction of a free-face (i.e., retaining wall, slope, channel, etc.) but has also been observed to a lesser extent on ground surfaces with gentle slopes. An empirical model developed by Youd, et al. (2002) is typically used to predict the amount of horizontal ground displacement within a site. For sites located in proximity to a free-face, the amount of lateral ground displacement is correlated with the distance of the site from the free-face as well as the depth of liquefiable strata which contribute to the lateral spreading. The depth of liquefiable strata below the ground surface is approximately twice of the height of the free face (Chu et al., 2006).

Other factors such as earthquake magnitude, distance from the causative fault, thickness of the liquefiable layers, and the fines content (FC) and particle sizes of the liquefiable layers also influence the amount of lateral ground displacement.

The concrete-line Coyote creek is located approximately 500 feet north of the proposed gymnasium. We estimated the height of the Coyote Creek is approximately 15 feet. Accordingly, the depth of the liquefiable soil layer contributing to lateral spreading on-site is approximately 30 feet below the existing ground surface. Due to the fine-grained nature of the soils in the upper 30 feet as well as the lacking of soil layers having corrected sampler blow counts less than 15 within the upper 30 feet, the site is not considered susceptible to seismically induced lateral spread.

7.7 Liquefaction-Induced Loss of Bearing Capacity

Our analysis also included using the residual shear strength of the liquefiable soil as recommended in the monograph by Earthquake Engineering Research Institute (EERI, 2008) to evaluate the potential for bearing capacity failure under the proposed footings. Due to the existence of a non-liquefiable soil crust (approximately 30 feet in thickness) overlying the liquefiable soils, our analysis indicated that the potential for bearing capacity failure during a seismic-induced soil liquefaction condition is low.

7.8 Landsliding

The site is located in an area of relatively flat terrain. There are no mapped landslides on site or in the vicinity. Landsliding is not considered to be a potential hazard at the site.

7.9 Tsunamis and Seiches

Tsunamis are long wavelength, seismic, sea waves (long compared to ocean depth) generated by the sudden movements of the ocean floor during submarine earthquakes, landslides, or volcanic activity. Seiches are waves generated in a large, enclosed body of water. The project area is not mapped within an area considered susceptible to tsunamis or seiches inundation. Therefore, damage due to tsunamis or seiches is not a design consideration.

8 DISCUSSIONS AND CONCLUSIONS

Based on the results of our geotechnical evaluation, it is our opinion that the proposed project is feasible from a geotechnical standpoint provided the recommendations of this report and appropriate construction practices are followed. In general, the following conclusions were made:

- Based on our exploratory borings, the site is underlain by fill overlying alluvial deposits. Fill was encountered to depths ranging from approximately 8 to 9 feet below the ground surface. The fill generally consisted of moist, loose to medium dense, silty sand, poorly graded sand

and sandy silt. The alluvial materials generally consisted of moist to wet, loose to very dense, silty sand and sandy silt, and firm to hard, sandy lean clay.

- Excavations into the underlying fill and alluvial deposits should be feasible with grading equipment in good working order. We anticipate that the on-site sandy soils should be generally suitable for use as compacted fill following moisture-conditioning, provided they are free of trash, debris, roots, vegetation, deleterious materials, and cobbles or hard lumps of materials in excess of 4 inches in diameter.

- Granular soils encountered at the site are anticipated to have little cohesion and may be subject to caving. These soils should be considered Type C soils in accordance with Occupational Safety and Health Administration (OSHA) soil classifications.

- Groundwater was encountered in our borings during drilling at depths ranging from approximately 9½ to 16½ feet below the ground surface. The historic high groundwater level is reported to be at approximately 10 feet below the ground surface. Fluctuations in the groundwater level may occur as a result of variations in seasonal precipitation, irrigation practices, groundwater pumping and other factors. Seepage and wet soil conditions should be anticipated during construction. Seepage should be anticipated by the contractor.

- The site is mapped within a State of California Seismic Hazards Zone as being potentially liquefiable (CDMG, 1999). Our liquefaction analysis indicated that liquefaction-induced dynamic settlement up to 3½ inches may occur during the design seismic event. Differential settlement on the order of 0.4 inch over a horizontal distance of 30 feet may be anticipated.

- The site-specific PGA_M was estimated to be 0.685g for the site.

- The subject site is not located within a State of California Earthquake Fault Zone (Alquist-Priolo Special Studies Zone). The probability of surface fault rupture is considered low at the site.

- The site is not located in an area considered susceptible to landsliding, tsunamis, or seiches.

- The site is located within an area with a reduced flood risk due to a potential levee failure (FEMA, 2009).

- Based on our laboratory corrosion testing, the on-site soil can be classified as non-corrosive based on the Caltrans Corrosion Guidelines (Caltrans, 2021).

9 RECOMMENDATIONS

The following sections include our geotechnical recommendations for construction of the proposed improvements. Grading and building foundations plans were not available for review at the time of this report. It is important that Ninyo & Moore be notified and given an opportunity to reevaluate our recommendations once this information becomes available and prior to bidding the project for construction.

9.1 Earthwork

Earthwork at the site is anticipated to consist of remedial grading of the near-surface soils, fill placement, foundation excavations, trenching and backfilling for new utilities, pavement construction, and finish grading for establishment of site drainage. Earthwork should be performed in accordance with the requirements of applicable governing agencies and the recommendations presented in the following sections.

9.1.1 Construction Plan Review and Pre-Construction Conference

We recommend that the grading and construction plans be submitted to Ninyo & Moore for review to evaluate conformance to the geotechnical recommendations provided in this report. We further recommend that a pre-construction conference be held in order to discuss the grading recommendations presented in this report. The owner and/or their representative, the governing agencies' representatives, the civil engineer, Ninyo & Moore, and the contractor should be in attendance to discuss the work plan, project schedule, and earthwork requirements.

9.1.2 Site Clearing and Preparation

Prior to excavation and fill placement, the site should be cleared of existing site improvements, pavements, surface obstructions and other deleterious materials, and abandoned utilities and stripped of rubble, debris, and vegetation, as well as surface soils containing organic materials. Existing utilities to remain in place (if any) should be located and protected from damage by construction activities. Obstructions that extend below the finish grade, if any, should be removed and the resulting holes filled with compacted soil. The materials generated from the clearing operations should be removed from the site and disposed of at a legal dump site.

9.1.3 Excavation Characteristics

Based on our field exploration, we anticipate that excavations within the existing fill and alluvium materials at the site may be accomplished with earthmoving equipment in good working condition. The near surface fill soils encountered in the exploratory borings are comprised of moist, loose to medium dense, silty sand, poorly graded sand and sandy silt. The alluvial materials generally consisted of moist to wet, loose to very dense, silty sand and sandy silt, and firm to hard, sandy lean clay. In the event that oversize material (larger than 4 inches in longest diameter), including cobbles, is encountered during excavation operations, the oversized material is not suitable for backfill and should be disposed of off-site. Contractors should make their own independent evaluation of the excavatability of the on-site materials prior to submitting their bids.

9.1.4 Temporary Excavations

Temporary excavations above groundwater up to approximately 10 feet in depth should be stable at inclinations of up to approximately 1½:1 (horizontal to vertical). Excavations which expose friable, cohesionless sands, may be subject to caving. Some surficial sloughing may occur, and temporary excavations should be evaluated in the field in accordance with Occupational Safety and Health Administration (OSHA) guidelines. The surficial soils should be considered as OSHA Soil Type C, and temporary excavations should conform with OSHA regulations.

Temporary slope surfaces should be kept moist to retard raveling and sloughing. Water should not be allowed to flow over the top of excavations in an uncontrolled manner. Stockpiled material and/or equipment should be kept back from the top of excavations a distance equivalent to the depth of the excavation or more. Temporary excavations should be observed by the geotechnical consultant so that appropriate additional recommendations necessitated by actual field conditions may be provided. Temporary excavations are time sensitive, and failures are possible.

9.1.5 Treatment of Near Surface Soils

Based on our subsurface evaluation, it is our opinion that suitable foundation support for the proposed at-grade structure and associated improvements may be provided by remedial grading consisting of the overexcavation and recompaction of the near-surface fill soils. For the proposed construction, we recommend that the near-surface soils be overexcavated and recompacted to a depth of approximately eight (8) feet below the existing ground surface or the depth of the undocumented fill, whichever is deeper. The limits of overexcavation should extend laterally beyond the building footprint to a distance of five (5) or more feet. The actual depths and limits of overexcavation should be evaluated by our representative based on the materials exposed at the time of construction.

Due to the existence of an active electrical conduit inside the west side of the proposed building footprint, we recommend that the overexcavation in the areas where the proposed footings are parallel and adjacent to the electrical conduit as well as the 6-foot-wide electrical conduit area be excluded from the recommendations provided above. Instead, we recommend the proposed footings parallel to the electrical conduit be extended to the bottom of the electrical conduit to avoid surcharging the electrical conduit. Where the footings cross over the electrical conduit, the top of the electrical conduit should be encased with concrete designed by the project structural engineer.

Additional overexcavation of loose, soft, and/or wet areas may be appropriate, depending on our observations during construction. The subgrade at the bottom of the overexcavation should be scarified to a depth of 8 inches, moisture conditioned to slightly above the laboratory optimum moisture content, and compacted to a relative compaction of 90 percent as evaluated by ASTM D 1557. The overexcavated area should be backfilled to the finished grade with on-site soils compacted to a relative compaction of 90 percent.

Exterior flatwork may be supported on compacted, low-expansion potential soil. Subgrade for exterior flatwork areas should be prepared by overexcavation and recompaction to a depth of approximately two (2) feet below the existing ground surface. At the bottom of the excavation, the upper approximately 8 inches of exposed subgrade should be scarified, moisture conditioned to slightly over optimum moisture content and compacted to 90 percent relative compaction as evaluated by ASTM D 1557.

Care should be taken by the contractor to avoid undermining adjacent existing foundations and improvements. New excavations should not extend within the "zone of influence" of existing foundations, which is defined as a 1:1 (horizontal to vertical) plane projecting out from the bottom outside edge of the foundations. In the event that excavations will extend into the "zone of influence" of existing foundations, our office should be notified. In such case, appropriate recommendations will need to be developed, such as temporary underpinning of impacted foundations and/or temporary shoring.

9.1.6 Excavation Bottom Stability

Excavations close to or below the groundwater will encounter wet and loose or soft ground conditions. Excavations that expose loose/soft soils or encounter seepage or groundwater, or that become disturbed during excavation, may be unstable and subject to pumping under heavy equipment loads. In general, unstable bottom conditions may be mitigated by over-excavating to a depth of approximately 1 to 2 feet below the proposed subgrade and replacing the excavated soil with crushed aggregate base or gravel wrapped in geofabric. If aggregate base is used, it should consist of either Caltrans Class II aggregate base or crushed miscellaneous base. Caltrans Class II aggregate base should conform to the State of California Standard Specifications, Section 26 1.02A. Crushed miscellaneous base should conform to the Standard Specifications for Public Works Construction, Section 200 2.4. Recommendations for stabilizing excavation bottoms should be based on evaluation in the field by a Ninyo & Moore representative at the time of construction.

9.1.7 Fill Material

In general, the on-site sandy soils should be suitable re-use as structural fill and trench backfill provided that they are free of trash, debris, roots, vegetation, or other deleterious materials. Non-granular clay materials may be used as general fill, but should not be used as structure or trench backfill. Fill should generally be free of rocks or lumps of material in excess of 4 inches in diameter. Rocks or hard lumps larger than approximately 4 inches in diameter should be broken into smaller pieces or should be removed from the site. Structure backfill should be comprised of granular, non-expansive soil that conforms to the latest edition of "Greenbook" Standard Specifications for Public Works Construction for structural backfill. "Non-expansive" can be defined as soil having an expansion index (EI) of 20 or less in accordance with ASTM D 4829. The on-site materials will involve moisture-conditioning to achieve appropriate moisture content for compaction.

Imported materials, if used, should consist of clean, non-expansive, granular material, which conforms to the "Greenbook" for structure backfill. The imported materials should also meet the Caltrans (2021) criteria for non-corrosive soils (i.e., soils having a minimum resistivity greater than 1,500 ohm-cm, a chloride concentration less than 500 parts per million [ppm], a sulfate concentration of less than 0.15 percent (1,500 ppm), and a pH value greater than 5.5). Import materials for use as fill should be evaluated by the geotechnical consultant prior to importing. The contractor should be responsible for the uniformity of import material brought to the site.

9.1.8 Fill Placement and Compaction

Fill soils placed should be compacted in horizontal lifts to a relative compaction of 90 percent as evaluated by ASTM D 1557. The lift thickness for fill soils will vary depending on the type of compaction equipment used but should generally be placed in horizontal lifts not exceeding 8 inches in loose thickness. Fill soils should be placed at generally slightly above the optimum moisture content as evaluated by ASTM D 1557. Special care should be taken to avoid damage to utility lines when compacting fill and subgrade materials.

9.2 Site-Specific Seismic Design Considerations

Design of the proposed improvements should be performed in accordance with the requirements of governing jurisdictions and applicable building codes. Table 2 presents the site-specific spectral response acceleration parameters in accordance with the CBC (2019) guidelines.

Table 2 – 2019 California Building Code Seismic Design Criteria	
Site Coefficients and Spectral Response Acceleration Parameters	**Values**
Site Class	D
Mapped Spectral Response Acceleration at 0.2-second Period, S_s	1.491g
Mapped Spectral Response Acceleration at 1.0-second Period, S_1	0.532g
Site-Specific Spectral Response Acceleration at 0.2-second Period, S_{MS}	1.637g
Site-Specific Spectral Response Acceleration at 1.0-second Period, S_{M1}	2.036g
Site-Specific Design Spectral Response Acceleration at 0.2-second Period, S_{DS}	1.091g
Site-Specific Design Spectral Response Acceleration at 1.0-second Period, S_{D1}	1.357g
Site-Specific Mapped Maximum Considered Earthquake Geometric Mean (MCE_G) Peak Ground Acceleration, PGA_M	0.685g

9.3 Foundations

The proposed gymnasium may be supported on shallow foundations including spread and continuous footings bearing on engineered fill material compacted in accordance with the recommendations presented in the Earthwork section of this report. Foundations should be designed in accordance with structural considerations and the following recommendations. In addition, requirements of the appropriate governing jurisdictions and applicable building codes should be considered in the design of the structures.

9.3.1 Spread Footings

Spread footings for the proposed gymnasium should extend 24 inches or more below the adjacent finished grade. Continuous and isolated pad footings should have a width of 36 inches or more. Continuous footings should be reinforced with four No. 4 steel reinforcing bars, two placed near the top and two placed near the bottom of the footings, and further detailed in accordance with the recommendations of the structural engineer.

Footings, as described above, may be designed using an allowable bearing capacity of 3,000 pounds per square foot (psf). The bearing capacity may be increased by one-third when considering loads of short duration such as wind or seismic forces. Total and differential settlements for footings designed and constructed in accordance with the above recommendations are estimated to be less than approximately 1 and ½ inch over a horizontal span of 30 feet, respectively.

Footings bearing on compacted fill may be designed using a coefficient of friction of 0.30, where the total frictional resistance equals the coefficient of friction times the dead load. Footings may be designed using a passive resistance of 300 psf per foot of depth for level ground condition up to a value of 3,000 psf. The allowable lateral resistance can be taken as the sum of the frictional resistance and passive resistance, provided the passive resistance does not exceed one-half of the total allowable resistance. The passive resistance may be increased by one-third when considering loads of short duration such as wind or seismic forces.

Trenches should not be excavated adjacent to spread footings. If trenches are to be excavated near a continuous footing, the bottom of the trench should be located above a 1:1 (horizontal to vertical) plane projected downward from the bottom of the footing. Utility lines that cross beneath footings should be encased in concrete below the footing. In addition, footings constructed near existing underground utility lines should be deepened such that the utility line is located above a 1:1 (horizontal to vertical) plane projected downward from the base of the footing.

9.3.2 Slabs-On-Grade

Buildings supported on shallow footings should have floor slabs designed by the project structural engineer based on the anticipated loading conditions. Building floor slabs should be underlain by compacted fill prepared in accordance with the recommendations presented in this report. As a minimum we recommend that slabs have a thickness of 5 inches or more, and be reinforced with No. 4 steel reinforcing bars placed 18 inches on-center (each way) in the middle one-third of the slab height. Exterior slabs-on-grade may be 4 inches thick. The proper placement of the reinforcement in the slab is vital for satisfactory performance. The floor slab and foundations should be tied together by extending the slab reinforcement into the footings. The slab should be underlain by a polyethylene vapor retarder, 10-mil or thicker. The vapor retarder should further be underlain by a 4-inch-thick layer of sand or gravel with a particle size of approximately $^3/_4$ inch or smaller. The vapor retarder is recommended in areas where moisture sensitive floor coverings are anticipated. Soils underlying the slabs should be moisture conditioned and compacted in accordance with the recommendations contained in this report prior to concrete placement. Joints should be constructed at intervals designed by the structural engineer to help reduce random cracking of the slab.

9.4 Underground Utilities

We anticipate that utility pipelines will be supported on compacted fill or alluvial deposits. The depths of the pipelines are not known; however, we anticipate that the pipe invert depths will not exceed 5 feet. Trenches should not be excavated parallel to building footings. If needed, trenches can be excavated adjacent to a continuous footing, provided that the bottom of the trench is located above a 1:1 (horizontal to vertical) plane projected downward from a point 6 inches above the bottom of the adjacent footing. Utility lines that cross beneath footings should be encased in concrete below the footing. To reduce the potential for pipe to building differential settlement due to liquefaction which could cause pipe shearing; we recommend that a pipe joint be located close to the exterior of the building. The type of joint should be such that relative movement can be accommodated without distress. The pipe connections should be sufficiently flexible to withstand differential settlement on the order of 1½ inches.

9.4.1 Pipe Bedding

We recommend that pipelines be supported on 6 inches or more of granular bedding material. Bedding material should be placed around pipe zones to 1 foot or more above the top of the pipe. The bedding material should be classified as sand, be free of organic material, and have a sand equivalent of 30 or more. We do not recommend gravel be used for bedding material. It has been our experience that the voids within gravel material are sufficiently large to allow fines to migrate into the voids, thereby creating the potential for sinkholes and depressions to develop at the ground surface.

Special care should be taken not to allow voids beneath and around the pipe. Compaction of the bedding material and backfill should proceed along both sides of the pipe concurrently. Trench backfill, including bedding material, should be placed in accordance with the recommendations presented in the Earthwork section of this report.

9.4.2 Trench Backfill

Based on our subsurface evaluation, the on-site sandy soils should generally be suitable for re-use as trench backfill provided that they are free of organic material, clay lumps, debris, and rocks more than approximately 4 inches in diameter. We recommend that trench backfilling be in general conformance with the Standard Specifications for Public Works Construction (“Greenbook”) for structure backfill. Fill should be moisture-conditioned to at or slightly above the laboratory optimum. Wet soils should be allowed to dry to a moisture content near the optimum prior to their placement as trench backfill. Trench backfill should be compacted to a relative compaction of 90 percent as evaluated by ASTM D 1557. Lift thickness for backfill will depend on the type of compaction equipment utilized, but fill should generally be placed in horizontal lifts not exceeding 8 inches in loose thickness. Special care should be exercised to avoid damaging the pipe during compaction of the backfill.

9.4.3 Modulus of Soil Reaction

The modulus of soil reaction is used to characterize the stiffness of soil backfill placed on the sides of buried flexible pipelines for the purpose of evaluating lateral deflection caused by the weight of the backfill above the pipe. We recommend that a modulus of soil reaction of

1,000 pounds per square inch be used for design, provided that granular bedding material is placed adjacent to the pipe, as recommended in this report.

9.5 Sidewalks and Hardscape

We recommend that new exterior concrete sidewalks and flatwork (hardscape) have a thickness of 4 inches and be reinforced with No. 3 steel reinforcing bars placed 24 inches on-center (each way) near the mid-height of the slab. The hardscape should be underlain by 4 inches of clean sand and installed with crack-control joints at an appropriate spacing as designed by the structural engineer to reduce the potential for shrinkage cracking. Positive drainage should be established and maintained adjacent to flatwork. To reduce the potential for differential offset, joints between the new hardscape and adjacent curbs, existing hardscape, building walls, and/or other structures, and between sections of new hardscape, should be doweled.

9.6 Corrosivity

Laboratory testing was performed on a representative sample of near-surface soil to evaluate pH, electrical resistivity, water-soluble chloride content, and water-soluble sulfate content. The soil pH and electrical resistivity tests were performed in general accordance with CT 643. Chloride content testing was performed in general accordance with CT 422. Sulfate content testing was performed in general accordance with CT 417. The laboratory test results are presented in Appendix C.

The soil pH was measured at approximately 7.9 and the electrical resistivity was measured to be approximately 4,485 ohm-centimeters. The chloride content of the sample was measured to be approximately 30 ppm. The sulfate content of the tested sample was approximately 0.001 percent (10 ppm). Based on the laboratory test results and Caltrans (2021) criteria, the project site can be classified as a non-corrosive site, which is defined as having earth materials with less than 500 ppm chlorides, less than 0.15 percent sulfates (i.e., 1,500 ppm), a pH of 5.5 or more, or an electrical resistivity of more than 1,500 ohm-centimeters. If corrosion susceptible improvements are planned on site, we recommend that a corrosion engineer be consulted for further evaluation and recommendations.

9.7 Concrete Placement

Concrete in contact with soil or water that contains high concentrations of water-soluble sulfates can be subject to premature chemical and/or physical deterioration. Based on the CBC (2019), the potential for sulfate attack is negligible for water-soluble sulfate contents in soil ranging from 0.00 to 0.10 percent by weight, moderate for water-soluble sulfate contents ranging from 0.10 to

0.20 percent by weight, severe for water-soluble sulfate contents ranging from 0.20 to 2.00 percent by weight, and very severe for water-soluble sulfate contents over 2.00 percent by weight. The soil sample tested for this evaluation, using Caltrans Test Method 417, indicates a water-soluble sulfate content of approximately 0.001 percent by weight (i.e., 10 ppm). Accordingly, the on-site soils are considered to have a negligible potential for sulfate attack. However, due to the potential variability of the on-site soils, consideration should be given to using Type II/V cement for the project.

In order to reduce the potential for shrinkage cracks in the concrete during curing, we recommend that the concrete for the proposed structures be placed with a slump of 4 inches based on ASTM C 143. The slump should be checked periodically at the site prior to concrete placement. We further recommend that concrete cover over reinforcing steel for foundations be provided in accordance with CBC (2019). The structural engineer should be consulted for additional concrete specifications.

9.8 Drainage

Good surface drainage is imperative for satisfactory site performance. Positive drainage should be provided and maintained to channel surface water away from foundations and off-site. Positive drainage is defined as a slope of two percent or more for a distance of 5 feet or more away from foundations and tops of slopes. Runoff should then be transported by the use of swales or pipes into a collective drainage system. Surface waters should not be allowed to pond adjacent to foundations or on pavements. Concentrated runoff should not be allowed to flow over asphalt pavement as this can result in early deterioration of the pavement. We recommend that structures have roof drains and downspouts installed to collect runoff. Area drains for landscaped and paved areas are recommended.

10 CONSTRUCTION OBSERVATION

The recommendations provided in this report are based on our understanding of the proposed project and on our evaluation of the data collected based on subsurface conditions disclosed by widely spaced exploratory borings. It is imperative that the interpolated subsurface conditions be checked by our representative during construction. Observation and testing of compacted fill and backfill should also be performed by our representative during construction. We further recommend that the project plans and specifications be reviewed by this office prior to construction. It should be noted that, upon review of these documents, some recommendations presented in this report might be revised or modified.

During construction, we recommend that the duties of the geotechnical consultant include, but not be limited to:

- Observing clearing, grubbing, and removals.
- Observing excavation bottoms and the placement and compaction of fill, including trench backfill.
- Evaluating imported materials prior to their use as fill.
- Performing field tests to evaluate fill compaction.
- Observing foundation excavations for bearing materials and cleaning prior to placement of reinforcing steel or concrete.

The recommendations provided in this report assume that Ninyo & Moore will be retained as the geotechnical consultant during the construction phase of this project. In the event that the services of Ninyo & Moore are not utilized during construction, we request that the selected consultant provide the owner with a letter (with a copy to Ninyo & Moore) indicating that they fully understand Ninyo & Moore's recommendations, and that they are in full agreement with the design parameters and recommendations contained in this report.

11 LIMITATIONS

The field evaluation, laboratory testing, and geotechnical analyses presented in this geotechnical report have been conducted in general accordance with current practice and the standard of care exercised by geotechnical consultants performing similar tasks in the project area. No warranty, expressed or implied, is made regarding the conclusions, recommendations, and opinions presented in this report. There is no evaluation detailed enough to reveal every subsurface condition. Variations may exist and conditions not observed or described in this report may be encountered during construction. Uncertainties relative to subsurface conditions can be reduced through additional subsurface exploration. Additional subsurface evaluation will be performed upon request. Please also note that our evaluation was limited to assessment of the geotechnical aspects of the project, and did not include evaluation of environmental concerns or the presence of hazardous materials.

This document is intended to be used only in its entirety. No portion of the document, by itself, is designed to completely represent any aspect of the project described herein. Ninyo & Moore should be contacted if the reader requires additional information or has questions regarding the content, interpretations presented, or completeness of this document.

This report is intended for design purposes only. It does not provide sufficient data to prepare an accurate bid by contractors. It is suggested that the bidders and their geotechnical consultant perform an independent evaluation of the subsurface conditions in the project areas. The independent evaluations may include, but not be limited to, review of other geotechnical reports prepared for the adjacent areas, site reconnaissance, and additional exploration and laboratory testing.

Our conclusions, recommendations, and opinions are based on an analysis of the observed site conditions. If geotechnical conditions different from those described in this report are encountered, our office should be notified, and additional recommendations, if warranted, will be provided upon request. It should be understood that the conditions of a site could change with time as a result of natural processes or the activities of man at the subject site or nearby sites. In addition, changes to the applicable laws, regulations, codes, and standards of practice may occur due to government action or the broadening of knowledge. The findings of this report may, therefore, be invalidated over time, in part or in whole, by changes over which Ninyo & Moore has no control.

This report is intended exclusively for use by the client. Any use or reuse of the findings, conclusions, and/or recommendations of this report by parties other than the client is undertaken at said parties' sole risk.

12 REFERENCES

Abrahamson, N.A., Silva, W.J. and Kamai, R., 2014, Summary of the ASK14 Ground Motion Relation for Active Crustal Regions, Earthquake Spectra: Vol. 30, No. 3, pp. 1025-1055, dated August.

American Concrete Institute (ACI), 2016, ACI Manual of Concrete Practice.

American Concrete Institute, 2019, Building Code Requirements for Structural Concrete (ACI 318-19) and Commentary (ACI 318R-19).

American Society of Civil Engineers (ASCE), 2016, Minimum Design Loads and Associated Criteria for Building and Other Structures, ASCE Standard 7-16.

The Applied Technology Council (ATC), 2022, Hazards by Location, https://hazards.atcouncil.org.

ASTM International (ASTM), 2019, Annual Book of ASTM Standards, West Conshohocken, Pennsylvania.

Boore, D.M., Stewart, J.P., Seyhan, E., and Atkinson, G.M., 2014, NGA-West2 Equations for Predicting PGA, PGV, and 5% Damped PSA for Shallow Crustal Earthquakes, Earthquake Spectra, Vol. 30, No. 3, pp. 1057-1085, dated August.

Bouckovalas, G. and Dakoulas, P., 2007, Liquefaction performance of shallow foundations in presence of a soil crust, 4th ICEGE Invited Lecture, edited by K.D. Pitilakis.

Bowles, J.E., 1996, Foundation Analysis and Design, Fifth Edition, The McGraw-Hill Companies, Inc.

Building Seismic Safety Council, 2009, National Earthquake Hazards Reduction Program (NEHRP) Recommended Seismic Provisions for New Buildings and Other Structures (FEMA P-750).

California Building Standards Commission, 2019, California Building Code (CBC): California Code of Regulations, Title 24, Part 2, Volumes 1 and 2, dated July 1.

California Department of Conservation, Division of Mines and Geology (CDMG), State of California, 1998, Seismic Hazard Zone Report for the Los Alamitos 7.5-Minute Quadrangle, Los Angeles and Orange Counties, California: Seismic Hazard Zone Report 019.

California Department of Conservation, Division of Mines and Geology (CDMG), State of California, 1999, Seismic Hazard Zones Official Map, Los Alamitos Quadrangle, dated March 25.

California Department of Transportation, 2021, Corrosion Guidelines, Version 3.2, Division of Engineering Services, Materials Engineering and Testing Services, Corrosion Technology Branch, dated May.

California Geological Survey, State of California, 2008, Guidelines for Evaluating and Mitigating Seismic Hazards in California, CDMG Special Publication 117A.

California Geological Survey (CGS), 2018, Earthquake Fault Zones, A Guide for Government Agencies, Property Owners/Developers, and Geoscience Practitioners for Assessing Fault Rupture Hazards in California: Special Publication 42.

California Geological Survey, 2022, Table of Significant California Earthquakes (Magnitude greater than or equal to 6.5, or that caused loss of life or more than $200,000 in damage), https://www.conservation.ca.gov/cgs/earthquakes/significant, accessed on January 4.

Campbell, K.W., and Bozorgnia, Y., 2014, NGA-West2 Ground Motion Model for the Average Horizontal Components of PGA, PGV, and 5% Damped Linear Acceleration Response Spectra, Earthquake Spectra, Vol. 30, No. 3, pp. 1087-1115, dated August.

Chiou, B. S.-J., and Youngs, R.R., 2014, Update of the Chiou and Youngs NGA Model for the Average Horizontal Component of Peak Ground Motion and Response Spectra, Earthquake Spectra, August 2014, Vol. 30, No. 3, dated August.

Chu, D.B., Stewart, J.P., Youd, T.L., and Chu, B.L., 2006. “Liquefaction-induced lateral spreading in near-fault regions during the 1999 Chi-Chi, Taiwan earthquake,” ASCE, 132 (12), 1549-1565.

CivilTech Software, 2019, Liquefy Pro (Version 5.9d), a computer program for liquefaction and settlement analysis.

Earthquake Engineering Research Institute (EERI), 2008, Soil Liquefaction during Earthquakes, by I.M. Idriss and R.W. Boulanger, MNO-12.

Federal Emergency Management Agency (FEMA), 2009, Flood Insurance Rate Map, City of Los Alamitos, Map Number 06059C0104J, dated December 3.

Google Earth, 2022, http://earth.google.com.

Historical Aerials, 2022, Website for Viewing Aerial Photographs, www.historicaerials.com.

Ishihara, K., 1995, “Effects of At-Depth Liquefaction on Embedded Foundations during Earthquakes”, Proceedings of the Tenth Asian Regional Conference on Soil Mechanics and Foundation Engineering, Beijing, China, Volume 2, 16-26.

Ninyo & Moore, 2022, Proposal for Geotechnical Consulting Services, New Gymnasium Project, Los Alamitos High School, Los Alamitos, California, dated January 13.

Norris, R.M., and Webb, R.W., 1990, Geology of California, Second Edition: John Wiley & Sons.

Public Works Standard, Inc., 2018, The “Greenbook”: Standard Specifications for Public Works Construction, with Errata No. 1, dated 2019: BNI Building News, Vista, California.

Saucedo, G.J., Greene, H.G., Kennedy, M.P., and Bezore, S.P., 2016, Geologic Map of the Long Beach 30’ x 60’ Quadrangle, California, Version 2.0, Scale 1:100,000.

Seed, H.B., and Idriss, I.M., 1982, Ground Motions and Soil Liquefaction During Earthquakes, Volume 5 of Engineering Monographs on Earthquake Criteria, Structural Design, and Strong Motion Records: Berkeley, Earthquake Engineering Research Institute.

Seyhan, E, 2014, Weighted Average 2014 NGA West-2 GMPE, Pacific Earthquake Engineering Research Center.

State of California, State Water Resources Control Board, 2021, GeoTracker Database System, http://geotracker.swrcb.ca.gov/.

Tokimatsu, K., and Seed, H.B., 1987, Evaluation of Settlements in Sands Due to Earthquake Shaking, Journal of the Geotechnical Engineering Division, ASCE, Vol. 113, No. 8, pp. 861-878.

United States Geological Survey, 2008, National Seismic Hazard Maps - Fault Parameters, https://earthquake.usgs.gov/cfusion/hazfaults_2008_search/query_main.cfm.

United States Geological Survey, 2021a, USGS US Topo 7.5-Minute Map for Los Alamitos, CA: USGS - National Geospatial Technical Operations Center (NGTOC).

United States Geological Survey and Southern California Earthquake Center, 2021b, Open Seismic Hazard Analysis, Version 1.5.2, released June 3, http://www.opensha.org/.

United States Geological Survey and California Geological Survey, 2022a, Quaternary fault and fold database for the United States, accessed May 9, at: https://www.usgs.gov/natural-hazards/earthquake-hazards/faults.

United States Geological Survey, 2022b, Unified Hazard Tool, https://earthquake.usgs.gov/hazards/interactive/.

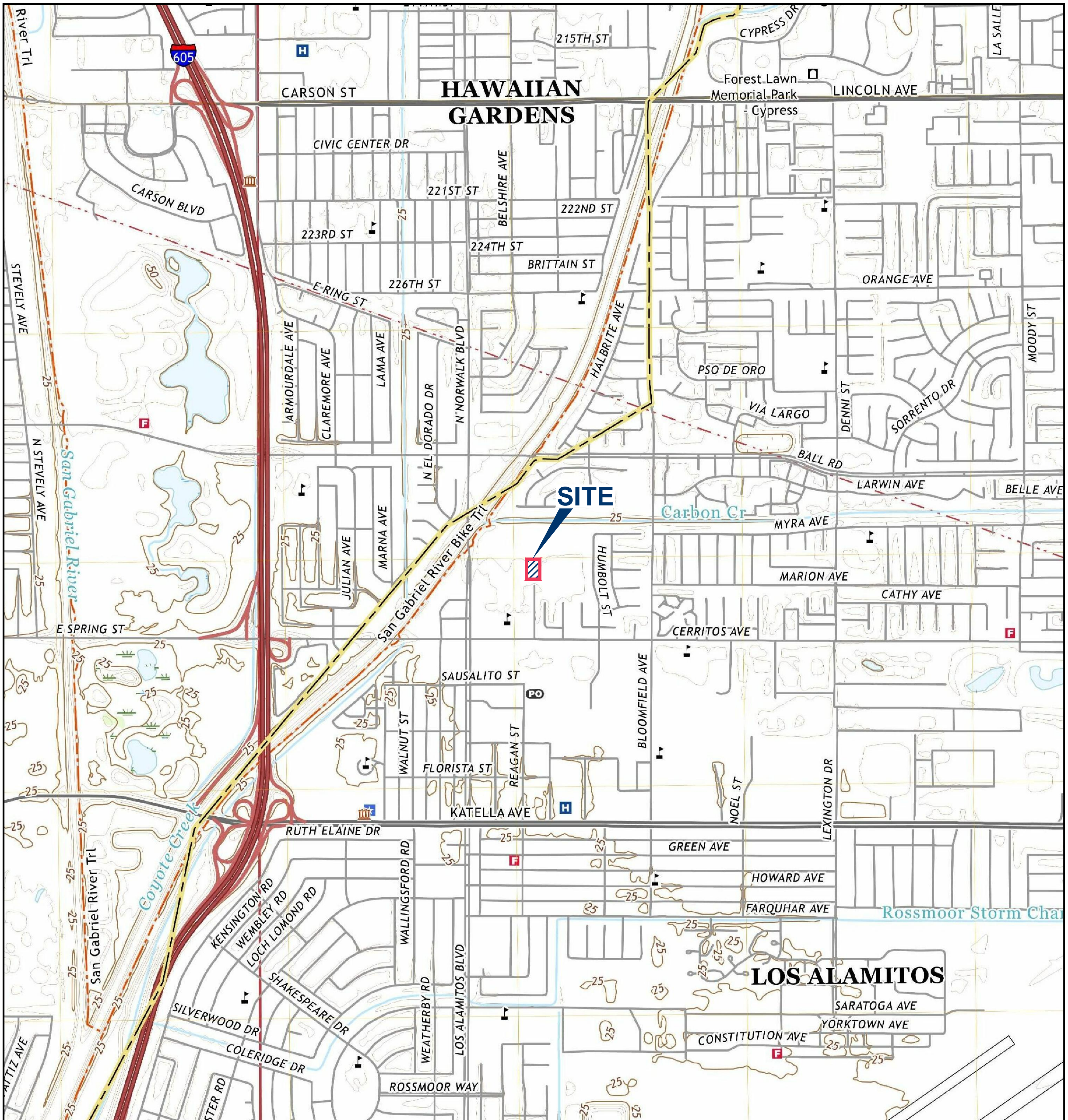
Westgroup Designs, 2022, Los Alamitos High School Gymnasium, Los Alamitos Unified School District, Floor Plan, dated January 5.

Youd, T.L., Idriss, I.M., Andrus, R.D., Arango, I., Castro, G., Christian, J.T., Dobry, R., Finn, W.D., Harder, L.F., Hynes, M.E., Ishihara, K., Koester, J.P., Liao, S.S.C., Marcuson, W.F., Martin, G.R., Mitchell, J.K., Moriwaki, Y., Power, M.S., Robertson, P.K., Seed, R.B., and Stokoe, K.H., II., 2001, Liquefaction Resistance of Soils: Summary Report from the 1996 NCEER and 1998 NCEER/NSF Workshops on Evaluation of Liquefaction Resistance of Soils, Journal of Geotechnical and Geoenvironmental Engineering, ASCE, 124(10), 817-833.

Youd, T.L., Hansen, C.M., and Bartlett, S.F., 2002, Revised Multilinear Regression Equations for Prediction of Lateral Spread Displacement, ASCE Geotechnical Journal, Vol. 128, No. 12.

Zhang, G., Robertson, P.K., and Brachman, R.W.I., 2002, "Estimating liquefaction-induced ground settlements from CPT for level ground", Canadian Geotechnical Journal, 39(5): 1168–1180.

FIGURES



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NOTE: DIMENSIONS, DIRECTIONS AND LOCATIONS ARE APPROXIMATE. I REFERENCE: USGS, 2021.

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FIGURE 1

SITE LOCATION

LOS ALAMITOS HIGH SCHOOL NEW GYMNASIUM
3591 WEST CERRITOS AVENUE
LOS ALAMITOS, CALIFORNIA

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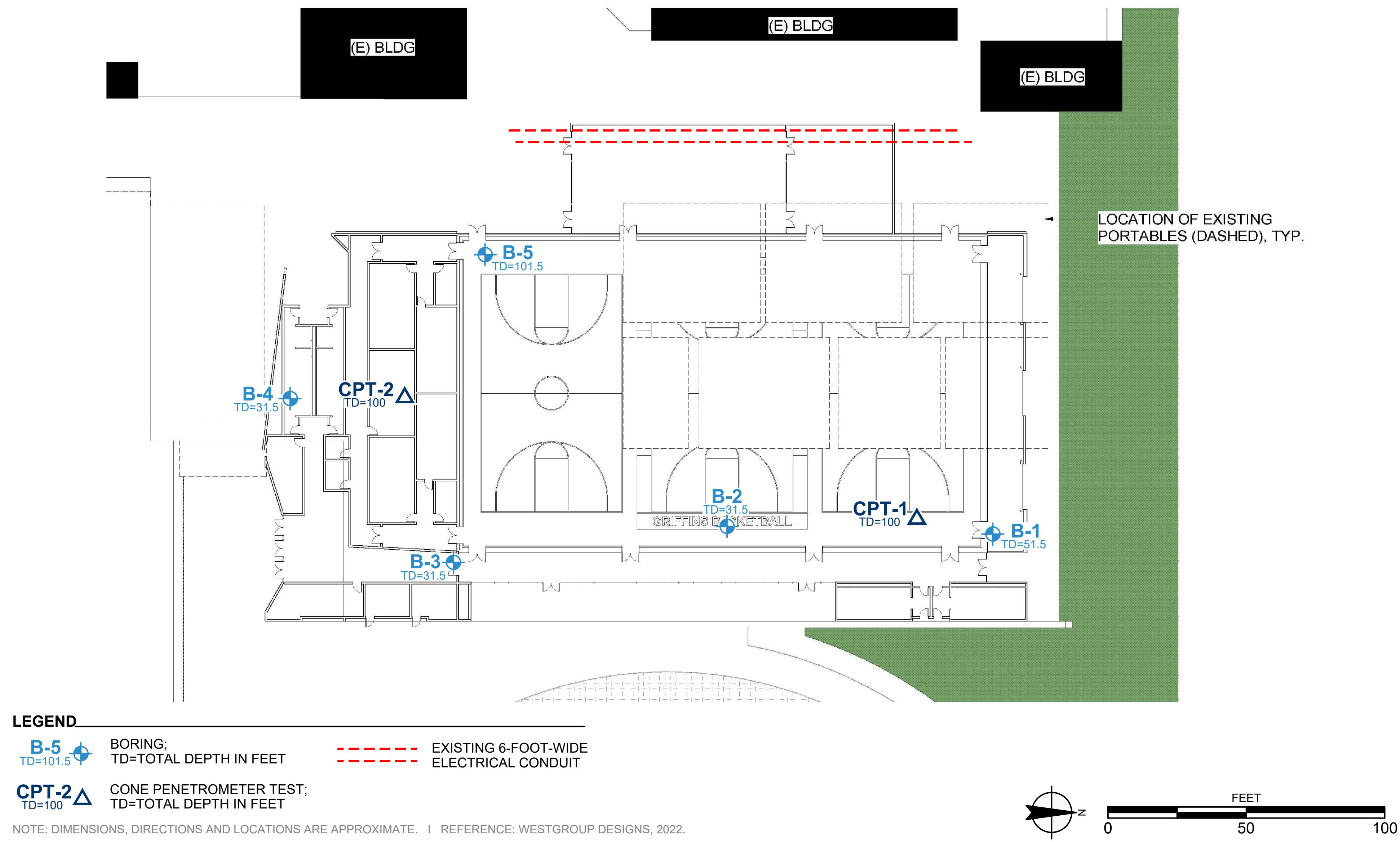

NOTE: DIMENSIONS, DIRECTIONS AND LOCATIONS ARE APPROXIMATE. I REFERENCE: WESTGROUP DESIGNS, 2022.

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FIGURE 2

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BORING LOCATIONS

LOS ALAMITOS HIGH SCHOOL NEW GYMNASIUM
3591 WEST CERRITOS AVENUE
LOS ALAMITOS, CALIFORNIA

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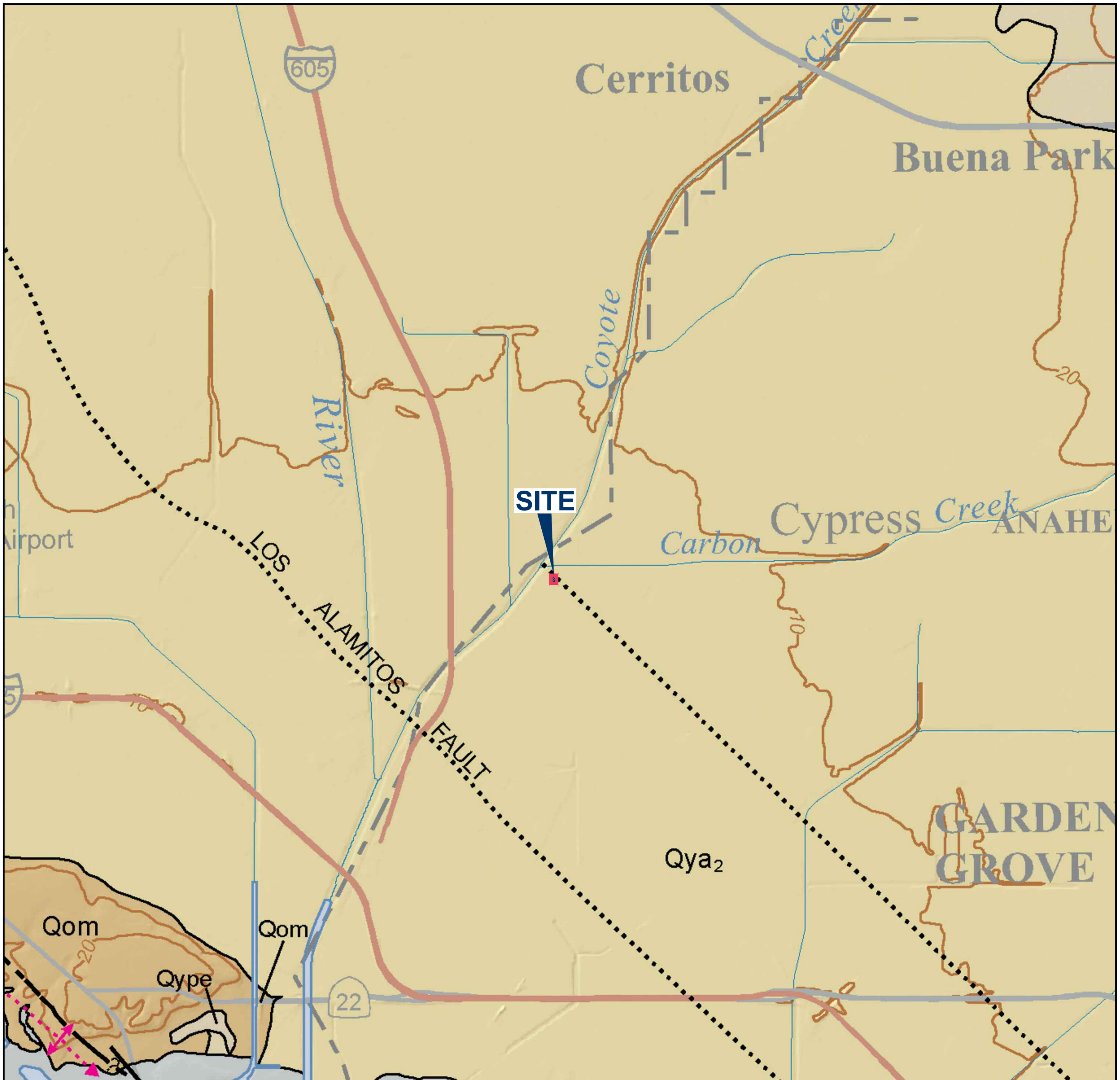

LEGEND

Qya_2	YOUNG ALLUVIUM, UNIT 2		GEOLOGIC CONTACT
Qom	OLD SHALLOW MARINE DEPOSITS ON WAVE-CUT SURFACE		FAULT; DASHED WHERE APPROXIMATE, DOTTED WHERE CONCEALED

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NOTE: DIMENSIONS, DIRECTIONS AND LOCATIONS ARE APPROXIMATE. I REFERENCE: SAUCEDO, 2016.

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FIGURE 3

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REGIONAL GEOLOGY

LOS ALAMITOS HIGH SCHOOL NEW GYMNASIUM
3591 WEST CERRITOS AVENUE
LOS ALAMITOS, CALIFORNIA

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SOURCES: CALIFORNIA GEOLOGICAL SURVEY, ACCESSED MAY 9, 2022, AT: https://www.usgs.gov/natural-hazards/earthquake-hazards/faults; ESRI, 2021.

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NOTE: DIRECTIONS, DIMENSIONS AND LOCATIONS ARE APPROXIMATE.

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FIGURE 4

FAULT LOCATIONS

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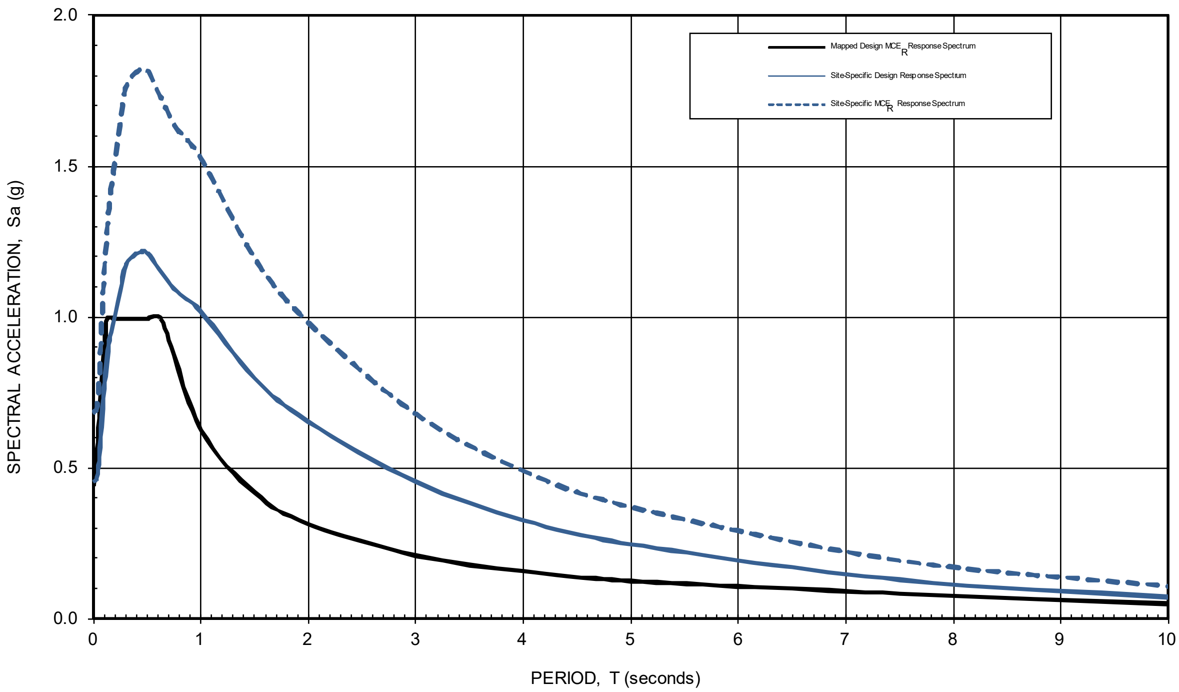
PERIOD (seconds)	SITE-SPECIFIC MCE_R RESPONSE SPECTRUM Sa (g)	SITE-SPECIFIC DESIGN RESPONSE SPECTRUM Sa (g)
0.010	0.685	0.456
0.020	0.690	0.460
0.030	0.692	0.462
0.050	0.766	0.511
0.075	0.954	0.636
0.100	1.146	0.764
0.150	1.384	0.923
0.200	1.514	1.009
0.250	1.634	1.090
0.300	1.758	1.172
0.400	1.813	1.209

PERIOD (seconds)	SITE-SPECIFIC MCE_R RESPONSE SPECTRUM Sa (g)	SITE-SPECIFIC DESIGN RESPONSE SPECTRUM Sa (g)
0.500	1.819	1.212
0.750	1.639	1.093
1.000	1.527	1.018
1.500	1.196	0.797
2.000	0.981	0.654
3.000	0.679	0.452
4.000	0.489	0.326
5.000	0.370	0.247
7.500	0.193	0.128
10.000	0.107	0.072

S_{DS} =	1.091 g	S_{D1} =	1.357 g	S_{MS} =	1.637 g	S_{M1} =	2.036 g	PGA_M =	0.685 g



NOTES:

1 The probabilistic ground motion spectral response accelerations are based on the risk-targeted Maximum Considered Earthquake (MCE_R) having a 2% probability of exceedance in 50 years in the maximum direction using the Chiou & Youngs (2014), Campbell & Bozorgnia (2014), Boore et al. (2014), and Abrahamson et al. (2014) attenuation relationships and the risk coefficients.

2 The deterministic ground motion spectral response accelerations are for the 84th percentile of the geometric mean values in the maximum direction using the Chiou & Youngs (2014), Campbell & Bozorgnia (2014), Boore et al. (2014), and Abrahamson et al. (2014) attenuation relationships for deep soil sites considering a Mw 7.3 event on the Compton fault zone located 8.8 kilometers from the site. It conforms with the lower bound limit per ASCE 7-16 Section 21.2.2.

3 The Site-Specific MCE_R Response Spectrum is the lesser of spectral ordinates of deterministic and probabilistic accelerations at each period per ASCE 7-16 Section 21.2.3. The Site-Specific Design Response Spectrum conforms with lower bound limit per ASCE 7-16 Section 21.3.

4 The Mapped Design MCE_R Response Spectrum is computed from mapped spectral ordinates modified for Site Class D (stiff soil profile) per ASCE 7-16 Section 11.4. It is presented for the sake of comparison.

FIGURE 5

ACCELERATION RESPONSE SPECTRA

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LOS ALAMITOS, CALIFORNIA

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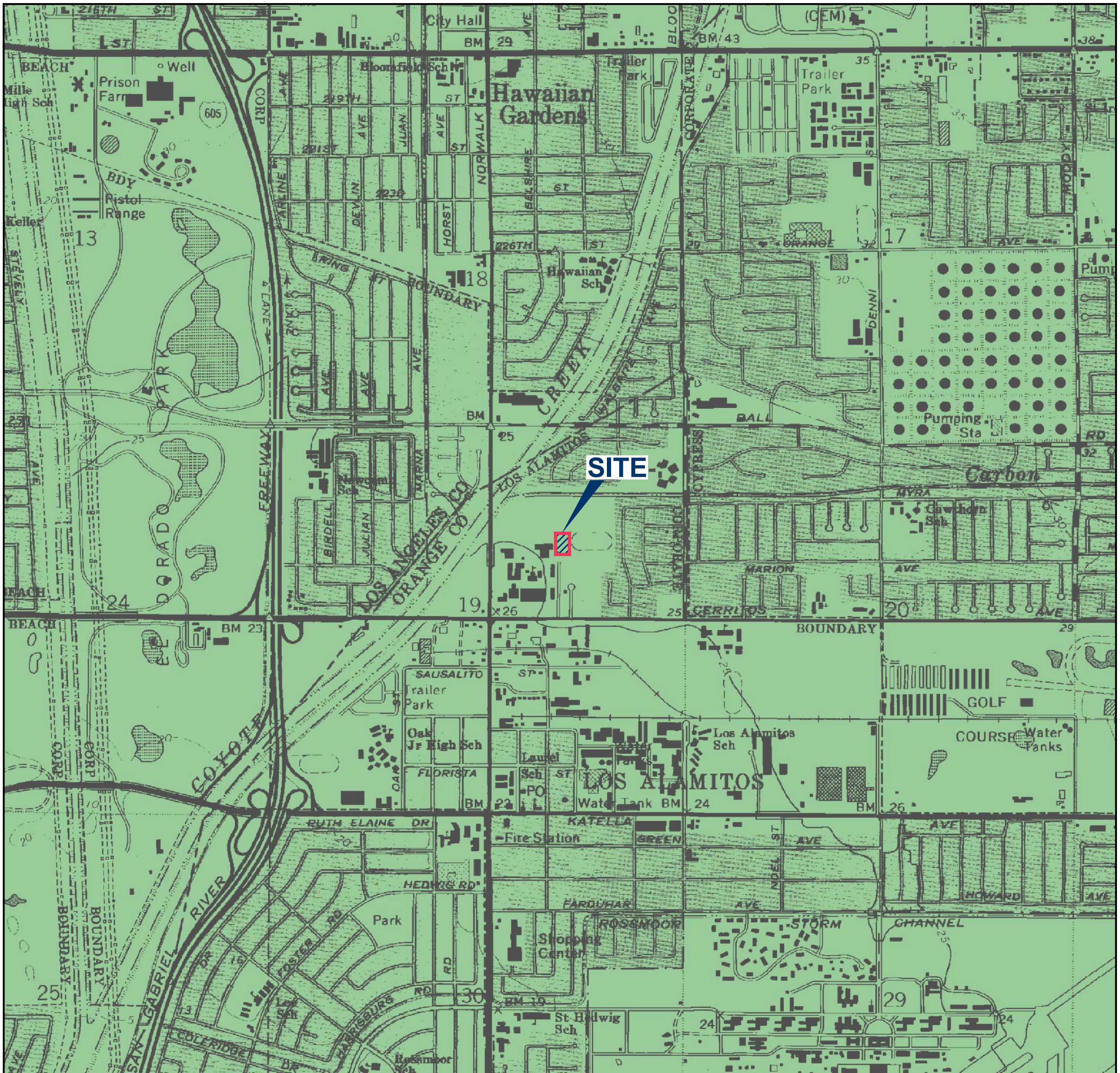

LEGEND

LIQUEFACTION

Areas where historic occurrence of liquefaction, or local geological, geotechnical and groundwater conditions indicate a potential for permanent ground displacements such that mitigation as defined in Public Resources Code Section 2693(c) would be required.

NOTE: DIMENSIONS, DIRECTIONS AND LOCATIONS ARE APPROXIMATE. I REFERENCE: CDMG, 1999.

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FIGURE 6

SEISMIC HAZARD ZONES

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3591 WEST CERRITOS AVENUE
LOS ALAMITOS, CALIFORNIA

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APPENDIX A

Boring Logs

APPENDIX A

BORING LOGS

Field Procedure for the Collection of Disturbed Samples

Disturbed soil samples were obtained in the field using the following methods.

Bulk Samples

Bulk samples of representative earth materials were obtained from the exploratory borings. The samples were bagged and transported to the laboratory for testing.

The Standard Penetration Test (SPT) Sampler

Disturbed drive samples of earth materials were obtained by means of a Standard Penetration Test sampler. The sampler is composed of a split barrel with an external diameter of 2 inches and an unlined internal diameter of $1^3/_8$ inches. The sampler was driven into the ground 12 to 18 inches with a 140-pound hammer falling freely from a height of 30 inches in general accordance with ASTM International (ASTM) D 1586. The blow counts were recorded for every 6 inches of penetration; the blow counts reported on the logs are those for the last 12 inches of penetration. Soil samples were observed and removed from the sampler, bagged, sealed, and transported to the laboratory for testing.

Field Procedure for the Collection of Relatively Undisturbed Samples

Relatively undisturbed soil samples were obtained in the field using the following method.

The Modified Split-Barrel Drive Sampler

The sampler, with an external diameter of 3 inches, was lined with 1-inch-long, thin brass rings with inside diameters of approximately 2.4 inches. The sample barrel was driven into the ground with the weight of a hammer in general accordance with ASTM D 3550. The driving weight was permitted to fall freely. The approximate length of the fall, the weight of the hammer, and the number of blows per foot of driving are presented on the boring logs as an index to the relative resistance of the materials sampled. The samples were removed from the sample barrel in the brass rings, sealed, and transported to the laboratory for testing.

Shelby Tube

The Shelby tube is a seamless, thin-walled, steel tube having an external diameter of 2.4 or 3.0 inches and a length of 8 to 30 inches. The tube was connected to the drill rod or a hand tool and pushed into an undisturbed soil mass to obtain a relatively undisturbed sample of soft, cohesive soil in general accordance with ASTM D 1587. When the tube was almost full (to avoid overpenetration), it was withdrawn from the excavation, removed from the drill rod or hand tool, sealed at both ends, and transported to the laboratory for testing.

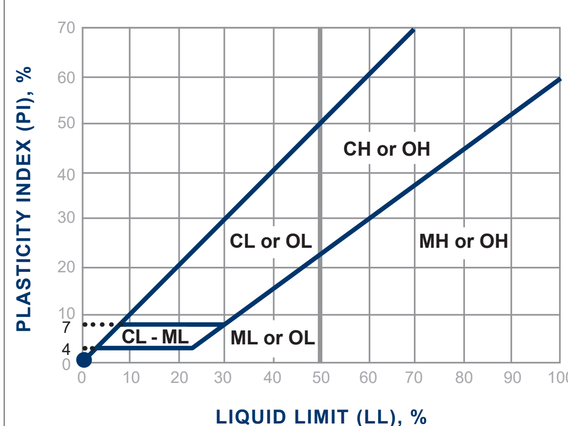
Soil Classification Chart Per ASTM D 2488

Primary Divisions			Secondary Divisions: Group Symbol	Secondary Divisions: Group Name
COARSE-GRAINED SOILS more than 50% retained on No. 200 sieve	**GRAVEL** more than 50% of coarse fraction retained on No. 4 sieve	CLEAN GRAVEL less than 5% fines	GW	well-graded GRAVEL
			GP	poorly graded GRAVEL
		GRAVEL with DUAL CLASSIFICATIONS 5% to 12% fines	GW-GM	well-graded GRAVEL with silt
			GP-GM	poorly graded GRAVEL with silt
			GW-GC	well-graded GRAVEL with clay
			GP-GC	poorly graded GRAVEL with clay
		GRAVEL with FINES more than 12% fines	GM	silty GRAVEL
			GC	clayey GRAVEL
			GC-GM	silty, clayey GRAVEL
	SAND 50% or more of coarse fraction passes No. 4 sieve	CLEAN SAND less than 5% fines	SW	well-graded SAND
			SP	poorly graded SAND
		SAND with DUAL CLASSIFICATIONS 5% to 12% fines	SW-SM	well-graded SAND with silt
			SP-SM	poorly graded SAND with silt
			SW-SC	well-graded SAND with clay
			SP-SC	poorly graded SAND with clay
		SAND with FINES more than 12% fines	SM	silty SAND
			SC	clayey SAND
			SC-SM	silty, clayey SAND
FINE-GRAINED SOILS 50% or more passes No. 200 sieve	**SILT and CLAY** liquid limit less than 50%	INORGANIC	CL	lean CLAY
			ML	SILT
			CL-ML	silty CLAY
		ORGANIC	OL (PI > 4)	organic CLAY
			OL (PI < 4)	organic SILT
	SILT and CLAY liquid limit 50% or more	INORGANIC	CH	fat CLAY
			MH	elastic SILT
		ORGANIC	OH (plots on or above "A"-line)	organic CLAY
			OH (plots below "A"-line)	organic SILT
	Highly Organic Soils		PT	Peat

Grain Size

Description		Sieve Size	Grain Size	Approximate Size
Boulders		> 12"	> 12"	Larger than basketball-sized
Cobbles		3 - 12"	3 - 12"	Fist-sized to basketball-sized
Gravel	Coarse	3/4 - 3"	3/4 - 3"	Thumb-sized to fist-sized
	Fine	#4 - 3/4"	0.19 - 0.75"	Pea-sized to thumb-sized
Sand	Coarse	#10 - #4	0.079 - 0.19"	Rock-salt-sized to pea-sized
	Medium	#40 - #10	0.017 - 0.079"	Sugar-sized to rock-salt-sized
	Fine	#200 - #40	0.0029 - 0.017"	Flour-sized to sugar-sized
Fines		Passing #200	< 0.0029"	Flour-sized and smaller

Plasticity Chart



Apparent Density - Coarse-Grained Soil

Apparent Density	Spooling Cable or Cathead: SPT (blows/foot)	Spooling Cable or Cathead: Modified Split Barrel (blows/foot)	Automatic Trip Hammer: SPT (blows/foot)	Automatic Trip Hammer: Modified Split Barrel (blows/foot)
Very Loose	≤ 4	≤ 8	≤ 3	≤ 5
Loose	5 - 10	9 - 21	4 - 7	6 - 14
Medium Dense	11 - 30	22 - 63	8 - 20	15 - 42
Dense	31 - 50	64 - 105	21 - 33	43 - 70
Very Dense	> 50	> 105	> 33	> 70

Consistency - Fine-Grained Soil

Consistency	Spooling Cable or Cathead: SPT (blows/foot)	Spooling Cable or Cathead: Modified Split Barrel (blows/foot)	Automatic Trip Hammer: SPT (blows/foot)	Automatic Trip Hammer: Modified Split Barrel (blows/foot)
Very Soft	< 2	< 3	< 1	< 2
Soft	2 - 4	3 - 5	1 - 3	2 - 3
Firm	5 - 8	6 - 10	4 - 5	4 - 6
Stiff	9 - 15	11 - 20	6 - 10	7 - 13
Very Stiff	16 - 30	21 - 39	11 - 20	14 - 26
Hard	> 30	> 39	> 20	> 26

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USCS METHOD OF SOIL CLASSIFICATION

BORING LOG EXPLANATION SHEET

DEPTH (feet)	SAMPLES: Bulk	SAMPLES: Driven	BLOWS/FOOT	MOISTURE (%)	DRY DENSITY (PCF)	SYMBOL	CLASSIFICATION U.S.C.S.	
0								Bulk sample.
								Modified split-barrel drive sampler.
								No recovery with modified split-barrel drive sampler.
								Sample retained by others.
								Standard Penetration Test (SPT).
5								No recovery with a SPT.
			XX/XX					Shelby tube sample. Distance pushed in inches/length of sample recovered in inches.
								No recovery with Shelby tube sampler.
								Continuous Push Sample.
								Seepage.
10								Groundwater encountered during drilling.
								Groundwater measured after drilling.
							SM	MAJOR MATERIAL TYPE (SOIL): Solid line denotes unit change.
							CL	Dashed line denotes material change. Attitudes: Strike/Dip b: Bedding c: Contact j: Joint f: Fracture F: Fault cs: Clay Seam s: Shear bss: Basal Slide Surface sf: Shear Fracture sz: Shear Zone sbs: Shear Bedding Surface
15								
								The total depth line is a solid line that is drawn at the bottom of the boring.
20								

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BORING LOG

DATE DRILLED	4/7/22	BORING NO.	B-1
GROUND ELEVATION	26' ± (MSL)	SHEET	1 OF 2
METHOD OF DRILLING	8" Hollow Stem Auger (MR)		
DRIVE WEIGHT	140 lbs (Auto. Trip Hammer)	DROP	30"
SAMPLED BY	KWK	LOGGED BY	KWK
REVIEWED BY	RDH		

DEPTH (feet)	BLOWS/FOOT	MOISTURE (%)	DRY DENSITY (PCF)	CLASSIFICATION U.S.C.S.	DESCRIPTION/INTERPRETATION
0					ASPHALT CONCRETE: Approximately 3 inches thick.
				GW	AGGREGATE BASE: Brown, moist, medium dense, well-graded GRAVEL with sand; approximately 3 inches thick.
				SM	FILL: Light brown, moist, loose, silty SAND; micaceous; trace gravel.
	8	5.4	87.0		
				ML	ALLUVIUM: Brown, moist, loose, sandy SILT. @ 9.5': Groundwater encountered during drilling.
10	4			CL	Brown, wet, firm, sandy lean CLAY.
	30"/30"				
				SP	Light brown, wet, loose, poorly graded SAND.
				CL	Brown, wet, stiff, sandy lean CLAY.
	12				
	30/30"	41.4	79.3		
20	10			ML	Brown, wet, medium dense, sandy SILT.
	10	25.7	97.5		Loose.
30	16				Medium dense.
	36			SM	Light brown, wet, medium dense, silty SAND.
40					

FIGURE A- 1

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LOS ALAMITOS HIGH SCHOOL NEW GYMNASIUM
LOS ALAMITOS, CALIFORNIA
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DEPTH (feet)	SAMPLES Bulk	SAMPLES Driven	BLOWS/FOOT	MOISTURE (%)	DRY DENSITY (PCF)	SYMBOL	CLASSIFICATION U.S.C.S.	DESCRIPTION/INTERPRETATION

DATE DRILLED 4/7/22 BORING NO. B-1

GROUND ELEVATION 26' ± (MSL) SHEET 2 OF 2

METHOD OF DRILLING 8" Hollow Stem Auger (MR)

DRIVE WEIGHT 140 lbs (Auto. Trip Hammer) DROP 30"

SAMPLED BY KWK LOGGED BY KWK REVIEWED BY RDH

DEPTH (feet)	Bulk	Driven	BLOWS/FOOT	MOISTURE (%)	DRY DENSITY (PCF)	SYMBOL	CLASSIFICATION U.S.C.S.	DESCRIPTION/INTERPRETATION
40			50				SM	ALLUVIUM: (Continued) Light brown, wet, very dense, silty SAND.
			24					Medium dense.
50			27					Dense.
								Total Depth = 51.5 feet. Groundwater encountered at approximately 9.5 feet during drilling. Backfilled with bentonite-cement grout and patched with black dyed concrete on 4/7/22. Notes: Groundwater may rise to a level higher than that measured in borehole due to seasonal variations in precipitation and several other factors as discussed in the report. The ground elevation shown above is an estimation only. It is based on our interpretations of published maps and other documents reviewed for the purposes of this evaluation. It is not sufficiently accurate for preparing construction bids and design documents.
60								
70								
80								

DEPTH (feet)	SAMPLES Bulk	SAMPLES Driven	BLOWS/FOOT	MOISTURE (%)	DRY DENSITY (PCF)	SYMBOL	CLASSIFICATION U.S.C.S.	DESCRIPTION/INTERPRETATION
0							GW	ASPHALT CONCRETE: Approximately 2 inches thick.
							SM	AGGREGATE BASE: Brown, moist, medium dense, well-graded GRAVEL with sand; approximately 3 inches thick.
							SP	FILL: Brown, moist, medium dense, silty SAND.
								Yellowish brown, moist, medium dense, poorly graded SAND.
			9					Light gray.
10							ML	ALLUVIUM: Brown, moist, loose, sandy SILT.
			6	35.7	86.0		CL	@ 10': Groundwater encountered during drilling. Light brown, wet, firm, sandy lean CLAY.
			30"/30"					
							ML	Brown, wet, very loose, sandy SILT.
			3					
20			22					Medium dense; micaceous.
			8					
30			13					Loose.
								Total Depth = 31.5 feet. Groundwater encountered at approximately 10 feet during drilling. Backfilled with bentonite-cement grout and patched with black dyed concrete on 4/7/22.
								Notes: Groundwater may rise to a level higher than that measured in borehole due to seasonal variations in precipitation and several other factors as discussed in the report.
								The ground elevation shown above is an estimation only. It is based on our interpretations of published maps and other documents reviewed for the purposes of this evaluation. It is not sufficiently accurate for preparing construction bids and design documents.
40								

DATE DRILLED 4/7/22 BORING NO. B-2

GROUND ELEVATION 26' ± (MSL) SHEET 1 OF 1

METHOD OF DRILLING 8" Hollow Stem Auger (MR)

DRIVE WEIGHT 140 lbs (Auto. Trip Hammer) DROP 30"

SAMPLED BY KWK LOGGED BY KWK REVIEWED BY RDH

FIGURE A- 3

LOS ALAMITOS HIGH SCHOOL NEW GYMNASIUM
LOS ALAMITOS, CALIFORNIA
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DATE DRILLED	4/7/22	BORING NO.	B-3
GROUND ELEVATION	28' ± (MSL)	SHEET 1 OF 1	
METHOD OF DRILLING	8" Hollow Stem Auger (MR)		
DRIVE WEIGHT	140 lbs (Auto. Trip Hammer)	DROP	30"
SAMPLED BY KWK	LOGGED BY KWK	REVIEWED BY	RDH

DEPTH (feet)	SAMPLES Bulk	SAMPLES Driven	BLOWS/FOOT	MOISTURE (%)	DRY DENSITY (PCF)	SYMBOL	CLASSIFICATION U.S.C.S.	DESCRIPTION/INTERPRETATION
0							GW	ASPHALT CONCRETE: Approximately 3 inches thick.
	X						ML	AGGREGATE BASE: Brown, moist, medium dense, well-graded GRAVEL with sand; approximately 3.5 inches thick.
								FILL: Light brown, moist, medium dense, sandy SILT.
		X	15	8.1	102.4		SP	Light brown, moist, medium dense, poorly graded SAND; micaceous.
				▽			ML	ALLUVIUM: Brown, wet, medium dense, sandy SILT. @ 10': Groundwater encountered during drilling.
10		X	9					
		X	7	32.2	89.5			Loose.
20		X	11					Medium dense.
		X	8					Loose.
30		X	8					Medium dense.
								Total Depth = 31.5 feet. Groundwater encountered at approximately 10 feet during drilling. Backfilled with bentonite-cement grout and patched with black dyed concrete on 4/7/22.
								Notes: Groundwater may rise to a level higher than that measured in borehole due to seasonal variations in precipitation and several other factors as discussed in the report.
								The ground elevation shown above is an estimation only. It is based on our interpretations of published maps and other documents reviewed for the purposes of this evaluation. It is not sufficiently accurate for preparing construction bids and design documents.
40								

FIGURE A- 4

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DEPTH (feet)	SAMPLES Bulk	SAMPLES Driven	BLOWS/FOOT	MOISTURE (%)	DRY DENSITY (PCF)	SYMBOL	CLASSIFICATION U.S.C.S.	DESCRIPTION/INTERPRETATION
0							GW	ASPHALT CONCRETE: Approximately 2 inches thick.
							ML	AGGREGATE BASE: Brown, moist, medium dense, well-graded GRAVEL with sand; approximately 2 inches thick.
								FILL: Brown, moist, medium dense, sandy SILT with clay; micaceous.
			10				SM	Brown, moist, medium dense, silty SAND; micaceous.
10			10	33.2	86.9		CL	ALLUVIUM: Brown, moist, stiff, sandy lean CLAY; micaceous.
			30"/30"					
			12				ML	Brown, moist, medium dense, sandy SILT.
				▽				@ 16.5': Groundwater encountered during drilling.
20			30					Wet.
			6					Loose; some clay.
30			16	34.7	88.4			Medium dense.
								Total Depth = 31.5 feet. Groundwater encountered at approximately 16.5 feet during drilling. Backfilled with bentonite-cement grout and patched with black dyed concrete on 4/7/22. Notes: Groundwater may rise to a level higher than that measured in borehole due to seasonal variations in precipitation and several other factors as discussed in the report. The ground elevation shown above is an estimation only. It is based on our interpretations of published maps and other documents reviewed for the purposes of this evaluation. It is not sufficiently accurate for preparing construction bids and design documents.
40								

DATE DRILLED 4/6/22 BORING NO. B-4

GROUND ELEVATION 28' ± (MSL) SHEET 1 OF 1

METHOD OF DRILLING 8" Hollow Stem Auger (MR)

DRIVE WEIGHT 140 lbs (Auto. Trip Hammer) DROP 30"

SAMPLED BY KWK LOGGED BY KWK REVIEWED BY RDH

FIGURE A- 5

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DEPTH (feet)	SAMPLES Bulk	SAMPLES Driven	BLOWS/FOOT	MOISTURE (%)	DRY DENSITY (PCF)	SYMBOL	CLASSIFICATION U.S.C.S.	DATE DRILLED 4/8/22 BORING NO. B-5
								GROUND ELEVATION 28' ± (MSL) SHEET 1 OF 3
								METHOD OF DRILLING 8" Hollow Stem Auger (MR)
								DRIVE WEIGHT 140 lbs (Auto. Trip Hammer) DROP 30"
								SAMPLED BY KWK LOGGED BY KWK REVIEWED BY RDH
								DESCRIPTION/INTERPRETATION
0								ASPHALT CONCRETE: Approximately 3 inches thick.
							GW	AGGREGATE BASE: Brown, moist, medium dense, well-graded GRAVEL with sand; approximately 3 inches thick.
							SM	FILL: Light brown, moist, medium dense, silty SAND.
							CL	ALLUVIUM: Brown, wet, firm, lean CLAY. @ 10': Groundwater encountered during drilling.
10			4					
			30"/24"	35.4	84.9			
20			12				ML	Brown, wet, medium dense, sandy SILT; micaceous.
30			10					Clayey.
40								

FIGURE A- 6

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DEPTH (feet)	SAMPLES Bulk	SAMPLES Driven	BLOWS/FOOT	MOISTURE (%)	DRY DENSITY (PCF)	SYMBOL	CLASSIFICATION U.S.C.S.	DATE DRILLED 4/8/22 BORING NO. B-5 GROUND ELEVATION 28' ± (MSL) SHEET 2 OF 3 METHOD OF DRILLING 8" Hollow Stem Auger (MR) DRIVE WEIGHT 140 lbs (Auto. Trip Hammer) DROP 30" SAMPLED BY KWK LOGGED BY KWK REVIEWED BY RDH DESCRIPTION/INTERPRETATION
40		■	12				ML	ALLUVIUM: (Continued) Brown, wet, medium dense, sandy SILT; micaceous.
50		■	35					Gray; very dense.
60		■	35					
70		■	54					
							CL	Gray, wet, very stiff, sandy lean CLAY; scattered shell fragments.
80								

FIGURE A- 7

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LOS ALAMITOS HIGH SCHOOL NEW GYMNASIUM
LOS ALAMITOS, CALIFORNIA
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DATE DRILLED 4/8/22 BORING NO. B-5

GROUND ELEVATION 28' ± (MSL) SHEET 3 OF 3

METHOD OF DRILLING 8" Hollow Stem Auger (MR)

DRIVE WEIGHT 140 lbs (Auto. Trip Hammer) DROP 30"

SAMPLED BY KWK LOGGED BY KWK REVIEWED BY RDH

DEPTH (feet)	SAMPLES Bulk	SAMPLES Driven	BLOWS/FOOT	MOISTURE (%)	DRY DENSITY (PCF)	SYMBOL	CLASSIFICATION U.S.C.S.	DESCRIPTION/INTERPRETATION
80			11				CL	ALLUVIUM: (Continued) Gray, wet, very stiff, sandy lean CLAY; scattered shell fragments.
			30"/30"					
							ML	Gray, wet, dense, sandy SILT.
90			21					
100			34					Very dense.
								Total Depth = 101.5 feet. Groundwater encountered at approximately 10 feet during drilling. Backfilled with bentonite-cement grout and patched with black dyed concrete on 4/7/22. Notes: Groundwater may rise to a level higher than that measured in borehole due to seasonal variations in precipitation and several other factors as discussed in the report. The ground elevation shown above is an estimation only. It is based on our interpretations of published maps and other documents reviewed for the purposes of this evaluation. It is not sufficiently accurate for preparing construction bids and design documents.
110								
120								

APPENDIX B

Cone Penetration Test Data

SUMMARY

OF

CONE PENETRATION TEST DATA

Project:

Los Alamitos High School
Los Alamitos, CA
April 6, 2022

Prepared for:

Ms. Julianne Padgett
Ninyo & Moore
475 Goddard, Ste 200
Irvine, CA 92618-4605
Office (949) 753-7070 / Fax (949) 753-7071

Prepared by:

KEHOE TESTING & ENGINEERING
5415 Industrial Drive
Huntington Beach, CA 92649-1518
Office (714) 901-7270 / Fax (714) 901-7289
www.kehoetesting.com

TABLE OF CONTENTS

SUMMARY

OF

CONE PENETRATION TEST DATA

1. INTRODUCTION

This report presents the results of a Cone Penetration Test (CPT) program carried out for the Los Alamitos High School project located in Los Alamitos, California. The work was performed by Kehoe Testing & Engineering (KTE) on April 6, 2022. The scope of work was performed as directed by Ninyo & Moore personnel.

2. SUMMARY OF FIELD WORK

The fieldwork consisted of performing CPT soundings at two locations to determine the soil lithology. A summary is provided in **TABLE 2.1**.

LOCATION	DEPTH OF CPT (ft)	COMMENTS/NOTES:
CPT-1	100	
CPT-2	100	

TABLE 2.1 - Summary of CPT Soundings

3. FIELD EQUIPMENT & PROCEDURES

The CPT soundings were carried out by **KTE** using an integrated electronic cone system manufactured by Vertek. The CPT soundings were performed in accordance with ASTM standards (D5778). The cone penetrometers were pushed using a 30-ton CPT rig. The cone used during the program was a 15 cm^2 cone with a cone net area ratio of 0.83. The following parameters were recorded at approximately 2.5 cm depth intervals:

- Cone Resistance (qc)
- Sleeve Friction (fs)
- Dynamic Pore Pressure (u)
- Inclination
- Penetration Speed
- Pore Pressure Dissipation (at selected depths)

At location CPT-1 shear wave measurements were obtained at approximately 10-foot intervals. The shear wave is generated using an air-actuated hammer, which is located inside the front jack of the CPT rig. The cone has a triaxial geophone, which recorded the shear wave signal generated by the air hammer.

The above parameters were recorded and viewed in real time using a laptop computer. Data is stored at the KTE office for up to 2 years for future analysis and reference. A complete set of baseline readings was taken prior to each sounding to determine temperature shifts and any zero load offsets. Monitoring base line readings ensures that the cone electronics are operating properly.

4. CONE PENETRATION TEST DATA & INTERPRETATION

The Cone Penetration Test data is presented in graphical form in the attached Appendix. These plots were generated using the CPeT-IT program. Penetration depths are referenced to ground surface. The soil behavior type on the CPT plots is derived from the attached CPT SBT plot (Robertson, "Interpretation of Cone Penetration Test…", 2009) and presents major soil lithologic changes. The stratigraphic interpretation is based on relationships between cone resistance (qc), sleeve friction (fs), and penetration pore pressure (u). The friction ratio (Rf), which is sleeve friction divided by cone resistance, is a calculated parameter that is used along with cone resistance to infer soil behavior type. Generally, cohesive soils (clays) have high friction ratios, low cone resistance and generate excess pore water pressures. Cohesionless soils (sands) have lower friction ratios, high cone bearing and generate little (or negative) excess pore water pressures.

The CPT data files have also been provided. These files can be imported in CPeT-IT (software by GeoLogismiki) and other programs to calculate various geotechnical parameters.

It should be noted that it is not always possible to clearly identify a soil type based on qc, fs and u. In these situations, experience, judgement and an assessment of the pore pressure data should be used to infer the soil behavior type.

If you have any questions regarding this information, please do not hesitate to call our office at (714) 901-7270.

Sincerely,

KEHOE TESTING & ENGINEERING

Steven P. Kehoe
President

04/13/22-kd-3948-1

APPENDIX

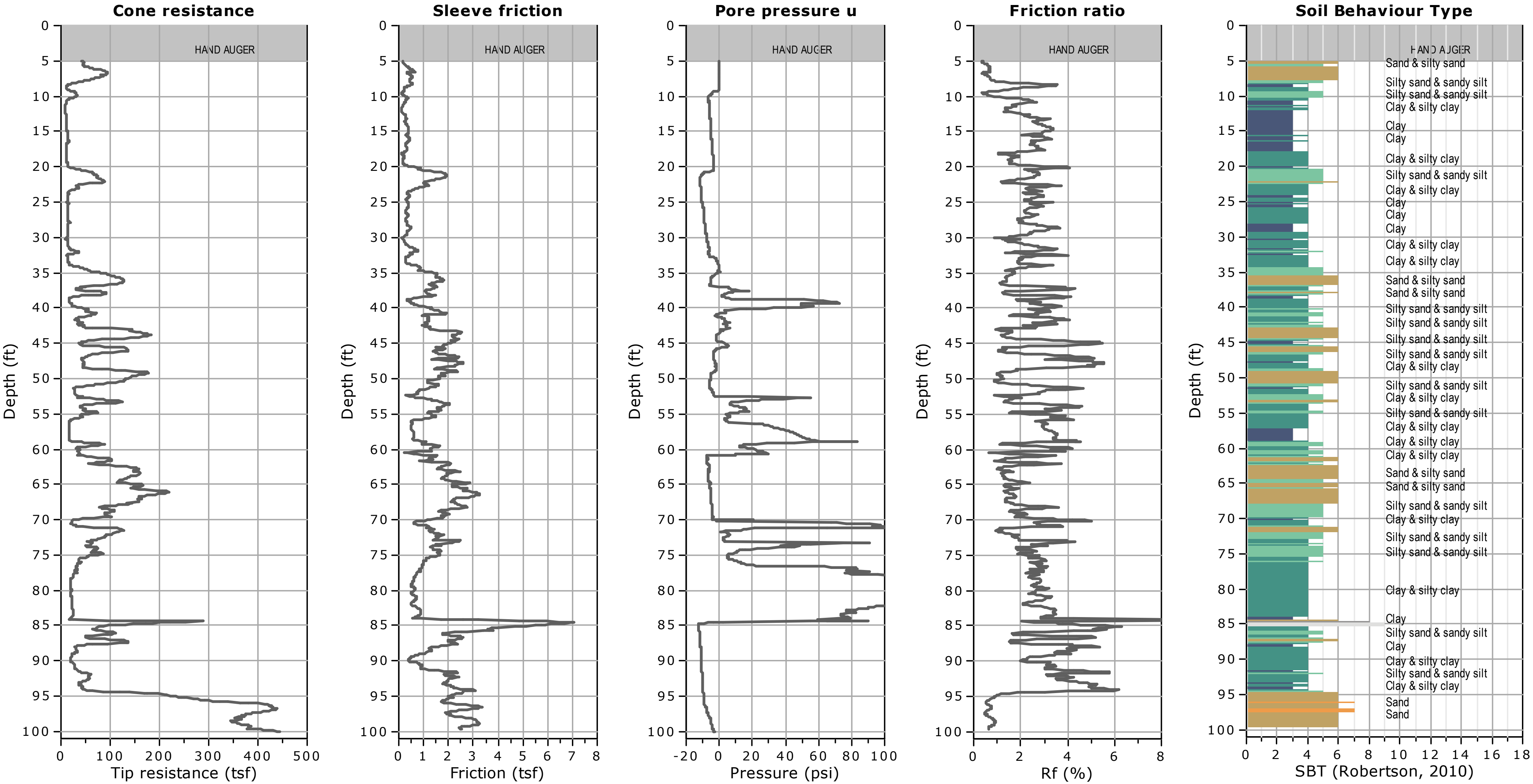
Kehoe Testing and Engineering
714-901-7270
steve@kehoetesting.com
www.kehoetesting.com

Project: **Ninyo & Moore / Los Alamitos High School**

Location: **Los Alamitos, CA**

CPT-1

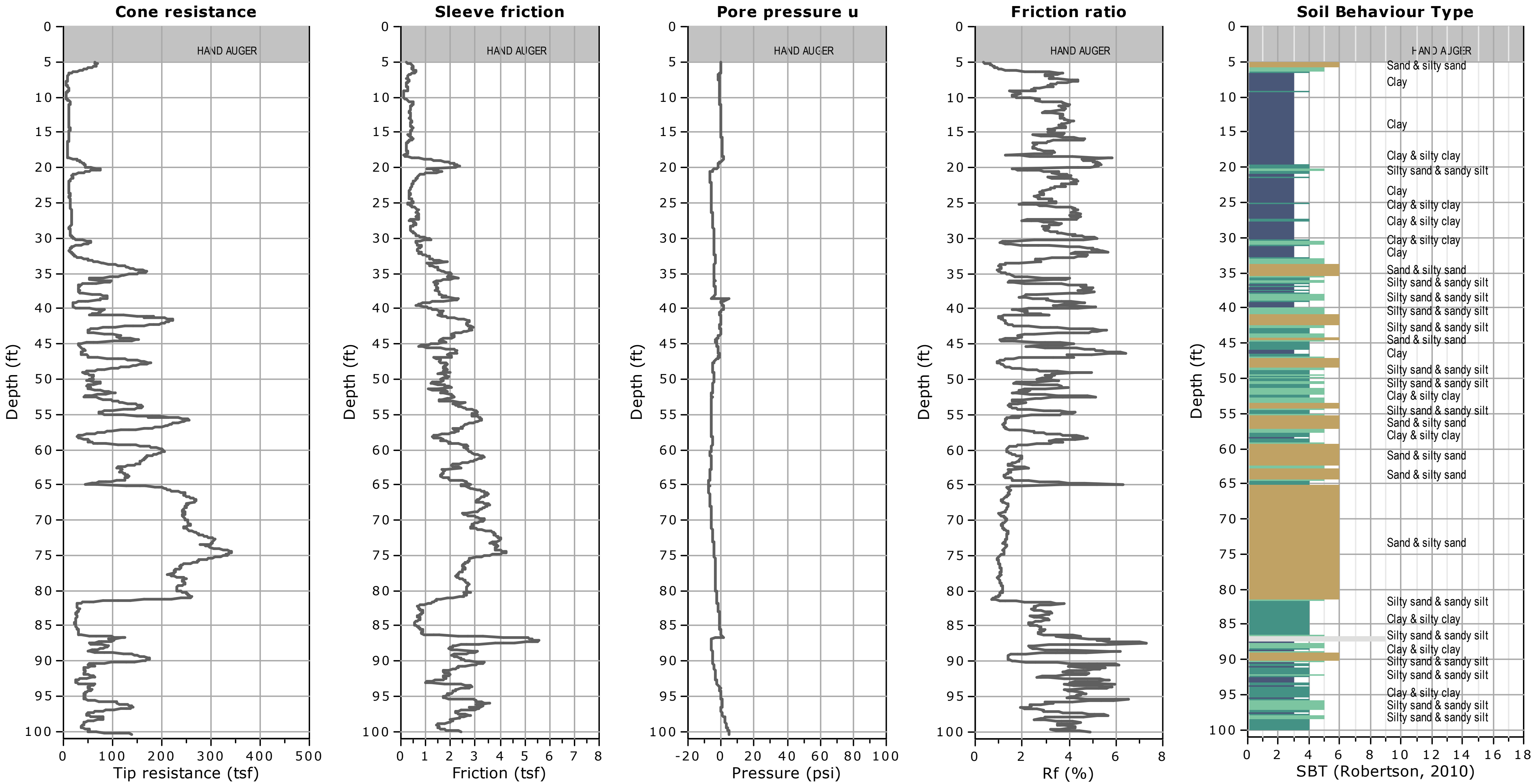
Total depth: 100.02 ft, Date: 4/6/2022



Kehoe Testing and Engineering
714-901-7270
steve@kehoetesting.com
www.kehoetesting.com

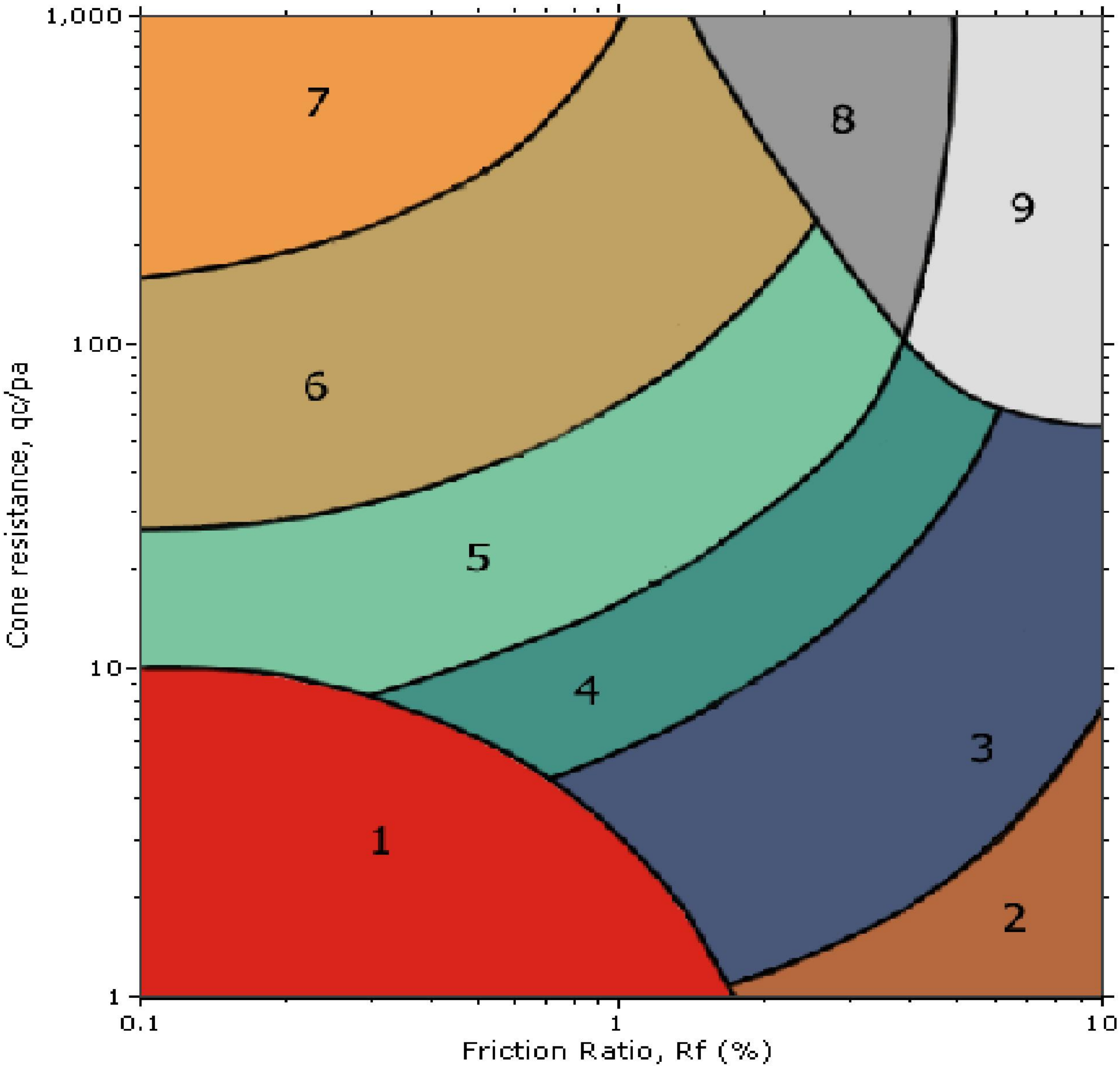
Project: Ninyo & Moore / Los Alamitos High School
Location: Los Alamitos, CA

CPT-2
Total depth: 100.34 ft, Date: 4/6/2022



Kehoe Testing and Engineering
714-901-7270
rich@kehoetesting.com
www.kehoetesting.com

SBT plot



SBT legend

- 1. Sensitive fine grained
- 2. Organic material
- 3. Clay to silty clay
- 4. Clayey silt to silty clay
- 5. Silty sand to sandy silt
- 6. Clean sand to silty sand
- 7. Gravely sand to sand
- 8. Very stiff sand to clayey sand
- 9. Very stiff fine grained

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Los Alamitos High School
Los Alamitos, CA

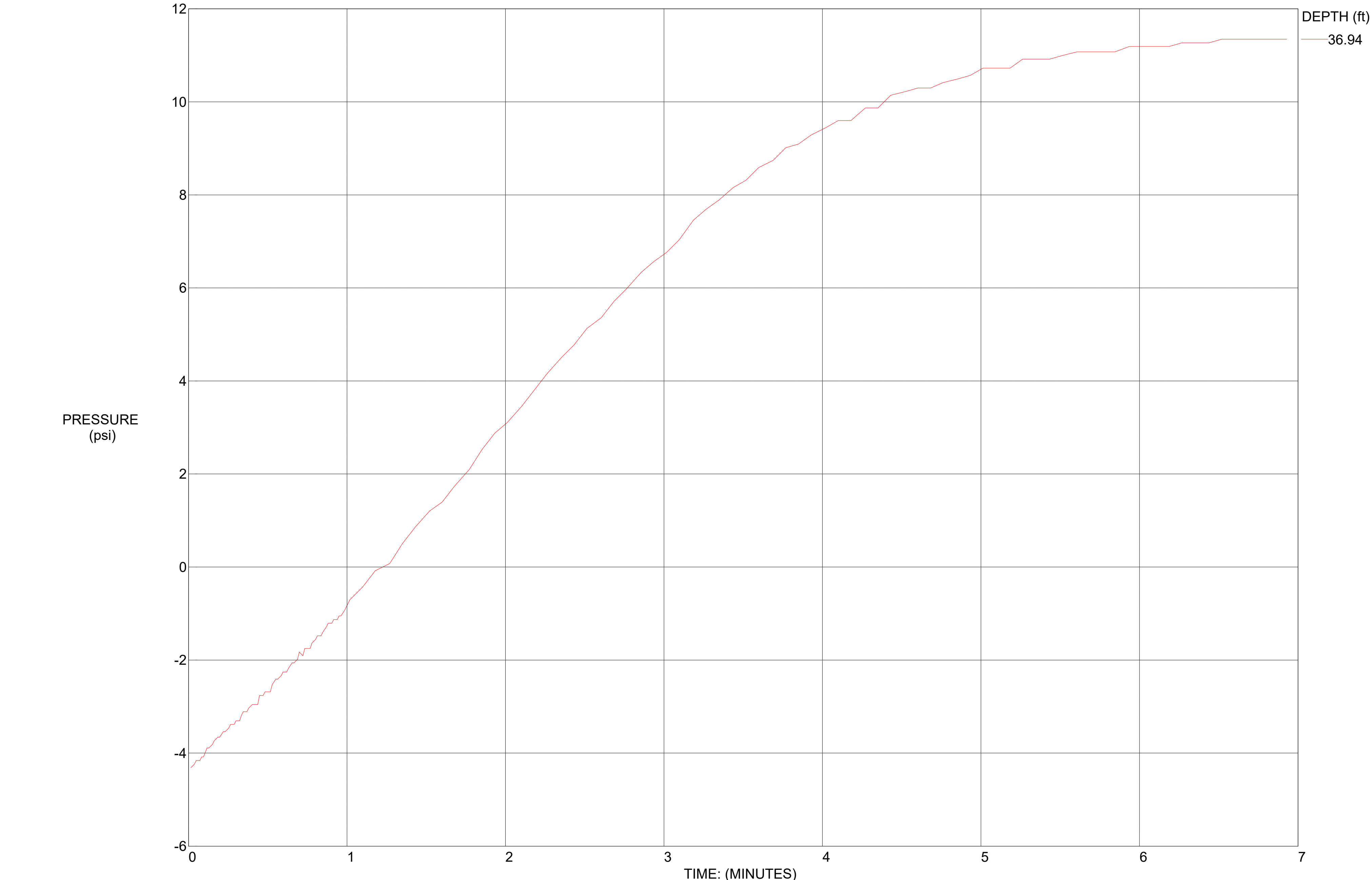
CPT Shear Wave Measurements

Location	Tip Depth (ft)	Geophone Depth (ft)	Travel Distance (ft)	S-Wave Arrival (msec)	S-Wave Velocity from Surface (ft/sec)	Interval S-Wave Velocity (ft/sec)
CPT-1	10.04	9.04	9.26	14.88	622	
	20.14	19.14	19.24	33.08	582	549
	30.02	29.02	29.09	49.12	592	614
	40.16	39.16	39.21	64.00	613	680
	50.69	49.69	49.73	78.16	636	743
	60.04	59.04	59.07	91.20	648	717
	70.05	69.05	69.08	103.20	669	834
	80.12	79.12	79.15	116.44	680	760
	90.16	89.16	89.18	127.40	700	916
	100.00	99.00	99.02	137.14	722	1010

Shear Wave Source Offset - 2 ft

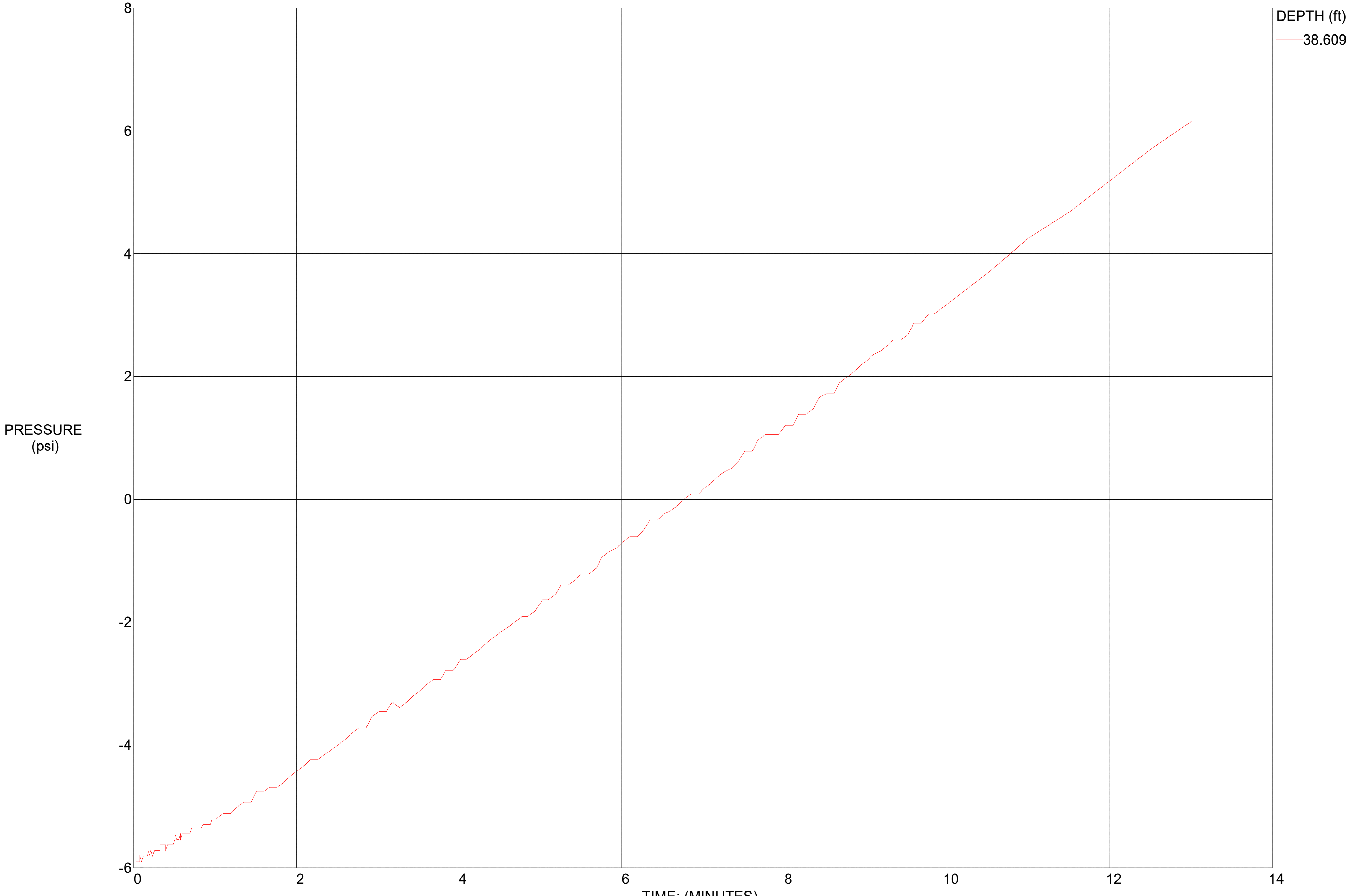
S-Wave Velocity from Surface = Travel Distance/S-Wave Arrival
Interval S-Wave Velocity = (Travel Dist2-Travel Dist1)/(Time2-Time1)

TEST ID: CPT-1



B-60

TEST ID: CPT-2



B-61

APPENDIX C

Laboratory Testing

APPENDIX C

LABORATORY TESTING

Classification

Soils were visually and texturally classified in accordance with the Unified Soil Classification System (USCS) in general accordance with ASTM D 2488. Soil classifications are indicated on the logs of the exploratory borings in Appendix A.

In-Place Moisture and Density Tests

The moisture content and dry density of relatively undisturbed samples obtained from the exploratory borings were evaluated in general accordance with ASTM D 2937. The test results are presented on the logs of the exploratory borings in Appendix A.

200 Wash

An evaluation of the percentage of minus-200 sieve material in selected soil samples was performed in general accordance with ASTM D 1140. The results of the tests are presented on Figure C-1.

Atterberg Limits

Tests were performed on selected representative fine-grained soil samples to evaluate the liquid limit, plastic limit, and plasticity index in general accordance with ASTM D 4318. The test results were utilized to evaluate the soil classification in accordance with the Unified Soil Classification System (USCS). The test results and classifications are shown on Figures C-2 and C-3.

Consolidation Tests

Consolidation tests were performed on selected relatively undisturbed soil samples in general accordance with ASTM D 2435. The samples were inundated during testing to represent adverse field conditions. The percent of consolidation for each load cycle was recorded as a ratio of the amount of vertical compression to the original height of the sample. The results of the tests are summarized on Figure C-4 and C-5.

Direct Shear Tests

Direct shear tests were performed on relatively undisturbed samples in general accordance with ASTM D 3080 to evaluate the shear strength characteristics of selected materials. The samples were inundated during shearing to represent adverse field conditions. The results are shown on Figures C-6 and C-7.

Soil Corrosivity Tests

Soil pH and minimum resistivity tests were performed on a representative soil sample in general accordance with California Test (CT) 643. The chloride content of the selected sample was evaluated in general accordance with CT 422. The sulfate content of the selected sample was evaluated in general accordance with CT 417. The test results are presented on Figure C-8.

SAMPLE LOCATION	SAMPLE DEPTH (ft)	DESCRIPTION	PERCENT PASSING NO. 4	PERCENT PASSING NO. 200	USCS (TOTAL SAMPLE)
B-1	5.0-6.5	SILTY SAND	96	14	SM
B-1	25.0-26.5	SILT	97	82	ML
B-2	15.0-16.5	SILT	99	91	ML
B-3	10.0-11.5	SILT	100	58	ML
B-4	5.0-6.5	SILTY SAND	100	15	SM
B-5	20.0-21.5	SILT	100	75	ML
B-5	60.0-61.5	SILT	100	53	ML
B-5	80.0-81.5	LEAN CLAY	98	74	CL

PERFORMED IN GENERAL ACCORDANCE WITH ASTM D 1140

FIGURE C-1

NO. 200 SIEVE ANALYSIS TEST RESULTS

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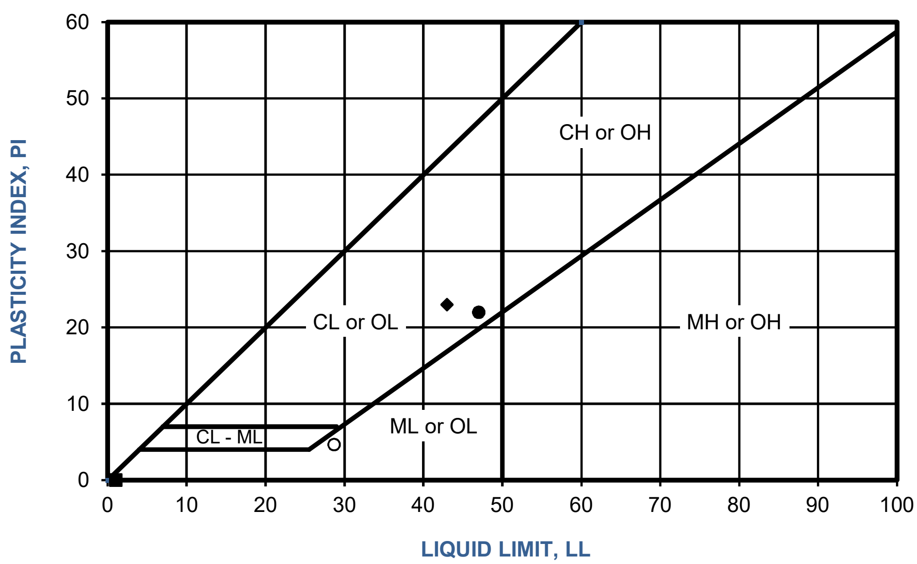
SYMBOL	LOCATION	DEPTH (ft)	LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	USCS CLASSIFICATION (Fraction Finer Than No. 40 Sieve)	USCS
●	B-1	17.0-19.5	47	25	22	CL	CL
■	B-3	10.0-11.5				NP	ML
◆	B-5	12.0-14.0	43	20	23	CL	CL
○	B-5	30.0-31.5	29	24	5	ML	ML

NP - INDICATES NON-PLASTIC



PERFORMED IN GENERAL ACCORDANCE WITH ASTM D 4318

FIGURE C-2

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ATTERBERG LIMITS TEST RESULTS

LOS ALAMITOS HIGH SCHOOL NEW GYMNASIUM
LOS ALAMITOS, CALIFORNIA

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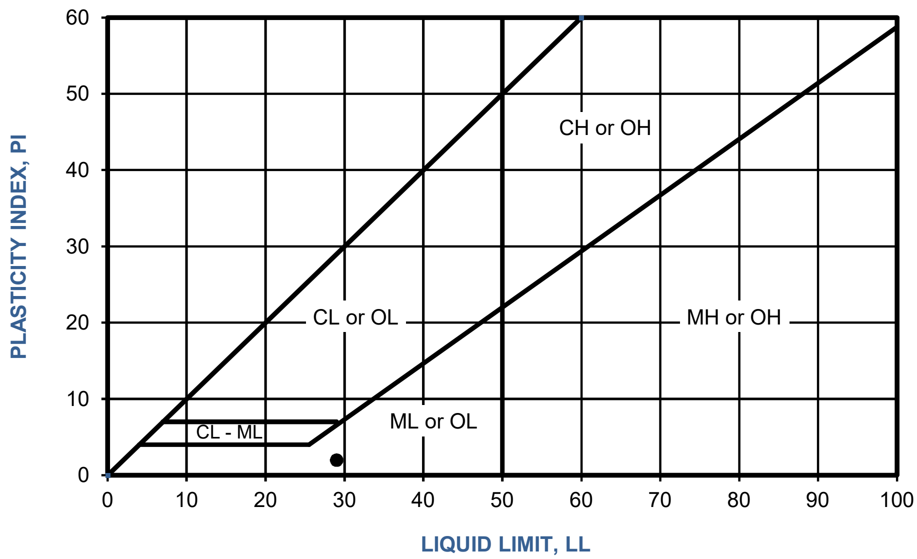
SYMBOL	LOCATION	DEPTH (ft)	LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	USCS CLASSIFICATION (Fraction Finer Than No. 40 Sieve)	USCS
●	B-1	25.0-26.5	29	27	2	ML	ML



PERFORMED IN GENERAL ACCORDANCE WITH ASTM D 4318

FIGURE C-3

ATTERBERG LIMITS TEST RESULTS

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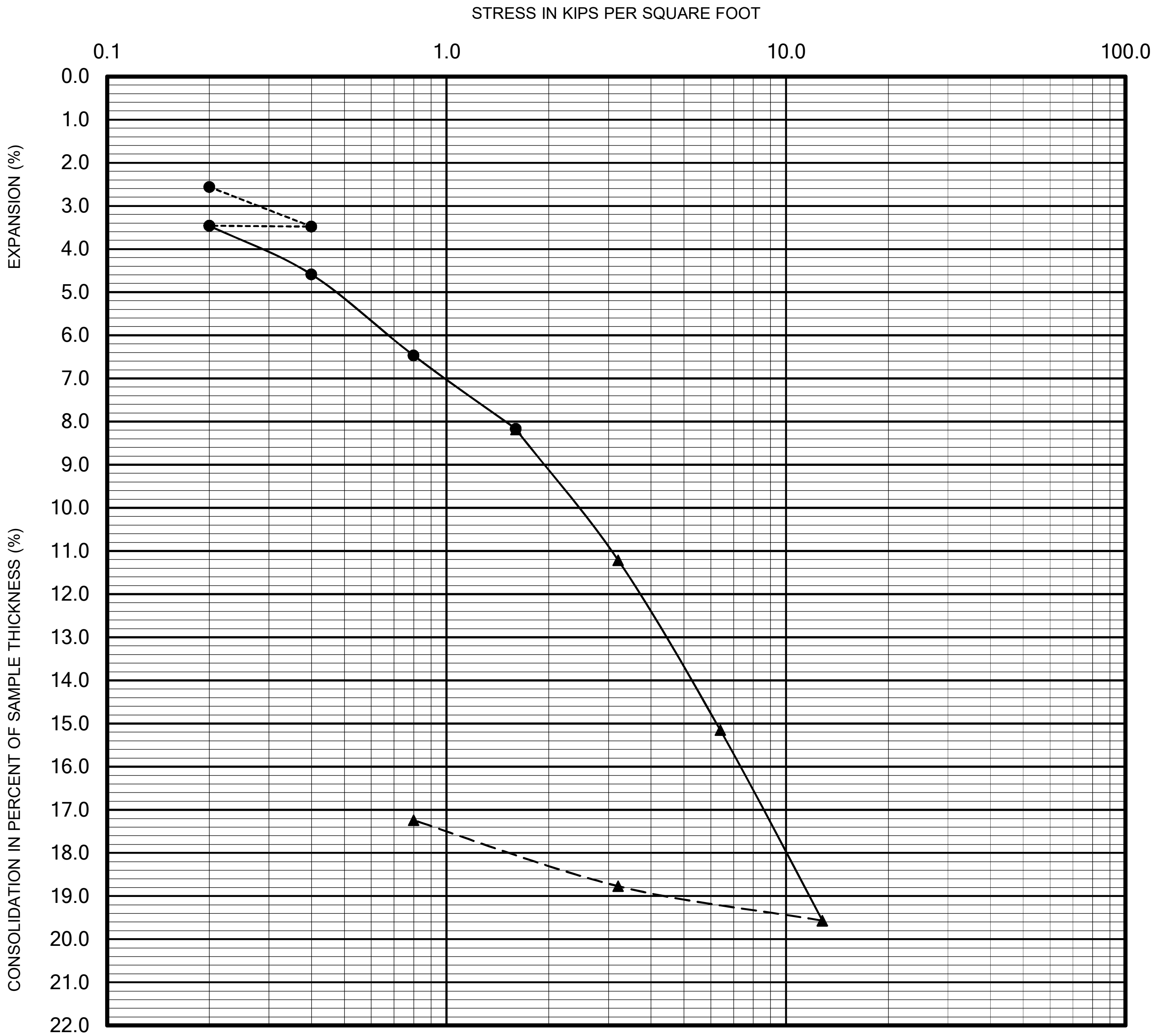

Sample Location	B-1
Depth (ft)	17.0-19.5
Soil Type	CL

PERFORMED IN GENERAL ACCORDANCE WITH ASTM D 2435

FIGURE C-4

CONSOLIDATION TEST RESULTS

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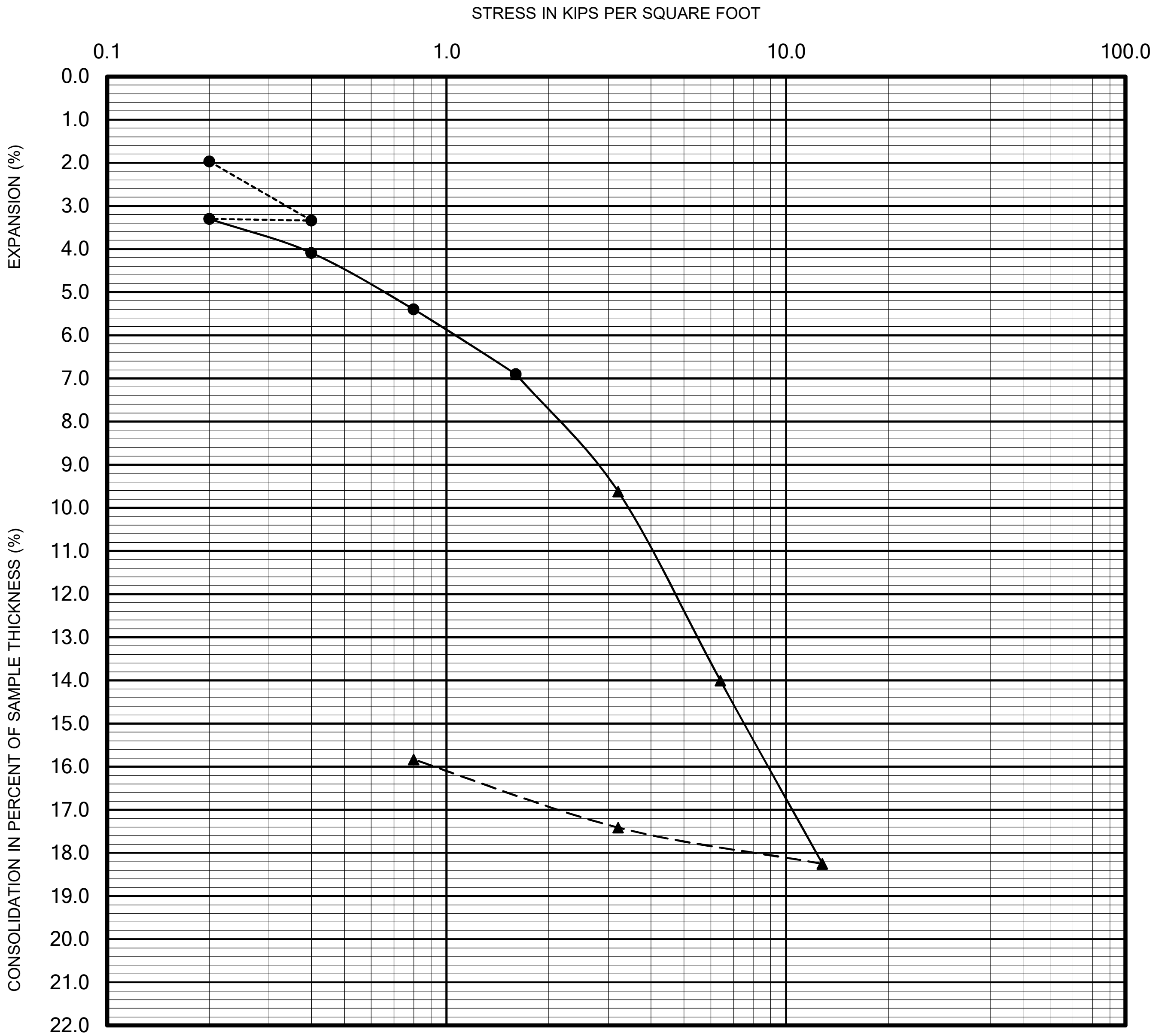

Seating Cycle	Sample Location	B-5
Loading Prior to Inundation	Depth (ft)	12.0-14.0
Loading After Inundation	Soil Type	CL
Rebound Cycle		

PERFORMED IN GENERAL ACCORDANCE WITH ASTM D 2435

FIGURE C-5

CONSOLIDATION TEST RESULTS

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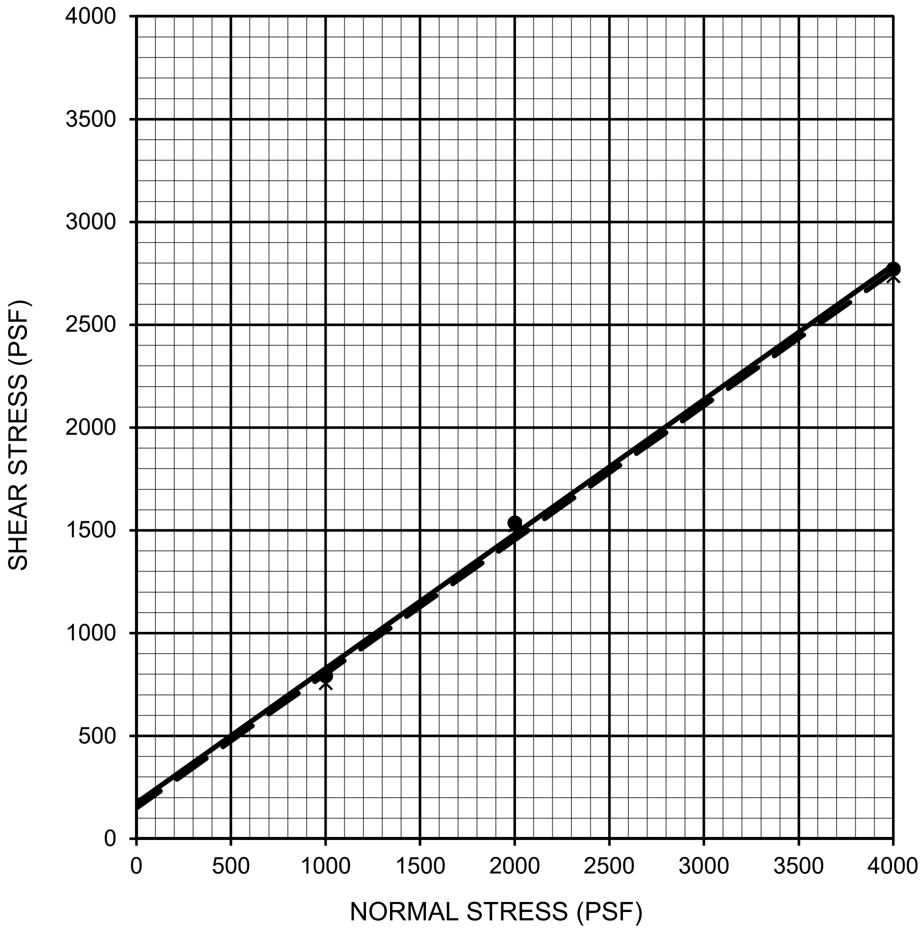

Description	Symbol	Sample Location	Depth (ft)	Shear Strength	Cohesion (psf)	Friction Angle (degrees)	Soil Type
SILTY SAND	——●——	B-1	5.0-6.5	Peak	174	33	SM
SILTY SAND	– – X – –	B-1	5.0-6.5	Ultimate	150	33	SM

PERFORMED IN GENERAL ACCORDANCE WITH ASTM D 3080

FIGURE C-6

DIRECT SHEAR TEST RESULTS

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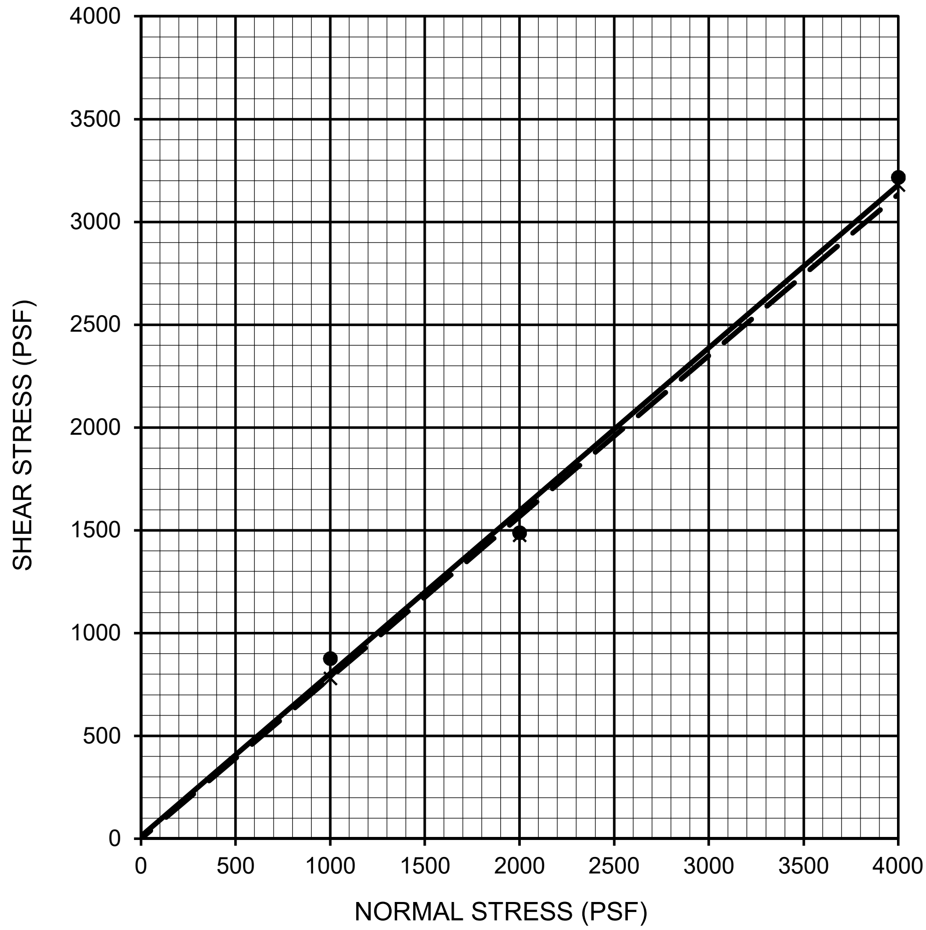

Description	Symbol	Sample Location	Depth (ft)	Shear Strength	Cohesion (psf)	Friction Angle (degrees)	Soil Type
SILT	——●——	B-2	10.0-11.5	Peak	12	38	ML
SILT	– – X – –	B-2	10.0-11.5	Ultimate	0	39	ML

PERFORMED IN GENERAL ACCORDANCE WITH ASTM D 3080

FIGURE C-7

DIRECT SHEAR TEST RESULTS

LOS ALAMITOS HIGH SCHOOL NEW GYMNASIUM
LOS ALAMITOS, CALIFORNIA

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SAMPLE LOCATION	SAMPLE DEPTH (ft)	pH [1]	RESISTIVITY [1] (ohm-cm)	SULFATE CONTENT [2]		CHLORIDE CONTENT [3] (ppm)
				(ppm)	(%)	
B-2	1.0-5.0	7.9	4,485	10	0.001	30

[1] PERFORMED IN GENERAL ACCORDANCE WITH CALIFORNIA TEST METHOD 643
[2] PERFORMED IN GENERAL ACCORDANCE WITH CALIFORNIA TEST METHOD 417
[3] PERFORMED IN GENERAL ACCORDANCE WITH CALIFORNIA TEST METHOD 422

FIGURE C-8

CORROSIVITY TEST RESULTS

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APPENDIX D

Site Specific Ground Motion Analysis

Period (sec)	2%-in-50 Years Probabilistic Spectrum	Probabilistic MCEr C_{RS} 0.909	Probabilistic MCEr C_{R1} 0.911	84th Percentile Deterministic Spectrum	Scaled Deterministic Spectrum	Site-Specific MCEr	80% of Modified General Response Spectrum	Design Response Spectrum
0.010	0.753	0.685		0.910	0.910	0.685	0.345	0.456
0.020	0.759	0.690		0.906	0.906	0.690	0.372	0.460
0.030	0.762	0.692		0.884	0.884	0.692	0.398	0.462
0.050	0.842	0.766		0.937	0.937	0.766	0.452	0.511
0.075	1.050	0.954		1.089	1.089	0.954	0.519	0.636
0.100	1.260	1.146		1.256	1.256	1.146	0.586	0.764
0.150	1.523	1.384		1.463	1.463	1.384	0.719	0.923
0.200	1.665	1.514		1.653	1.653	1.514	0.795	1.009
0.250	1.798	1.634		1.857	1.857	1.634	0.795	1.090
0.300	1.934	1.758		2.095	2.095	1.758	0.795	1.172
0.400	1.993	1.813		2.393	2.393	1.813	0.795	1.209
0.500	1.999	1.819		2.508	2.508	1.819	0.795	1.212
0.750	1.800	1.639		2.441	2.441	1.639	0.795	1.093
1.000	1.677	1.527		2.353	2.353	1.527	0.709	1.018
1.500	1.313	1.196		1.935	1.935	1.196	0.473	0.797
2.000	1.076	0.981		1.593	1.593	0.981	0.355	0.654
3.000	0.745	0.679		0.982	0.982	0.679	0.236	0.452
4.000	0.537	0.489		0.636	0.636	0.489	0.177	0.326
5.000	0.406	0.370		0.451	0.451	0.370	0.142	0.247
7.500	0.211	0.193		0.207	0.207	0.193	0.095	0.128
10.000	0.118	0.107		0.108	0.108	0.107	0.057	0.072

Period (sec)	2%-in-50 Years Probabilistic Spectrum	Probabilistic MCEr		84th Percentile Deterministic Spectrum	Scaled Deterministic Spectrum	Site-Specific MCEr	80% of Modified General Response Spectrum	Design Response Spectrum
		C_{RS}	C_{R1}					
		0.909	0.911					
0.010	0.753	0.685		0.702	0.702	0.685	0.345	0.456
0.020	0.759	0.690		0.722	0.722	0.690	0.372	0.460
0.030	0.762	0.692		0.714	0.714	0.692	0.398	0.462
0.050	0.842	0.766		0.729	0.729	0.729	0.452	0.486
0.075	1.050	0.954		0.853	0.853	0.853	0.519	0.569
0.100	1.260	1.146		0.993	0.993	0.993	0.586	0.662
0.150	1.523	1.384		1.207	1.207	1.207	0.719	0.805
0.200	1.665	1.514		1.374	1.374	1.374	0.795	0.916
0.250	1.798	1.634		1.551	1.551	1.551	0.795	1.034
0.300	1.934	1.758		1.720	1.720	1.720	0.795	1.147
0.400	1.993	1.813		1.905	1.905	1.813	0.795	1.209
0.500	1.999	1.819		1.986	1.986	1.819	0.795	1.212
0.750	1.800	1.639		1.914	1.914	1.639	0.795	1.093
1.000	1.677	1.527		1.890	1.890	1.527	0.709	1.018
1.500	1.313	1.196		1.609	1.609	1.196	0.473	0.797
2.000	1.076	0.981		1.379	1.379	0.981	0.355	0.654
3.000	0.745	0.679		1.023	1.023	0.679	0.236	0.452
4.000	0.537	0.489		0.758	0.758	0.489	0.177	0.326
5.000	0.406	0.370		0.574	0.574	0.370	0.142	0.247
7.500	0.211	0.193		0.278	0.278	0.193	0.095	0.128
10.000	0.118	0.107		0.151	0.151	0.107	0.057	0.072

Los Alamitos HS
211897001

lat 33.813297 long -118.068715

Source:	Vs30, m/s	Site Class
CPT Shear Wave Survey	217	D
CGS Map Viewer (2015)	228	D
use Vs30=	**217**	**D**

Z2.5	4.5	km
Z1.0	0.8	km

Faults for Deaggregation:

Compton		Reference	Newport Inglewood		Reference
M	7.3	1	M	7.5	1
Type	Thrust	2	Type	Strike slip	4
dip	20	3	dip	90	4
dip direction	NE	2	dip direction	-	
Hanging Wall Side	Yes		Hanging Wall Side	-	
ztop, km	5.2	3	ztop, km	0	3
zbot, km	15.6	3	zbot, km	15	3
rx, km	11.3	3 (measured)	rx, km	6.8	4
rjb, km	0	calculated	rjb, km	6.8	
rrup, km	8.8	1 & confirmed by calculation from measured rx	rrup, km	6.8	

References:

1. United States Geological Survey, 2022, Unified Hazard Tool; https://earthquake.usgs.gov/hazards/interactive/.
2. United States Geological Survey, 2022, U.S. Quaternary Faults; https://usgs.maps.arcgis.com/apps/webappviewer/index.html?id=5a6038b3a1684561a9b0aadf88412fcf.
3. United States Geological Survey, UCERF3 kmz file
4. United States Geological Survey, 2008, National Seismic Hazard Maps - Fault Parameters, https://earthquake.usgs.gov/cfusion/hazfaults_2008_search/query_main.cfm

211897001 Los Alamitos High School New Gynasium CPT-1

Tip Depth (ft)	Geophone Depth (ft)	Travel Distance (ft)	S-Wave Arrival (msec)	S-Wave Velocity 'rom Surfac (ft/sec)	Interval S-Wave Velocity (ft/sec)	Layer thicness d (ft)	d/v
10.04	9.04	9.26	14.88	622			
20.14	19.14	19.24	33.08	582	549	19.24	0.035075
30.02	29.02	29.09	49.12	592	614	9.84	0.01604
40.16	39.16	39.21	64.00	613	680	10.12	0.01488
50.69	49.69	49.73	78.16	636	743	10.52	0.01416
60.04	59.04	59.07	91.20	648	717	9.34	0.01304
70.05	69.05	69.08	103.20	669	834	10.01	0.012
80.12	79.12	79.15	116.44	680	760	10.07	0.01324
90.16	89.16	89.18	127.40	700	916	10.04	0.01096
100.00	99.00	99.02	137.14	722	1010	9.84	0.00974
						99.02	0.139135

Vs30 = 712 (ft/sec) 217 (m/sec)

```
Site data for Location: 33.813297, -118.068715

Source: CGS/Wills VS30 Map (2015)
        Type: Vs30
        Type Flag: Inferred
        Value: 228.2

Source: SCEC Community Velocity Model Version 4, Iteration 26, Basin Depth
        Type: Depth to Vs = 2.5 km/sec
        Type Flag: Inferred
        Value: 4.5

Source: SCEC Community Velocity Model Version 4, Iteration 26, Basin Depth
        Type: Depth to Vs = 1.0 km/sec
        Type Flag: Inferred
        Value: 0.8
```

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 (u...

Latitude

Decimal degrees

33.813297

Longitude

Decimal degrees, negative values for western longitudes

-118.068715

Site Class

259 m/s (Site class D)

Spectral Period

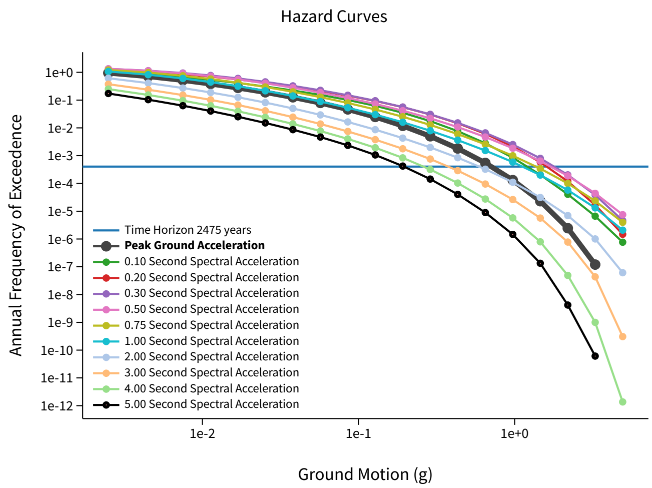
Peak Ground Acceleration

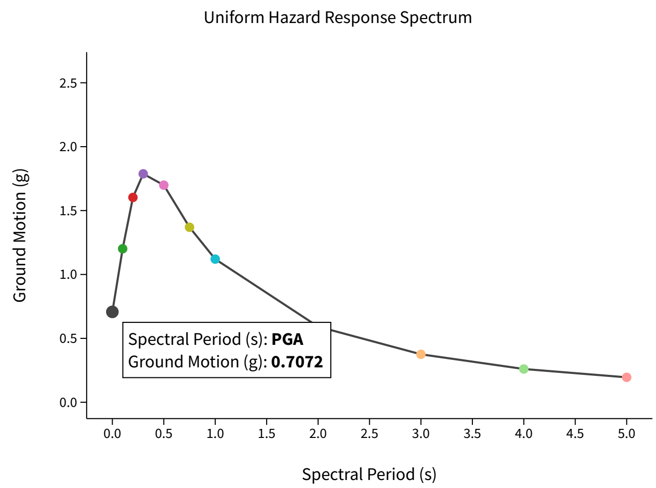
Time Horizon

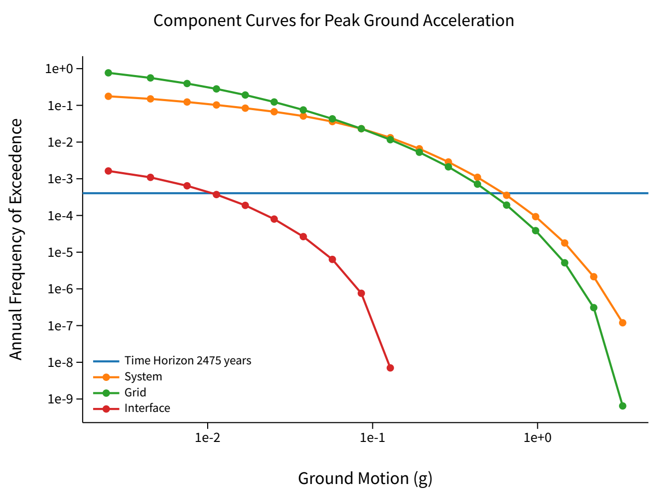
Return period in years

2475

Hazard Curve





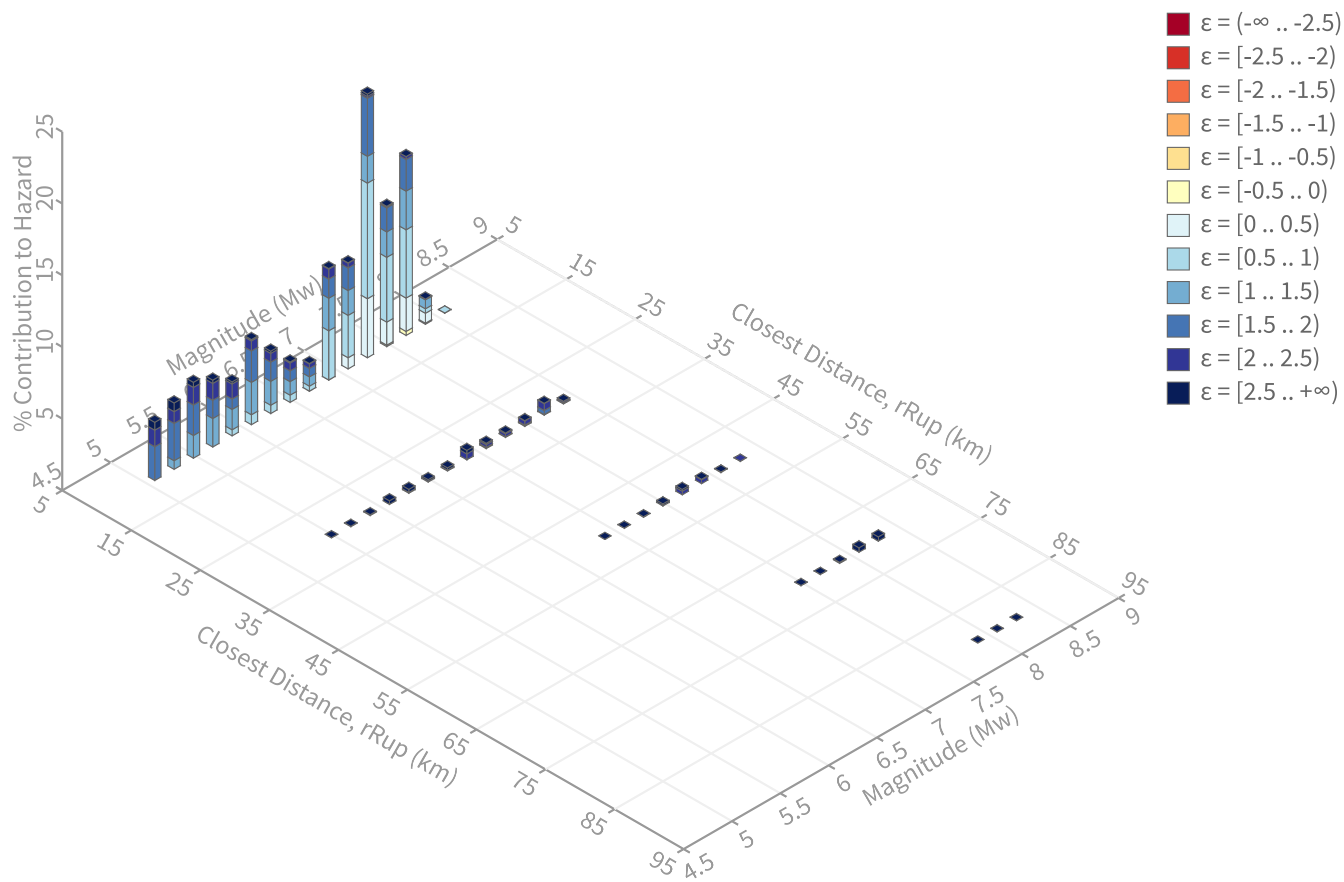


View Raw Data

^ Deaggregation

Component

Total



Summary statistics for, Deaggregation: Total

Deaggregation targets

Return period: 2475 yrs
Exceedance rate: 0.0004040404 yr^{-1}
PGA ground motion: 0.70720979 g

Recovered targets

Return period: 2915.2721 yrs
Exceedance rate: 0.00034302115 yr^{-1}

Totals

Binned: 100 %
Residual: 0 %
Trace: 0.06 %

Mean (over all sources)

m: 6.78
r: 11.2 km
ε_0: 1.32 σ

Mode (largest m-r bin)

m: 7.3
r: 10.77 km
ε_0: 0.94 σ
Contribution: 18.37 %

Mode (largest m-r-ε_0 bin)

m: 7.29
r: 8.18 km
ε_0: 0.7 σ
Contribution: 8.06 %

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	System							33.57
Compton [0]		8.80	7.31	0.50	118.112°W	33.746°N	208.04	8.64
Newport-Inglewood alt 2 [3]		6.93	7.46	0.89	118.117°W	33.768°N	221.64	7.13
Puente Hills (Coyote Hills) [1]		12.11	7.29	1.41	118.034°W	33.912°N	16.10	3.47
Palos Verdes [10]		18.70	7.42	1.84	118.253°W	33.746°N	246.30	2.91
Anaheim [1]		7.31	6.90	0.94	118.024°W	33.846°N	48.71	2.69
Compton [1]		9.89	7.21	0.72	118.161°W	33.764°N	237.30	1.19
Puente Hills (Santa Fe Springs) [0]		14.22	7.71	1.37	118.083°W	33.935°N	354.54	1.03
UC33brAvg_FM31	System							32.64
Newport-Inglewood alt 1 [3]		6.94	7.47	0.87	118.118°W	33.768°N	222.54	9.56
Compton [0]		8.80	7.25	0.52	118.112°W	33.746°N	208.04	8.50
Palos Verdes [10]		18.70	7.27	1.92	118.253°W	33.746°N	246.30	2.86
Anaheim [1]		7.31	6.87	0.95	118.024°W	33.846°N	48.71	2.69
Puente Hills [1]		16.16	7.40	1.59	118.041°W	33.947°N	9.60	2.39
UC33brAvg_FM31 (opt)	Grid							16.96
PointSourceFinite: -118.069, 33.845		6.18	5.64	1.38	118.069°W	33.845°N	0.00	3.66
PointSourceFinite: -118.069, 33.845		6.18	5.64	1.38	118.069°W	33.845°N	0.00	3.66
PointSourceFinite: -118.069, 33.872		8.05	5.68	1.66	118.069°W	33.872°N	0.00	1.81
PointSourceFinite: -118.069, 33.872		8.05	5.68	1.66	118.069°W	33.872°N	0.00	1.81
UC33brAvg_FM32 (opt)	Grid							16.82
PointSourceFinite: -118.069, 33.845		6.18	5.64	1.38	118.069°W	33.845°N	0.00	3.44
PointSourceFinite: -118.069, 33.845		6.18	5.64	1.38	118.069°W	33.845°N	0.00	3.44
PointSourceFinite: -118.069, 33.872		8.06	5.68	1.67	118.069°W	33.872°N	0.00	1.80
PointSourceFinite: -118.069, 33.872		8.06	5.68	1.67	118.069°W	33.872°N	0.00	1.80

Deterministic Seismic Hazard Analysis Input Compton	
M_W:	7.3
R_{RUP} (km):	8.80
R_{JB} (km):	0.00
R_X (km):	11.30
Ry0 (km):	999
V_{S30} (m/sec):	217
U:	0
F_{RV}:	1
F_{NM}:	0
F_{HW}:	1
Dip (deg):	20
Z_{TOR} (km):	5.2
Z_{HYP} (km):	999
$Z_{1.0}$ (km):	0.8
$Z_{2.5}$ (km):	4.5
W (km):	30
Vs30Flag:	measured
F_{AS}:	no
Region	California

Deterministic Seismic Hazard Analysis Output (50th Percentile)

Chiou & Youngs (2014)		Campbell & Bozorgnia (2014)		Boore et al. (2014)		Abrahamson et al. (2014)	
Period (sec)	S_a (g)	Period (sec)	S_a (g)	Period (sec)	S_a (g)	Period (sec)	S_a (g)
0.01	0.610	0.01	0.468	0.01	0.501	0.01	0.509
0.02	0.613	0.02	0.472	0.02	0.478	0.02	0.501
0.03	0.604	0.03	0.477	0.03	0.460	0.03	0.462
0.05	0.618	0.05	0.523	0.05	0.488	0.05	0.461
0.075	0.692	0.075	0.604	0.075	0.575	0.075	0.521
0.1	0.774	0.1	0.685	0.1	0.694	0.1	0.608
0.15	0.902	0.15	0.728	0.15	0.854	0.15	0.809
0.2	1.059	0.2	0.793	0.2	0.968	0.2	0.980
0.25	1.199	0.25	0.863	0.25	1.022	0.25	1.151
0.3	1.289	0.3	0.955	0.3	1.086	0.3	1.332
0.4	1.370	0.4	1.103	0.4	1.069	0.4	1.518
0.5	1.402	0.5	1.159	0.5	1.029	0.5	1.466
0.75	1.279	0.75	1.123	0.75	0.861	0.75	1.174
1	1.122	1	0.939	1	0.855	1	0.958
1.5	0.833	1.5	0.737	1.5	0.743	1.5	0.694
2	0.655	2	0.614	2	0.641	2	0.485
3	0.347	3	0.349	3	0.440	3	0.281
4	0.196	4	0.223	4	0.308	4	0.176
5	0.121	5	0.143	5	0.225	5	0.134
7.5	0.048	7.5	0.062	7.5	0.107	7.5	0.073
10	0.024	10	0.031	10	0.057	10	0.043

Deterministic Seismic Hazard Analysis Output (84th Percentile)

Chiou & Youngs (2014)		Campbell & Bozorgnia (2014)		Boore et al. (2014)		Abrahamson et al. (2014)	
Period	S_a	Period	S_a	Period	S_a	Period	S_a
0.01	0.948	0.01	0.707	0.01	0.869	0.01	0.806
0.02	0.955	0.02	0.713	0.02	0.858	0.02	0.790
0.03	0.946	0.03	0.723	0.03	0.844	0.03	0.721
0.05	0.960	0.05	0.806	0.05	0.944	0.05	0.719
0.075	1.055	0.075	0.962	0.075	1.157	0.075	0.817
0.1	1.168	0.1	1.097	0.1	1.395	0.1	0.950
0.15	1.358	0.15	1.134	0.15	1.636	0.15	1.243
0.2	1.610	0.2	1.223	0.2	1.734	0.2	1.495
0.25	1.849	0.25	1.335	0.25	1.787	0.25	1.760
0.3	2.016	0.3	1.520	0.3	1.901	0.3	2.063
0.4	2.204	0.4	1.843	0.4	1.892	0.4	2.441
0.5	2.316	0.5	2.016	0.5	1.845	0.5	2.409
0.75	2.232	0.75	2.124	0.75	1.590	0.75	2.007
1	2.039	1	1.837	1	1.679	1	1.706
1.5	1.589	1.5	1.486	1.5	1.476	1.5	1.305
2	1.284	2	1.243	2	1.281	2	0.949
3	0.688	3	0.712	3	0.893	3	0.554
4	0.390	4	0.441	4	0.625	4	0.344
5	0.239	5	0.285	5	0.455	5	0.263
7.5	0.094	7.5	0.125	7.5	0.212	7.5	0.144
10	0.048	10	0.062	10	0.108	10	0.085

Deterministic Seismic Hazard Analysis Input	
Newport Inglewood	
M_W:	7.5
R_{RUP} (km):	6.80
R_{JB} (km):	6.80
R_X (km):	6.80
Ry0 (km):	999
V_{S30} (m/sec):	217
U:	0
F_{RV}:	0
F_{NM}:	0
F_{HW}:	0
Dip (deg):	90
Z_{TOR} (km):	0
Z_{HYP} (km):	999
$Z_{1.0}$ (km):	0.8
$Z_{2.5}$ (km):	4.5
W (km):	15
Vs30Flag:	measured
F_{AS}:	no
Region	California

Deterministic Seismic Hazard Analysis Output (50th Percentile)

Chiou & Youngs (2014)		Campbell & Bozorgnia (2014)		Boore et al. (2014)		Abrahamson et al. (2014)	
Period (sec)	S_a (g)	Period (sec)	S_a (g)	Period (sec)	S_a (g)	Period (sec)	S_a (g)
0.01	0.427	0.01	0.380	0.01	0.406	0.01	0.369
0.02	0.486	0.02	0.384	0.02	0.387	0.02	0.367
0.03	0.486	0.03	0.386	0.03	0.379	0.03	0.349
0.05	0.442	0.05	0.405	0.05	0.404	0.05	0.356
0.075	0.515	0.075	0.475	0.075	0.465	0.075	0.404
0.1	0.596	0.1	0.546	0.1	0.546	0.1	0.478
0.15	0.715	0.15	0.630	0.15	0.677	0.15	0.666
0.2	0.840	0.2	0.682	0.2	0.777	0.2	0.819
0.25	0.944	0.25	0.785	0.25	0.809	0.25	0.941
0.3	1.006	0.3	0.861	0.3	0.842	0.3	1.046
0.4	1.057	0.4	0.949	0.4	0.826	0.4	1.118
0.5	1.073	0.5	0.982	0.5	0.808	0.5	1.070
0.75	0.976	0.75	0.890	0.75	0.693	0.75	0.870
1	0.854	1	0.825	1	0.682	1	0.723
1.5	0.643	1.5	0.677	1.5	0.613	1.5	0.559
2	0.523	2	0.571	2	0.556	2	0.420
3	0.352	3	0.400	3	0.430	3	0.290
4	0.231	4	0.274	4	0.336	4	0.224
5	0.151	5	0.194	5	0.265	5	0.176
7.5	0.064	7.5	0.085	7.5	0.140	7.5	0.100
10	0.034	10	0.043	10	0.078	10	0.060

Deterministic Seismic Hazard Analysis Output (84th Percentile)

Chiou & Youngs (2014)		Campbell & Bozorgnia (2014)		Boore et al. (2014)		Abrahamson et al. (2014)	
Period	S_a	Period	S_a	Period	S_a	Period	S_a
0.01	0.671	0.01	0.582	0.01	0.704	0.01	0.601
0.02	0.766	0.02	0.587	0.02	0.695	0.02	0.594
0.03	0.770	0.03	0.593	0.03	0.696	0.03	0.558
0.05	0.695	0.05	0.631	0.05	0.780	0.05	0.563
0.075	0.796	0.075	0.764	0.075	0.934	0.075	0.637
0.1	0.913	0.1	0.883	0.1	1.098	0.1	0.750
0.15	1.095	0.15	0.992	0.15	1.298	0.15	1.029
0.2	1.300	0.2	1.064	0.2	1.392	0.2	1.262
0.25	1.482	0.25	1.229	0.25	1.415	0.25	1.467
0.3	1.601	0.3	1.389	0.3	1.475	0.3	1.667
0.4	1.726	0.4	1.602	0.4	1.462	0.4	1.862
0.5	1.795	0.5	1.725	0.5	1.448	0.5	1.822
0.75	1.719	0.75	1.699	0.75	1.279	0.75	1.531
1	1.560	1	1.624	1	1.339	1	1.316
1.5	1.231	1.5	1.369	1.5	1.218	1.5	1.061
2	1.027	2	1.156	2	1.113	2	0.824
3	0.699	3	0.816	3	0.874	3	0.572
4	0.460	4	0.543	4	0.683	4	0.437
5	0.298	5	0.387	5	0.536	5	0.346
7.5	0.126	7.5	0.172	7.5	0.279	7.5	0.197
10	0.066	10	0.087	10	0.150	10	0.119

Chiou & Youngs (2014)		Campbell & Bozorgnia (2014)		Boore et al. (2014)		Abrahamson et al. (2014)	
Site Param List:		**Site Param List:**		**Site Param List:**		**Site Param List:**	
Longitude	-118.06872	Longitude	-118.06872	Longitude	-118.06872	Longitude	-118.06872
Latitude	33.813297	Latitude	33.813297	Latitude	33.813297	Latitude	33.813297
Vs30	217	Vs30	217	Vs30	217	Vs30	217
Vs30 Type	Measured	Vs30 Type	Measured	Vs30 Type	Measured	Vs30 Type	Measured
Depth 1.0 km/sec (m)	800	Depth 1.0 km/sec (m)	800	Depth 1.0 km/sec (m)	800	Depth 1.0 km/sec (m)	800
Depth 2.5 km/sec (km)	4.5	Depth 2.5 km/sec (km)	4.5	Depth 2.5 km/sec (km)	4.5	Depth 2.5 km/sec (km)	4.5

IMR Param List:	
Gaussian Truncation	None
Tectonic Region	Active Shallow Crust
Component	RotD50
Std Dev Type	Total
Additional Epistemic Uncertainty	(Disabled)
IML/Prob Param List:	
Map Type	IML@Prob
Probability	0.02
Forecast Param List:	
Eqk Rup Forecast	Mean UCERF3
Mean UCERF3 Presets	(POISSON ONLY) Both FM Branch Averaged
Apply Aftershock Filter	False
Aleatory Mag-Area StdDev	0
Background Seismicity	Include
Treat Background Seismicity As	Point Sources
Use Quad Surfaces (otherwise gridded)	False
Fault Grid Spacing	1
Probability Model	Poisson
Sect Upper Depth Averaging Tolerance (km)	100
Use Mean Upper Depth	True
Rup Mag Averaging Tolerance	1
Rupture Rake To Use	Def. Model Mean
Fault Model(s)	Both
Ignore Cache	FALSE
TimeSpan Param List:	
Duration (Years)	50

Probabilistic Seismic Hazard Analysis (2% in 50 years)							
Chiou & Youngs (2014)		Campbell & Bozorgnia (2014)		Boore et al. (2014)		Abrahamson et al. (2014)	
Period (sec)	S_a (g)	Period (sec)	S_a (g)	Period (sec)	S_a (g)	Period (sec)	S_a (g)
0.01	0.697	0.01	0.563	0.01	0.772	0.01	0.725
0.02	0.702	0.02	0.566	0.02	0.791	0.02	0.721
0.03	0.713	0.03	0.576	0.03	0.812	0.03	0.690
0.05	0.768	0.05	0.638	0.05	0.983	0.05	0.714
0.075	0.909	0.075	0.837	0.075	1.332	0.075	0.818
0.1	1.067	0.1	1.040	0.1	1.595	0.1	0.974
0.15	1.305	0.15	1.216	0.15	1.723	0.15	1.344
0.2	1.536	0.2	1.307	0.2	1.614	0.2	1.620
0.25	1.712	0.25	1.438	0.25	1.541	0.25	1.799
0.3	1.802	0.3	1.619	0.3	1.542	0.3	1.941
0.4	1.841	0.4	1.676	0.4	1.444	0.4	2.025
0.5	1.820	0.5	1.721	0.5	1.391	0.5	1.923
0.75	1.591	0.75	1.621	0.75	1.136	0.75	1.528
1	1.367	1	1.379	1	1.156	1	1.269
1.5	1.029	1.5	1.039	1.5	0.926	1.5	0.974
2	0.829	2	0.823	2	0.810	2	0.730
3	0.513	3	0.542	3	0.607	3	0.474
4	0.319	4	0.362	4	0.475	4	0.343
5	0.202	5	0.258	5	0.380	5	0.271
7.5	0.084	7.5	0.122	7.5	0.223	7.5	0.173
10	0.044	10	0.059	10	0.125	10	0.118

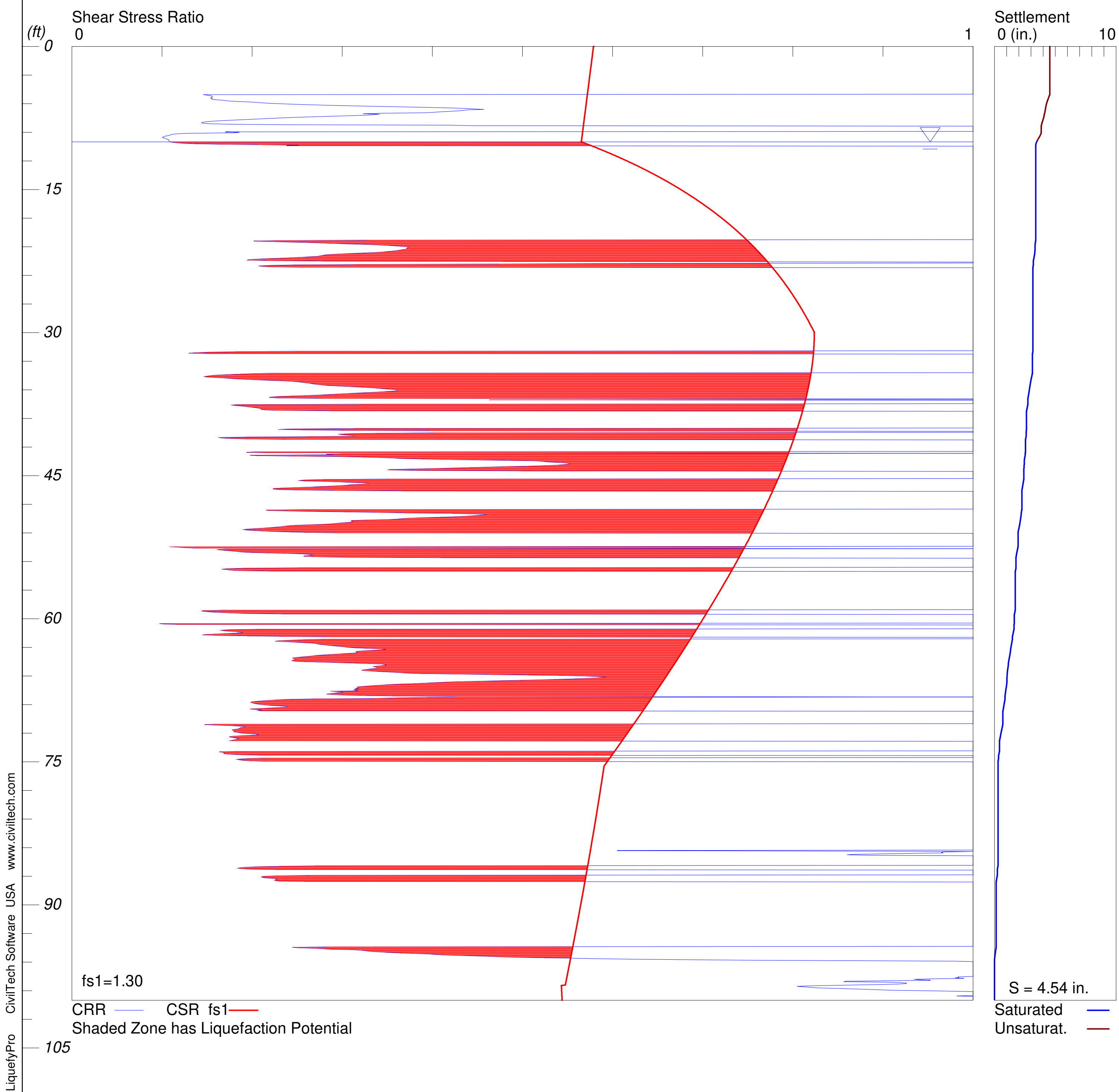
APPENDIX E

Liquefaction Analysis

LIQUEFACTION ANALYSIS

Los Alamitos High School

Hole No.=CPT-1 Water Depth=10 ft Surface Elev.=28 ***Magnitude=7.3***
Acceleration=0.685g



CivilTech Corporation **211897001** **Plate A-1**

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LIQUEFACTION ANALYSIS SUMMARY
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Input File Name: G:\Projects\200000 - Irvine\211850 - 211899\211897\211897001\Electronic Project File\Data Analysis & Calculations\Liquefaction\CPT-1 Los Alamitos HS Liquefy starting at 5'.liq
Title: Los Alamitos High School
Subtitle: 211897001

Surface Elev.=28
Hole No.=CPT-1
Depth of Hole= 100.00 ft
Water Table during Earthquake= 10.00 ft
Water Table during In-Situ Testing= 10.00 ft
Max. Acceleration= 0.69 g
Earthquake Magnitude= 7.30

Input Data:
Surface Elev.=28
Hole No.=CPT-1
Depth of Hole=100.00 ft
Water Table during Earthquake= 10.00 ft
Water Table during In-Situ Testing= 10.00 ft
Max. Acceleration=0.69 g
Earthquake Magnitude=7.30
No-Liquefiable Soils: CL, OL are Non-Liq. Soil

1. CPT Calculation Method: Modify Robertson*
2. Settlement Analysis Method: Tokimatsu/Seed
3. Fines Correction for Liquefaction: Stark/Olson et al.*
4. Fine Correction for Settlement: During Liquefaction*
5. Settlement Calculation in: All zones*
9. User request factor of safety (apply to CSR) , User= 1.3
   Plot one CSR curve (fs1=User)
10. Use Curve Smoothing: Yes*
* Recommended Options

In-Situ Test Data:

Depth ft	qc atm	fs atm	Rf pcf	gamma %	Fines mm	D50
0.00	-999.00	-999.00	100.00	120.00	*	0.50
6.96	91.18	0.47	0.51	120.00	*	0.50
9.06	14.51	0.21	1.44	120.00	*	0.50
11.18	9.71	0.16	1.62	120.00	*	0.50
13.26	9.84	0.32	3.21	120.00	*	0.50
15.35	13.47	0.35	2.57	120.00	*	0.50
17.47	11.66	0.32	2.76	120.00	*	0.50
19.61	12.78	0.22	1.75	120.00	*	0.50
21.69	76.94	1.67	2.17	120.00	*	0.50
23.76	15.20	0.34	2.22	120.00	*	0.50
25.86	14.51	0.34	2.37	120.00	*	0.50
27.96	17.27	0.34	1.96	120.00	*	0.50
30.12	11.74	0.13	1.14	120.00	*	0.50
32.23	27.54	0.52	1.88	120.00	*	0.50
34.34	43.17	0.89	2.07	120.00	*	0.50
36.42	123.10	1.37	1.12	120.00	*	0.50
38.55	19.86	0.74	3.72	120.00	*	0.50
40.66	69.77	1.83	2.62	120.00	*	0.50
42.73	48.18	1.24	2.58	120.00	*	0.50
44.81	40.93	2.19	5.36	120.00	*	0.50

46.92	51.12	2.37	4.64	120.00	*	0.50
49.04	170.50	2.18	1.28	120.00	*	0.50
51.12	43.61	1.48	3.40	120.00	*	0.50
53.21	125.10	1.63	1.30	120.00	*	0.50
55.31	37.65	1.47	3.91	120.00	*	0.50
57.41	16.58	0.57	3.45	120.00	*	0.50
59.61	50.00	1.60	3.19	120.00	*	0.50
61.70	93.95	0.81	0.87	120.00	*	0.50
63.80	144.70	1.86	1.29	120.00	*	0.50
65.88	204.80	2.65	1.29	120.00	*	0.50
67.98	110.00	2.56	2.33	120.00	*	0.50
70.08	20.90	1.06	5.07	120.00	*	0.50
72.20	92.91	1.81	1.94	120.00	*	0.50
74.34	67.09	1.66	2.47	120.00	*	0.50
86.39	63.64	2.12	3.33	120.00	*	0.50
95.54	290.90	1.83	0.63	120.00	*	0.50
97.66	374.00	2.03	0.54	120.00	*	0.50
99.74	411.90	0.00	0.00	120.00	*	0.50

* Modify Robertson method generates Fines from qc/fs. Inputted Fines are not relevant.

Output Results:

Settlement of Saturated Sands=3.46 in.
Settlement of Unsaturated Sands=1.08 in.
Total Settlement of Saturated and Unsaturated Sands=4.54 in.
Differential Settlement=2.271 to 2.998 in.

Depth ft	CRRm	CSRfs	F.S.	S_sat. in.	S_dry in.	S_all in.
0.00	2.00	0.58	5.00	3.46	1.08	4.54
1.00	2.00	0.58	5.00	3.46	1.08	4.54
2.00	2.00	0.58	5.00	3.46	1.08	4.54
3.00	2.00	0.57	5.00	3.46	1.08	4.54
4.00	2.00	0.57	5.00	3.46	1.08	4.54
5.00	2.00	0.57	5.00	3.46	1.08	4.54
6.00	0.23	0.57	5.00	3.46	0.82	4.28
7.00	0.34	0.57	5.00	3.46	0.66	4.12
8.00	0.14	0.57	5.00	3.46	0.45	3.91
9.00	0.19	0.57	5.00	3.46	0.38	3.84
10.00	0.11	0.57	0.19*	3.46	0.00	3.46
11.00	2.00	0.59	5.00	3.39	0.00	3.39
12.00	2.00	0.62	5.00	3.39	0.00	3.39
13.00	2.00	0.64	5.00	3.39	0.00	3.39
14.00	2.00	0.66	5.00	3.39	0.00	3.39
15.00	2.00	0.68	5.00	3.39	0.00	3.39
16.00	2.00	0.69	5.00	3.39	0.00	3.39
17.00	2.00	0.71	5.00	3.39	0.00	3.39
18.00	2.00	0.72	5.00	3.39	0.00	3.39
19.00	2.00	0.73	5.00	3.39	0.00	3.39
20.00	2.00	0.75	5.00	3.39	0.00	3.39
21.00	0.37	0.76	0.49*	3.34	0.00	3.34
22.00	0.27	0.77	0.36*	3.27	0.00	3.27
23.00	0.21	0.78	0.27*	3.18	0.00	3.18
24.00	2.00	0.78	5.00	3.16	0.00	3.16
25.00	2.00	0.79	5.00	3.16	0.00	3.16
26.00	2.00	0.80	5.00	3.16	0.00	3.16
27.00	2.00	0.81	5.00	3.16	0.00	3.16
28.00	2.00	0.81	5.00	3.16	0.00	3.16
29.00	2.00	0.82	5.00	3.16	0.00	3.16
30.00	2.00	0.82	5.00	3.16	0.00	3.16
31.00	2.00	0.82	5.00	3.16	0.00	3.16
32.00	0.18	0.82	0.22*	3.16	0.00	3.16
33.00	2.00	0.82	5.00	3.11	0.00	3.11
34.00	2.00	0.82	5.00	3.11	0.00	3.11
35.00	0.22	0.82	0.27*	2.99	0.00	2.99
36.00	0.36	0.82	0.44*	2.86	0.00	2.86
37.00	2.00	0.81	5.00	2.74	0.00	2.74
38.00	0.21	0.81	0.26*	2.67	0.00	2.67

39.00	2.00	0.81	5.00	2.64	0.00	2.64
40.00	2.00	0.81	5.00	2.64	0.00	2.64
41.00	0.16	0.80	0.20*	2.59	0.00	2.59
42.00	2.00	0.80	5.00	2.55	0.00	2.55
43.00	0.30	0.79	0.38*	2.50	0.00	2.50
44.00	0.51	0.79	0.64*	2.44	0.00	2.44
45.00	2.00	0.79	5.00	2.40	0.00	2.40
46.00	0.30	0.78	0.39*	2.33	0.00	2.33
47.00	2.00	0.78	5.00	2.25	0.00	2.25
48.00	2.00	0.77	5.00	2.25	0.00	2.25
49.00	0.44	0.77	0.57*	2.20	0.00	2.20
50.00	0.29	0.76	0.39*	2.09	0.00	2.09
51.00	0.29	0.75	0.39*	1.94	0.00	1.94
52.00	2.00	0.75	5.00	1.94	0.00	1.94
53.00	0.19	0.74	0.25*	1.85	0.00	1.85
54.00	2.00	0.74	5.00	1.77	0.00	1.77
55.00	0.22	0.73	0.30*	1.72	0.00	1.72
56.00	2.00	0.73	5.00	1.71	0.00	1.71
57.00	2.00	0.72	5.00	1.71	0.00	1.71
58.00	2.00	0.71	5.00	1.71	0.00	1.71
59.00	2.00	0.71	5.00	1.71	0.00	1.71
60.00	2.00	0.70	5.00	1.64	0.00	1.64
61.00	2.00	0.69	5.00	1.60	0.00	1.60
62.00	2.00	0.69	5.00	1.47	0.00	1.47
63.00	0.31	0.68	0.45*	1.35	0.00	1.35
64.00	0.26	0.67	0.38*	1.23	0.00	1.23
65.00	0.33	0.67	0.50*	1.12	0.00	1.12
66.00	0.57	0.66	0.86*	1.03	0.00	1.03
67.00	0.34	0.65	0.52*	0.99	0.00	0.99
68.00	0.30	0.65	0.47*	0.87	0.00	0.87
69.00	0.21	0.64	0.33*	0.78	0.00	0.78
70.00	2.00	0.63	5.00	0.69	0.00	0.69
71.00	2.00	0.62	5.00	0.69	0.00	0.69
72.00	0.19	0.62	0.31*	0.53	0.00	0.53
73.00	2.00	0.61	5.00	0.41	0.00	0.41
74.00	0.17	0.60	0.28*	0.39	0.00	0.39
75.00	2.00	0.59	5.00	0.29	0.00	0.29
76.00	2.00	0.59	5.00	0.29	0.00	0.29
77.00	2.00	0.59	5.00	0.29	0.00	0.29
78.00	2.00	0.59	5.00	0.29	0.00	0.29
79.00	2.00	0.58	5.00	0.29	0.00	0.29
80.00	2.00	0.58	5.00	0.29	0.00	0.29
81.00	2.00	0.58	5.00	0.29	0.00	0.29
82.00	2.00	0.58	5.00	0.29	0.00	0.29
83.00	2.00	0.58	5.00	0.29	0.00	0.29
84.00	2.00	0.58	5.00	0.29	0.00	0.29
85.00	2.00	0.57	5.00	0.29	0.00	0.29
86.00	0.21	0.57	0.36*	0.28	0.00	0.28
87.00	0.21	0.57	0.37*	0.22	0.00	0.22
88.00	2.00	0.57	5.00	0.14	0.00	0.14
89.00	2.00	0.57	5.00	0.14	0.00	0.14
90.00	2.00	0.56	5.00	0.14	0.00	0.14
91.00	2.00	0.56	5.00	0.14	0.00	0.14
92.00	2.00	0.56	5.00	0.14	0.00	0.14
93.00	2.00	0.56	5.00	0.14	0.00	0.14
94.00	2.00	0.56	5.00	0.14	0.00	0.14
95.00	0.35	0.55	0.64*	0.07	0.00	0.07
96.00	1.22	0.55	2.20	0.00	0.00	0.00
97.00	1.44	0.55	2.61	0.00	0.00	0.00
98.00	0.86	0.55	1.57	0.00	0.00	0.00
99.00	0.95	0.54	1.74	0.00	0.00	0.00
100.00	2.00	0.54	5.00	0.00	0.00	0.00

* F.S.<1, Liquefaction Potential Zone
(F.S. is limited to 5, CRR is limited to 2,   CSR is limited to 2)

Units: Unit: qc, fs, Stress or Pressure = atm (1.0581tsf); Unit Weight = pcf; Depth = ft; Settlement = in.

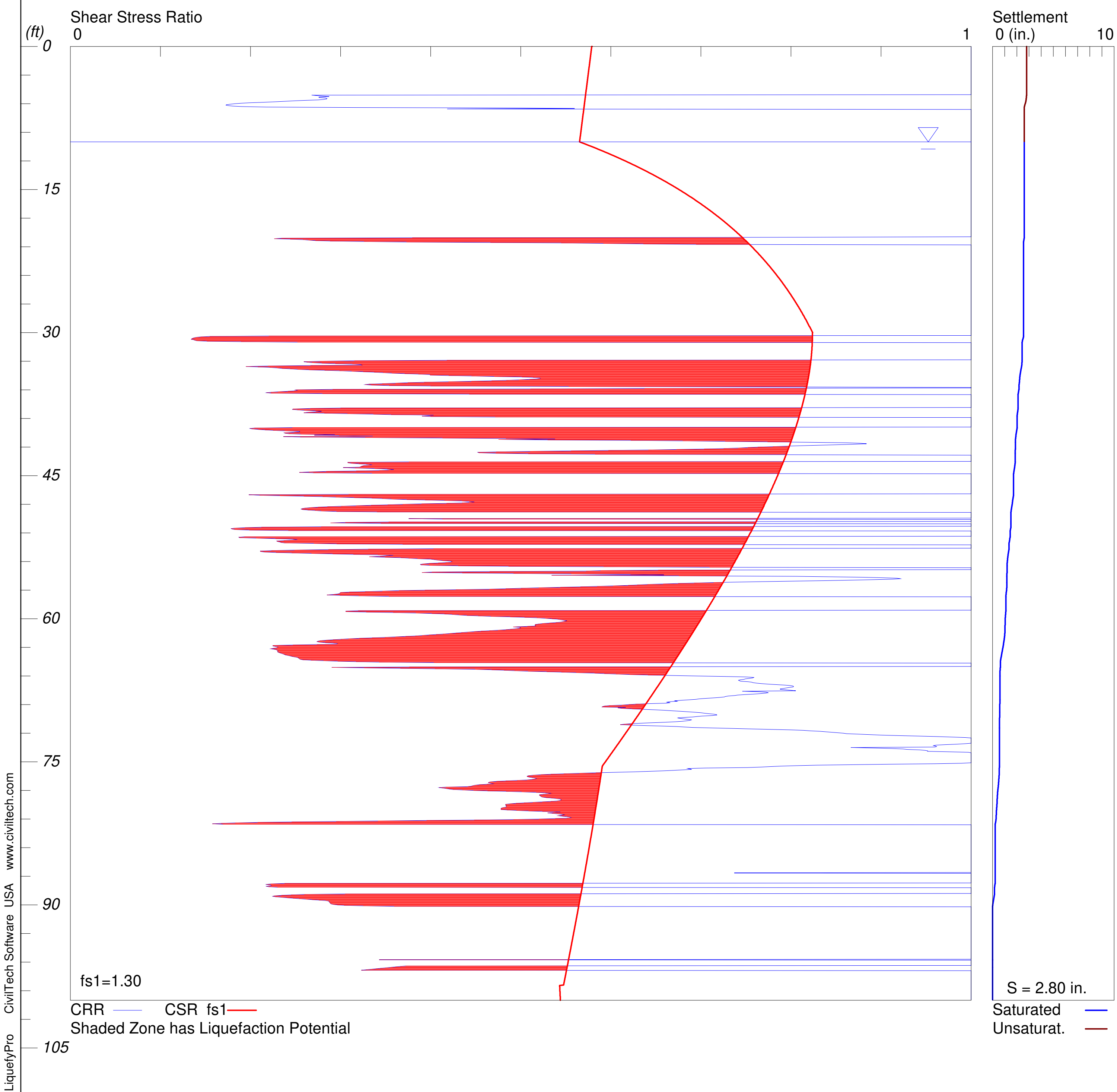
```
        1 atm (atmosphere) = 1 tsf (ton/ft2)
        CRRm            Cyclic resistance ratio from soils
        CSRsf           Cyclic stress ratio induced by a given earthquake (with user
request factor of safety)
        F.S.            Factor of Safety against liquefaction, F.S.=CRRm/CSRsf
        S_sat           Settlement from saturated sands
        S_dry           Settlement from Unsaturated Sands
        S_all           Total Settlement from Saturated and Unsaturated Sands
        NoLiq           No-Liquefy Soils
```

LIQUEFACTION ANALYSIS

Los Alamitos High School

Hole No.=CPT-2   Water Depth=10 ft   Surface Elev.=28

Magnitude=7.3
Acceleration=0.685g



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LIQUEFACTION ANALYSIS SUMMARY
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Input File Name: G:\Projects\200000 - Irvine\211850 - 211899\211897\211897001\Electronic Project File\Data Analysis & Calculations\Liquefaction\CPT-2 Los Alamitos HS LiquefyPro starting at 5'.liq
Title: Los Alamitos High School
Subtitle: 211897001

Surface Elev.=28
Hole No.=CPT-2
Depth of Hole= 100.00 ft
Water Table during Earthquake= 10.00 ft
Water Table during In-Situ Testing= 10.00 ft
Max. Acceleration= 0.69 g
Earthquake Magnitude= 7.30

Input Data:
Surface Elev.=28
Hole No.=CPT-2
Depth of Hole=100.00 ft
Water Table during Earthquake= 10.00 ft
Water Table during In-Situ Testing= 10.00 ft
Max. Acceleration=0.69 g
Earthquake Magnitude=7.30
No-Liquefiable Soils: CL, OL are Non-Liq. Soil

1. CPT Calculation Method: Modify Robertson*
2. Settlement Analysis Method: Tokimatsu/Seed
3. Fines Correction for Liquefaction: Stark/Olson et al.*
4. Fine Correction for Settlement: During Liquefaction*
5. Settlement Calculation in: All zones*
9. User request factor of safety (apply to CSR) ,   User= 1.3
   Plot one CSR curve (fs1=User)
10. Use Curve Smoothing: Yes*
* Recommended Options

In-Situ Test Data:

Depth ft	qc atm	fs atm	Rf pcf	gamma %	Fines mm	D50
0.00	-999.00	-999.00	100.00	120.00	*	0.50
5.84	54.49	0.47	0.86	120.00	*	0.50
6.79	10.53	0.33	3.16	120.00	*	0.50
7.71	7.25	0.32	4.38	120.00	*	0.50
8.61	9.07	0.27	3.01	120.00	*	0.50
9.53	6.13	0.12	1.90	120.00	*	0.50
10.44	10.71	0.28	2.59	120.00	*	0.50
11.35	10.45	0.38	3.67	120.00	*	0.50
12.29	11.83	0.39	3.27	120.00	*	0.50
13.20	10.10	0.39	3.88	120.00	*	0.50
14.12	10.71	0.40	3.77	120.00	*	0.50
15.05	11.48	0.37	3.25	120.00	*	0.50
15.97	10.10	0.47	4.66	120.00	*	0.50
16.89	8.55	0.21	2.49	120.00	*	0.50
17.79	8.29	0.28	3.40	120.00	*	0.50
18.70	12.43	0.70	5.66	120.00	*	0.50
19.64	44.21	2.27	5.13	120.00	*	0.50
20.57	46.71	1.63	3.49	120.00	*	0.50
21.46	19.60	0.64	3.27	120.00	*	0.50
22.41	12.00	0.44	3.68	120.00	*	0.50

23.30	11.66	0.33	2.83	120.00	*	0.50
24.22	12.26	0.32	2.65	120.00	*	0.50
25.14	13.90	0.26	1.84	120.00	*	0.50
26.07	15.89	0.68	4.26	120.00	*	0.50
26.99	15.37	0.69	4.46	120.00	*	0.50
27.90	16.58	0.60	3.60	120.00	*	0.50
28.81	13.12	0.39	2.94	120.00	*	0.50
29.75	16.15	0.73	4.52	120.00	*	0.50
30.69	53.88	0.59	1.10	120.00	*	0.50
31.58	13.12	0.66	5.03	120.00	*	0.50
32.51	22.36	1.06	4.73	120.00	*	0.50
33.41	70.20	1.90	2.71	120.00	*	0.50
34.33	141.70	1.48	1.04	120.00	*	0.50
35.27	123.56	1.92	1.55	120.00	*	0.50
36.17	95.50	1.35	1.41	120.00	*	0.50
37.10	30.22	1.48	4.88	120.00	*	0.50
38.01	71.58	1.58	2.21	120.00	*	0.50
38.92	44.21	1.58	3.57	120.00	*	0.50
39.84	25.04	1.10	4.40	120.00	*	0.50
40.76	69.34	1.66	2.40	120.00	*	0.50
41.67	221.74	2.72	1.23	120.00	*	0.50
42.62	104.39	2.94	2.82	120.00	*	0.50
43.51	62.00	2.19	3.53	120.00	*	0.50
44.44	147.57	1.59	1.07	120.00	*	0.50
45.34	33.42	0.72	2.15	120.00	*	0.50
46.26	35.23	2.26	6.42	120.00	*	0.50
47.19	124.60	1.58	1.27	120.00	*	0.50
48.10	142.30	1.77	1.25	120.00	*	0.50
49.05	39.89	1.97	4.94	120.00	*	0.50
49.94	60.70	1.59	2.62	120.00	*	0.50
50.88	50.51	1.76	3.48	120.00	*	0.50
51.78	92.91	1.78	1.92	120.00	*	0.50
52.71	71.06	1.99	2.81	120.00	*	0.50
53.61	150.33	2.25	1.49	120.00	*	0.50
54.53	83.50	3.02	3.62	120.00	*	0.50
55.45	171.23	3.17	1.85	120.00	*	0.50
56.40	220.10	2.64	1.20	120.00	*	0.50
57.29	96.19	2.33	2.42	120.00	*	0.50
58.21	30.14	1.25	4.15	120.00	*	0.50
59.13	69.25	2.02	2.92	120.00	*	0.50
60.06	203.09	2.72	1.34	120.00	*	0.50
60.96	169.85	3.33	1.96	120.00	*	0.50
61.88	155.77	2.48	1.59	120.00	*	0.50
62.81	118.12	1.64	1.39	120.00	*	0.50
63.72	131.85	1.61	1.22	120.00	*	0.50
64.64	72.45	2.59	3.57	120.00	*	0.50
65.77	216.04	3.22	1.49	120.00	*	0.50
66.70	253.52	3.30	1.30	120.00	*	0.50
67.61	249.03	3.39	1.36	120.00	*	0.50
68.52	244.02	3.22	1.32	120.00	*	0.50
69.44	241.17	2.86	1.19	120.00	*	0.50
70.38	251.62	3.02	1.20	120.00	*	0.50
71.28	251.62	3.08	1.23	120.00	*	0.50
72.19	282.70	3.81	1.35	120.00	*	0.50
73.14	302.22	3.78	1.25	120.00	*	0.50
74.03	307.31	3.78	1.23	120.00	*	0.50
74.94	332.87	3.57	1.07	120.00	*	0.50
75.87	273.03	2.71	0.99	120.00	*	0.50
76.78	237.89	2.58	1.08	120.00	*	0.50
77.73	213.97	2.27	1.06	120.00	*	0.50
78.62	243.03	2.59	1.07	120.00	*	0.50
79.53	231.67	2.65	1.14	120.00	*	0.50
80.47	252.31	2.61	1.04	120.00	*	0.50
81.38	136.26	1.44	1.06	120.00	*	0.50
88.00	87.30	2.05	2.34	120.00	*	0.50
90.06	143.40	3.09	2.15	120.00	*	0.50

* Modify Robertson method generates Fines from qc/fs. Inputted Fines are not relevant.

Output Results:

Settlement of Saturated Sands=2.60 in.
Settlement of Unsaturated Sands=0.20 in.
Total Settlement of Saturated and Unsaturated Sands=2.80 in.
Differential Settlement=1.401 to 1.849 in.

Depth ft	CRRm	CSRfs	F.S.	S_sat. in.	S_dry in.	S_all in.
0.00	2.00	0.58	5.00	2.60	0.20	2.80
1.00	2.00	0.58	5.00	2.60	0.20	2.80
2.00	2.00	0.58	5.00	2.60	0.20	2.80
3.00	2.00	0.57	5.00	2.60	0.20	2.80
4.00	2.00	0.57	5.00	2.60	0.20	2.80
5.00	2.00	0.57	5.00	2.60	0.20	2.80
6.00	0.18	0.57	5.00	2.60	0.08	2.69
7.00	2.00	0.57	5.00	2.60	0.00	2.60
8.00	2.00	0.57	5.00	2.60	0.00	2.60
9.00	2.00	0.57	5.00	2.60	0.00	2.60
10.00	2.00	0.57	5.00	2.60	0.00	2.60
11.00	2.00	0.59	5.00	2.60	0.00	2.60
12.00	2.00	0.62	5.00	2.60	0.00	2.60
13.00	2.00	0.64	5.00	2.60	0.00	2.60
14.00	2.00	0.66	5.00	2.60	0.00	2.60
15.00	2.00	0.68	5.00	2.60	0.00	2.60
16.00	2.00	0.69	5.00	2.60	0.00	2.60
17.00	2.00	0.71	5.00	2.60	0.00	2.60
18.00	2.00	0.72	5.00	2.60	0.00	2.60
19.00	2.00	0.73	5.00	2.60	0.00	2.60
20.00	0.82	0.75	1.11	2.60	0.00	2.60
21.00	2.00	0.76	5.00	2.55	0.00	2.55
22.00	2.00	0.77	5.00	2.55	0.00	2.55
23.00	2.00	0.78	5.00	2.55	0.00	2.55
24.00	2.00	0.78	5.00	2.55	0.00	2.55
25.00	2.00	0.79	5.00	2.55	0.00	2.55
26.00	2.00	0.80	5.00	2.55	0.00	2.55
27.00	2.00	0.81	5.00	2.55	0.00	2.55
28.00	2.00	0.81	5.00	2.55	0.00	2.55
29.00	2.00	0.82	5.00	2.55	0.00	2.55
30.00	2.00	0.82	5.00	2.55	0.00	2.55
31.00	0.25	0.82	0.31*	2.44	0.00	2.44
32.00	2.00	0.82	5.00	2.43	0.00	2.43
33.00	0.28	0.82	0.34*	2.43	0.00	2.43
34.00	0.30	0.82	0.36*	2.32	0.00	2.32
35.00	0.48	0.82	0.59*	2.22	0.00	2.22
36.00	0.25	0.82	0.31*	2.17	0.00	2.17
37.00	2.00	0.81	5.00	2.11	0.00	2.11
38.00	0.25	0.81	0.30*	2.10	0.00	2.10
39.00	2.00	0.81	5.00	2.03	0.00	2.03
40.00	0.20	0.81	0.25*	2.02	0.00	2.02
41.00	0.33	0.80	0.41*	1.90	0.00	1.90
42.00	0.76	0.80	0.96*	1.87	0.00	1.87
43.00	2.00	0.79	5.00	1.87	0.00	1.87
44.00	0.32	0.79	0.41*	1.83	0.00	1.83
45.00	2.00	0.79	5.00	1.74	0.00	1.74
46.00	2.00	0.78	5.00	1.74	0.00	1.74
47.00	0.20	0.78	0.26*	1.73	0.00	1.73
48.00	0.37	0.77	0.48*	1.61	0.00	1.61
49.00	2.00	0.77	5.00	1.52	0.00	1.52
50.00	0.34	0.76	0.45*	1.51	0.00	1.51
51.00	2.00	0.75	5.00	1.45	0.00	1.45
52.00	0.23	0.75	0.31*	1.37	0.00	1.37
53.00	0.22	0.74	0.29*	1.31	0.00	1.31
54.00	0.42	0.74	0.57*	1.21	0.00	1.21
55.00	0.57	0.73	0.78*	1.19	0.00	1.19
56.00	0.84	0.73	1.16	1.18	0.00	1.18
57.00	0.39	0.72	0.55*	1.15	0.00	1.15
58.00	2.00	0.71	5.00	1.10	0.00	1.10
59.00	2.00	0.71	5.00	1.10	0.00	1.10
60.00	0.53	0.70	0.76*	1.05	0.00	1.05

61.00	0.50	0.69	0.72*	1.02	0.00	1.02
62.00	0.33	0.69	0.49*	0.98	0.00	0.98
63.00	0.23	0.68	0.34*	0.85	0.00	0.85
64.00	0.25	0.67	0.37*	0.71	0.00	0.71
65.00	2.00	0.67	5.00	0.64	0.00	0.64
66.00	0.70	0.66	1.05	0.60	0.00	0.60
67.00	0.80	0.65	1.22	0.60	0.00	0.60
68.00	0.74	0.65	1.15	0.60	0.00	0.60
69.00	0.62	0.64	0.97*	0.60	0.00	0.60
70.00	0.71	0.63	1.13	0.58	0.00	0.58
71.00	0.62	0.62	1.00*	0.57	0.00	0.57
72.00	0.86	0.62	1.39	0.56	0.00	0.56
73.00	1.01	0.61	1.66	0.56	0.00	0.56
74.00	1.00	0.60	1.66	0.56	0.00	0.56
75.00	1.08	0.59	1.82	0.56	0.00	0.56
76.00	0.64	0.59	1.09	0.55	0.00	0.55
77.00	0.48	0.59	0.82*	0.51	0.00	0.51
78.00	0.45	0.59	0.76*	0.43	0.00	0.43
79.00	0.54	0.58	0.93*	0.38	0.00	0.38
80.00	0.48	0.58	0.82*	0.33	0.00	0.33
81.00	0.52	0.58	0.90*	0.29	0.00	0.29
82.00	2.00	0.58	5.00	0.21	0.00	0.21
83.00	2.00	0.58	5.00	0.21	0.00	0.21
84.00	2.00	0.58	5.00	0.21	0.00	0.21
85.00	2.00	0.57	5.00	0.21	0.00	0.21
86.00	2.00	0.57	5.00	0.21	0.00	0.21
87.00	2.00	0.57	5.00	0.21	0.00	0.21
88.00	0.22	0.57	0.39*	0.18	0.00	0.18
89.00	0.23	0.57	0.41*	0.14	0.00	0.14
90.00	0.30	0.56	0.52*	0.02	0.00	0.02
91.00	2.00	0.56	5.00	0.01	0.00	0.01
92.00	2.00	0.56	5.00	0.01	0.00	0.01
93.00	2.00	0.56	5.00	0.01	0.00	0.01
94.00	2.00	0.56	5.00	0.01	0.00	0.01
95.00	2.00	0.55	5.00	0.01	0.00	0.01
96.00	2.00	0.55	5.00	0.01	0.00	0.01
97.00	2.00	0.55	5.00	0.00	0.00	0.00
98.00	2.00	0.55	5.00	0.00	0.00	0.00
99.00	2.00	0.54	5.00	0.00	0.00	0.00
100.00	2.00	0.54	5.00	0.00	0.00	0.00

* F.S.<1, Liquefaction Potential Zone
(F.S. is limited to 5, CRR is limited to 2, CSR is limited to 2)

Units: Unit: qc, fs, Stress or Pressure = atm (1.0581tsf); Unit Weight = pcf; Depth = ft; Settlement = in.

---

1 atm (atmosphere) = 1 tsf (ton/ft2)

CRRm	Cyclic resistance ratio from soils
CSRsf	Cyclic stress ratio induced by a given earthquake (with user request factor of safety)
F.S.	Factor of Safety against liquefaction, F.S.=CRRm/CSRsf
S_sat	Settlement from saturated sands
S_dry	Settlement from Unsaturated Sands
S_all	Total Settlement from Saturated and Unsaturated Sands
NoLiq	No-Liquefy Soils

APPENDIX F

Dynamic Settlement of Shallow Foundations Analysis

Estimate bearing capacity and soil dynamic settlement for strip footing in liquefiable soil

Los Alamitos High School, Proj. No. 211897001

Reference: Bouckovalas, G. and Dakoulas, P., 2007, Liquefaction performance of shallow foundations in presence of a soil crust, 4th ICEGE Invited Lecture, edited by K.D. Pitilakis

Input design parameters

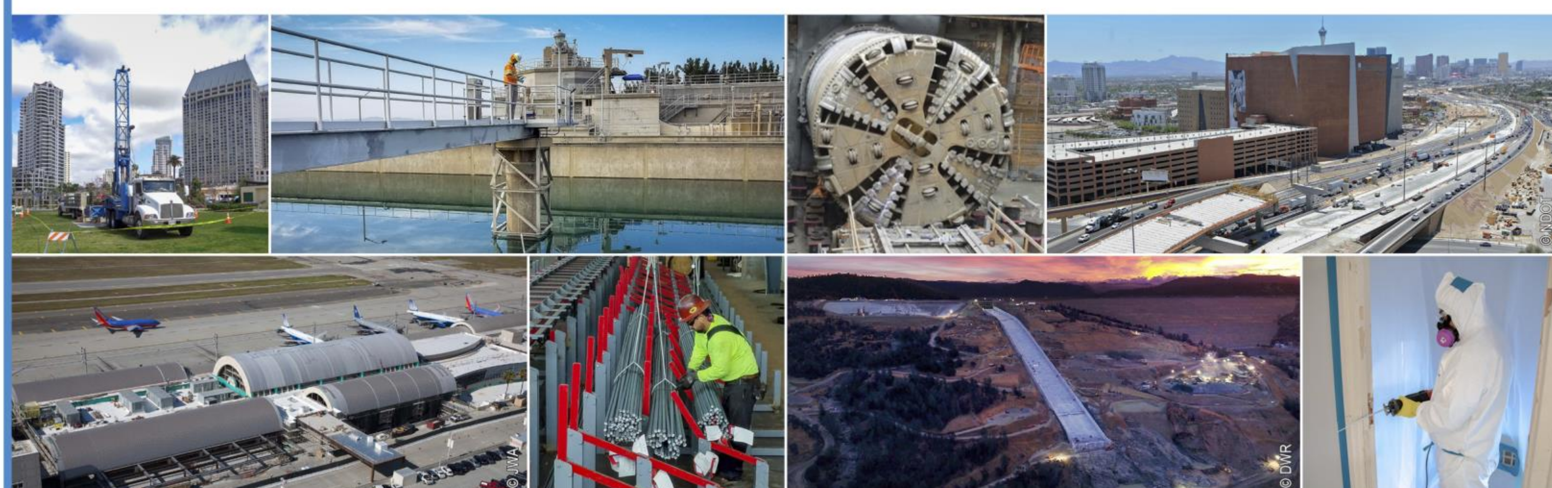
Footing Depth, B (ft) =	2	
Footing contact pressure, q (psf) =	3000	
Soil Crust, Cu (psf) =	1000	
Soil Crust, Thickness H (ft) =	30	
Soil Crust, buoyant unit weight γ' (pcf) =	52.6	Soil Crust total unit weight (pcf) = 115
Liqufiable soil, ϕ_o (deg) =	30	
Thickness of liquefied soil, Z (ft)=	45	
Liqufiable soil, $\sigma_{vo'}$ at depth B below soil crust (psf) =	2307.2	
Liqufiable soil, $\Delta\sigma_v$ induced by q at depth B below soil crust (psf) =	100	
Estimated dynamic settlement , ρ_{dyn} (ft) =	0.007045	

Design seismic parameters:

PGA, a_{max} (ft/s^2) =	22.057
Number of cycles, N =	12.8
Predominant period, T (sec) =	0.35

Iterative Calculations

3rd Run			2nd Run			1st Run		
a = 1-250(ρ_{dyn}/B)^2 =	0.996898		a = 1-250(rdyn/B)^2 =	0.997058		a = 1-250(rdyn/B)^2 =	0.84375	
U =	0.977742		U =	0.977819		U =	0.904349	
ϕ =	0.74	(deg)	f =	0.733703	(deg)	f =	3.160884	(deg)
$N_{\gamma-\phi}$ =	0.1		Ng-f =	0.1		Ng-f =	0.2	
$N_{q-\phi}$ =	1.1		Nq-f =	1.1		Nq-f =	1.3	
FS^cdeg =	10.05435		FScdeg =	10.05435		FScdeg =	10.16131	
FSdeg =	1.713333		FSdeg =	1.713333		FSdeg =	1.713333	
ρ_o =	2.258278	(ft)	ro =	2.258278	(ft)	ro =	2.258278	(ft)
ρ_{dyn} =	0.007045	(ft)	rdyn =	0.007045	(ft)	rdyn =	0.006861	(ft)
	0.084542	(inch)						



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Appendix C Noise Modeling Worksheets

Appendix

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Fundamentals of Noise

NOISE

Noise is most often defined as unwanted sound; whether it is loud, unpleasant, unexpected, or otherwise undesirable. Although sound can be easily measured, the perception of noise and the physical response to sound complicate the analysis of its impact on people. People judge the relative magnitude of sound sensation in subjective terms such as "noisiness" or "loudness."

Noise Descriptors

The following are brief definitions of terminology used in this chapter:

- **Sound.** A disturbance created by a vibrating object, which, when transmitted by pressure waves through a medium such as air, is capable of being detected by a receiving mechanism, such as the human ear or a microphone.

- **Noise.** Sound that is loud, unpleasant, unexpected, or otherwise undesirable.

- **Decibel (dB).** A unitless measure of sound, expressed on a logarithmic scale and with respect to a defined reference sound pressure. The standard reference pressure is 20 micropascals (20 μPa).

- **Vibration Decibel (VdB).** A unitless measure of vibration, expressed on a logarithmic scale and with respect to a defined reference vibration velocity. In the U.S., the standard reference velocity is 1 micro-inch per second (1×10^{-6} in/sec).

- **A-Weighted Decibel (dBA).** An overall frequency-weighted sound level in decibels that approximates the frequency response of the human ear.

- **Equivalent Continuous Noise Level (L_{eq}); also called the Energy-Equivalent Noise Level.** The value of an equivalent, steady sound level which, in a stated time period (often over an hour) and at a stated location, has the same A-weighted sound energy as the time-varying sound. Thus, the L_{eq} metric is a single numerical value that represents the equivalent amount of variable sound energy received by a receptor over the specified duration.

- **Statistical Sound Level (L_n).** The sound level that is exceeded "n" percent of time during a given sample period. For example, the L_{50} level is the statistical indicator of the time-varying noise signal that is exceeded 50 percent of the time (during each sampling period); that is, half of the sampling time, the changing noise levels are above this value and half of the time they are below it. This is called the "median sound level." The L_{10} level, likewise, is the value that is exceeded 10 percent of the time (i.e., near the maximum) and this is often known as the "intrusive sound level." The L_{90} is the sound level exceeded 90 percent of the time and is often considered the "effective background level" or "residual noise level."

- **Maximum Sound Level (L_{max}).** The highest RMS sound level measured during the measurement period.
- **Root Mean Square Sound Level (RMS).** The square root of the average of the square of the sound pressure over the measurement period.
- **Day-Night Sound Level (L_{dn} or DNL).** The energy-average of the A-weighted sound levels occurring during a 24-hour period, with 10 dB added to the sound levels occurring during the period from 10:00 PM to 7:00 AM.
- **Community Noise Equivalent Level (CNEL).** The energy average of the A-weighted sound levels occurring during a 24-hour period, with 5 dB added from 7:00 PM to 10:00 PM and 10 dB from 10:00 PM to 7:00 AM. NOTE: For general community/environmental noise, CNEL and L_{dn} values rarely differ by more than 1 dB (with the CNEL being only slightly more restrictive – that is, higher than the L_{dn} value). As a matter of practice, L_{dn} and CNEL values are interchangeable and are treated as equivalent in this assessment.
- **Peak Particle Velocity (PPV).** The peak rate of speed at which soil particles move (e.g., inches per second) due to ground vibration.
- **Sensitive Receptor.** Noise- and vibration-sensitive receptors include land uses where quiet environments are necessary for enjoyment and public health and safety. Residences, schools, motels and hotels, libraries, religious institutions, hospitals, and nursing homes are examples.

Characteristics of Sound

When an object vibrates, it radiates part of its energy in the form of a pressure wave. Sound is that pressure wave transmitted through the air. Technically, airborne sound is a rapid fluctuation or oscillation of air pressure above and below atmospheric pressure that creates sound waves.

Sound can be described in terms of amplitude (loudness), frequency (pitch), or duration (time). Loudness or amplitude is measured in dB, frequency or pitch is measured in Hertz [Hz] or cycles per second, and duration or time variations is measured in seconds or minutes.

Amplitude

Unlike linear units such as inches or pounds, decibels are measured on a logarithmic scale. Because of the physical characteristics of noise transmission and perception, the relative loudness of sound does not closely match the actual amounts of sound energy. Table 1 presents the subjective effect of changes in sound pressure levels. Ambient sounds generally range from 30 dBA (very quiet) to 100 dBA (very loud). Changes of 1 to 3 dB are detectable under quiet, controlled conditions, and changes of less than 1 dB are usually not discernible (even under ideal conditions). A 3 dB change in noise levels is considered the minimum change that is detectable with human hearing in outside environments. A change of 5 dB is readily discernible to most people in an exterior environment, and a 10 dB change is perceived as a doubling (or halving) of the sound.

Table 1 Noise Perceptibility

Change in dB	Noise Level
± 3 dB	Barely perceptible increase
± 5 dB	Readily perceptible increase
± 10 dB	Twice or half as loud
± 20 dB	Four times or one-quarter as loud

Source: California Department of Transportation (Caltrans). 2013, September. Technical Noise Supplement ("TeNS").

Frequency

The human ear is not equally sensitive to all frequencies. Sound waves below 16 Hz are not heard at all, but are "felt" more as a vibration. Similarly, though people with extremely sensitive hearing can hear sounds as high as 20,000 Hz, most people cannot hear above 15,000 Hz. In all cases, hearing acuity falls off rapidly above about 10,000 Hz and below about 200 Hz.

When describing sound and its effect on a human population, A-weighted (dBA) sound levels are typically used to approximate the response of the human ear. The A-weighted noise level has been found to correlate well with people's judgments of the "noisiness" of different sounds and has been used for many years as a measure of community and industrial noise. Although the A-weighted scale and the energy-equivalent metric are commonly used to quantify the range of human response to individual events or general community sound levels, the degree of annoyance or other response also depends on several other perceptibility factors, including:

- Ambient (background) sound level
- General nature of the existing conditions (e.g., quiet rural or busy urban)
- Difference between the magnitude of the sound event level and the ambient condition
- Duration of the sound event
- Number of event occurrences and their repetitiveness
- Time of day that the event occurs

Duration

Time variation in noise exposure is typically expressed in terms of a steady-state energy level equal to the energy content of the time varying period (called L_{eq}), or alternately, as a statistical description of the sound level that is exceeded over some fraction of a given observation period. For example, the L_{50} noise level represents the noise level that is exceeded 50 percent of the time; half the time the noise level exceeds this level and half the time the noise level is less than this level. This level is also representative of the level that is exceeded 30 minutes in an hour. Similarly, the L_2, L_8 and L_{25} values represent the noise levels that are exceeded 2, 8, and 25 percent of the time or 1, 5, and 15 minutes per hour, respectively. These "n" values are typically used to demonstrate compliance for stationary noise sources with many cities' noise ordinances. Other values typically noted during a noise survey are the L_{min} and L_{max}. These values represent the minimum and maximum root-mean-square noise levels obtained over the measurement period, respectively.

Because community receptors are more sensitive to unwanted noise intrusion during the evening and at night, state law and many local jurisdictions use an adjusted 24-hour noise descriptor called the Community Noise Equivalent Level (CNEL) or Day-Night Noise Level (L_{dn}). The CNEL descriptor requires that an artificial increment (or "penalty") of 5 dBA be added to the actual noise level for the hours from 7:00 PM to 10:00

PM and 10 dBA for the hours from 10:00 PM to 7:00 AM. The L_{dn} descriptor uses the same methodology except that there is no artificial increment added to the hours between 7:00 PM and 10:00 PM. Both descriptors give roughly the same 24-hour level, with the CNEL being only slightly more restrictive (i.e., higher). The CNEL or L_{dn} metrics are commonly applied to the assessment of roadway and airport-related noise sources.

Sound Propagation

Sound dissipates exponentially with distance from the noise source. This phenomenon is known as "spreading loss." For a single-point source, sound levels decrease by approximately 6 dB for each doubling of distance from the source (conservatively neglecting ground attenuation effects, air absorption factors, and barrier shielding). For example, if a backhoe at 50 feet generates 84 dBA, at 100 feet the noise level would be 79 dBA, and at 200 feet it would be 73 dBA. This drop-off rate is appropriate for noise generated by on-site operations from stationary equipment or activity at a project site. If noise is produced by a line source, such as highway traffic, the sound decreases by 3 dB for each doubling of distance over a reflective ("hard site") surface such as concrete or asphalt. Line source noise in a relatively flat environment with ground-level absorptive vegetation decreases by an additional 1.5 dB for each doubling of distance.

Psychological and Physiological Effects of Noise

Physical damage to human hearing begins at prolonged exposure to noise levels higher than 85 dBA. Exposure to high noise levels affects the entire system, with prolonged noise exposure in excess of 75 dBA increasing body tensions, thereby affecting blood pressure and functions of the heart and the nervous system. Extended periods of noise exposure above 90 dBA results in permanent cell damage, which is the main driver for employee hearing protection regulations in the workplace. For community environments, the ambient or background noise problem is widespread, through generally worse in urban areas than in outlying, less-developed areas. Elevated ambient noise levels can result in noise interference (e.g., speech interruption/masking, sleep disturbance, disturbance of concentration) and cause annoyance. Since most people do not routinely work with decibels or A-weighted sound levels, it is often difficult to appreciate what a given sound pressure level number means. To help relate noise level values to common experience, Table 2 shows typical noise levels from familiar sources.

Table 2 Typical Noise Levels

Common Outdoor Activities	Noise Level (dBA)	Common Indoor Activities
Onset of physical discomfort	120+	
	110	Rock Band (near amplification system)
Jet Flyover at 1,000 feet		
	100	
Gas Lawn Mower at three feet		
	90	
Diesel Truck at 50 feet, at 50 mph		Food Blender at 3 feet
	80	Garbage Disposal at 3 feet
Noisy Urban Area, Daytime		
	70	Vacuum Cleaner at 10 feet
Commercial Area		Normal speech at 3 feet
Heavy Traffic at 300 feet	60	
		Large Business Office
Quiet Urban Daytime	50	Dishwasher Next Room
Quiet Urban Nighttime	40	Theater, Large Conference Room (background)
Quiet Suburban Nighttime		
	30	Library
Quiet Rural Nighttime		Bedroom at Night, Concert Hall (background)
	20	
		Broadcast/Recording Studio
	10	
Lowest Threshold of Human Hearing	0	Lowest Threshold of Human Hearing

Source: California Department of Transportation (Caltrans). 2013, September. Technical Noise Supplement ("TeNS").

Vibration Fundamentals

Vibration is an oscillatory motion through a solid medium in which the motion's amplitude can be described in terms of displacement, velocity, or acceleration. Vibration is normally associated with activities stemming from operations of railroads or vibration-intensive stationary sources, but can also be associated with construction equipment such as jackhammers, pile drivers, and hydraulic hammers. As with noise, vibration can be described by both its amplitude and frequency. Vibration displacement is the distance that a point on a surface moves away from its original static position; velocity is the instantaneous speed that a point on a surface moves; and acceleration is the rate of change of the speed. Each of these descriptors can be used to correlate vibration to human response, building damage, and acceptable equipment vibration levels. During construction, the operation of construction equipment can cause groundborne vibration. During the operational phase of a project, receptors may be subject to levels of vibration that can cause annoyance due to noise generated from vibration of a structure or items within a structure.

Vibration amplitudes are usually described in terms of either the peak particle velocity (PPV) or the root mean square (RMS) velocity. PPV is the maximum instantaneous peak of the vibration signal and RMS is the square root of the average of the squared amplitude of the signal. PPV is more appropriate for evaluating potential building damage and RMS is typically more suitable for evaluating human response.

As with airborne sound, annoyance with vibrational energy is a subjective measure, depending on the level of activity and the sensitivity of the individual. To sensitive individuals, vibrations approaching the threshold of perception can be annoying. Persons accustomed to elevated ambient vibration levels, such as in an urban environment, may tolerate higher vibration levels. Table 3 displays the human response and the effects on buildings resulting from continuous vibration (in terms of various levels of PPV).

Table 3 Human Reaction to Typical Vibration Levels

Vibration Level, PPV (in/sec)	Human Reaction	Effect on Buildings
0.006–0.019	Threshold of perception, possibility of intrusion	Vibrations unlikely to cause damage of any type
0.08	Vibrations readily perceptible	Recommended upper level of vibration to which ruins and ancient monuments should be subjected
0.10	Level at which continuous vibration begins to annoy people	Virtually no risk of “architectural” (i.e. not structural) damage to normal buildings
0.20	Vibrations annoying to people in buildings	Threshold at which there is a risk to “architectural” damage to normal dwelling – houses with plastered walls and ceilings
0.4–0.6	Vibrations considered unpleasant by people subjected to continuous vibrations and unacceptable to some people walking on bridges	Vibrations at a greater level than normally expected from traffic, but would cause “architectural” damage and possibly minor structural damage

Source: California Department of Transportation (Caltrans). 2020, April. *Transportation and Construction Vibration Guidance Manual.* Prepared by ICF International.

LOCAL REGULATIONS AND STANDARDS

Noise Hazards

Excessive noise can adversely affect human health and well-being, economic productivity, and property values. Mobile and stationary noise sources contribute to overall noise levels, and the impacts of both must be analyzed when planning the City's future growth and management.

Noise Sources and Sensitive Receptors

Mobile

Surrounded by freeways, the primary noise source in Los Alamitos and Rossmoor is from automobile, truck and motorcycle traffic. Noise from motor vehicles is generated by engine vibrations, the interaction between tires and the road, and the exhaust system. Activities on the Joint Forces Training Base also contribute periodic noise sources through aircraft activity, although approaches and departures have specific flight routes to assist in noise abatement.

Stationary

Residential uses generate noise from landscaping, maintenance activities, and air conditioning systems. Commercial and industrial uses generate noise from heating, ventilation, air conditioning systems, loading docks, and machinery. Noise generated by residential or commercial uses are generally short and intermittent. Industrial uses may generate noise on a more continuous basis due to the nature of its activities.

Within the City of Los Alamitos, land uses are primarily residential, with retail along major roadways and industrial uses in the northeastern and northwestern portions of the City. Rossmoor is almost exclusively residential, with some commercial uses in the northeastern corner of the community.

Construction activities are another regular and ongoing source of noise typically isolated to the immediate vicinity of the construction site and occur during daytime hours in accordance with municipal regulations. Construction activities also occur for relatively short-term periods—a few weeks to a few months.

Sensitive Receptors

Sensitive land uses are those uses with human activities that may be subject to stress or significant interference from noise. These include residences, schools, childcare facilities, religious institutions, hospitals, libraries, parks and recreational facilities, health care facilities, convalescent centers, and retirement homes. Such uses should be protected from unnecessary noise to the maximum degree feasible.

Understanding the Measurement of Noise

Noise refers to sound pressure variations audible to the ear. The audibility of a sound depends on how loud it is (amplitude), its pitch (frequency), and the person's ability to hear. Whether the sound is judged as noise depends largely on the listener's current activity and attitude toward the sound source, as well as the amplitude and frequency of the sound.

To obtain convenient measurements, sound is measured in units of the decibel (dB). However, the human ear is not equally sensitive to all frequencies. At low frequencies (a rumble or roar), the ear is not very sensitive, while at higher frequencies (a screech or a whine), the ear is most sensitive. To reflect this varying sensitivity, an A-weighted decibel scale (dBA) is typically used to approximate the sensitivity of the human ear. The scale ranges from zero for the least perceptible sound to about 130 to 140 dBA, at which point most people begin to feel pain. A sound level of 190 dBA will rupture the eardrum and permanently damage the inner ear.

The most common sounds vary between 40 dBA (very quiet) and 100 dBA (very loud). Normal conversation at three feet is roughly at 60 dBA, while loud engine noises equate to 110 dBA, which can cause serious discomfort. A listener often judges an increase in sound levels of 10 dBA as a doubling of sound. Examples of various noise sources and their decibel level are shown in Table 2.

Table 2. Representative Noise Levels

Common Outdoor Activities	Noise Level (dBA)	Common Indoor Activities
	110	Rock band
Jet fly-over at 100 feet	105	
	100	
Gas lawnmower at 3 feet	95	
	90	
	85	Food blender at 3 feet
Diesel truck going 50 mph at 50 feet	80	Garbage disposal at 3 feet
Noisy urban area during daytime	75	
Gas lawnmower at 100 feet	70	Vacuum cleaner at 10 feet
Commercial area	65	Normal speech at 3 feet
Heavy traffic at 300 feet	60	
	55	Large business office
Quiet urban area during daytime	50	Dishwasher in next room
	45	
Quiet urban area during nighttime	40	Theater, large conference room (background)
Quiet suburban area during nighttime	35	
	30	Library
Quiet rural area during nighttime	25	Bedroom at night, concert hall (background)
	20	
	15	Broadcast or recording studio
	10	
	5	
Lowest threshold of human hearing	0	Lowest threshold of human hearing
Source: Caltrans 2009.		

Noise Standards

City of Los Alamitos

The General Plan is a tool for managing noise by planning for and maintaining compatibility between sensitive land uses and noise sources. Noise from stationary sources is regulated through specific standards in Chapter 17.24 of the Los Alamitos Municipal Code and Division 6 of the Orange County Municipal Code (Rossmoor). The City's noise standards are shown below in Table 3 and are similar to the standards found in the County's municipal code.

Table 4 provides additional guidance when considering the compatibility of proposed land uses with existing noise levels in the proposed project area.

State of California

The State of California provides noise standards through Title 24 of the California Building Code. Title 24 establishes standards for residential construction practices and building materials to ensure that interior noise levels do not exceed 45 dBA. The state leaves it up to each jurisdiction to determine acceptable interior and exterior noise levels by land use. The state does provide some guidance through information presented in the table below.

Table 3. City of Los Alamitos Noise Standards

Noise Zone	Exterior Noise Standards		Interior Noise Standards	
	Noise Level	Time Period	Noise Level	Time Period
1 (Residential) day	55 dBA	7 a.m. – 10 p.m.	55 dBA	7 a.m. – 10 p.m.
1 (Residential) night	50 dBA	10 p.m. – 7 a.m.	45 dBA	10 p.m. – 7 a.m.
2 (Professional and Institutional)	55 dBA	Anytime	55 dBA	Anytime
3 (Commercial)	60 dBA	Anytime	55 dBA	Anytime

Source: LAMC Chapter 17.24, Noise.
Notes: The noise levels at the affected property shall not exceed:
- The noise standard for a cumulative period of more than 30 minutes in any hour; or
- The noise standard plus 5 dBA for a cumulative period of more than 15 minutes in any hour; or
- The noise standard plus 10 dBA for a cumulative period of more than 5 minutes in any hour; or
- The noise standard plus 15 dBA for a cumulative period of more than one minute in any hour; or
- The noise standard plus 20 dBA for any period of time.

Table 4. Land Use and Noise Compatibility Matrix

LAND USES	EXISTING NOISE LEVEL (dBA CNEL)						
Example Land Uses	**<**	**55**	**60**	**65**	**70**	**75**	**80>**
Amphitheater, concert hall, auditorium, meeting hall	B	B	C	C	D	D	D
Mobile home	A	A	B	C	C	D	D
Hospital, library, school, faith/religious uses	A	A	B	C	C	D	D
Hotel, motel, transient lodging	A	A	B	B	C	C	D
Single family, multifamily, faith/religious uses	A	A	B	B	C	D	D
Parks	A	A	A	B	C	D	D
Office building, research & development, professional office, city office building, and hotel	A	A	A	B	B	C	D
Amusement park, miniature golf, go-cart track, health club, equestrian center	A	A	A	B	B	D	D
Golf courses, nature centers, cemeteries, wildlife reserves, wildlife habitat	A	A	A	A	B	C	C
Commercial retail, bank, restaurant, movie theater	A	A	A	A	B	B	C
Automobile service station, auto dealer, manufacturing, warehousing, wholesale, utilities	A	A	A	A	B	B	B
Agriculture	A	A	A	A	A	A	A

Notes:

Community Noise Equivalent Level (CNEL). The energy-average of the A-weighted sound levels during a 24-hour period, with 5 dB added to the levels from 7:00 PM to 10:00 PM and 10 dB added from 10:00 PM to 7:00 AM.

Compatibility Zones. The following zones indicate the degree to which listed land uses are compatible with noise levels shown in the table.

Zone A. Clearly Compatible. Specified land use is satisfactory, based upon the assumption that any buildings involved are of normal conventional construction without any special noise insulation requirements.

Zone B. Normally Compatible. New construction or development should be undertaken only after detailed analysis of the noise reduction requirements are made and needed noise insulation features in the design are determined. Conventional construction, with closed windows and fresh air supply systems or air conditioning, will normally suffice.

Zone C. Normally Incompatible. New construction or development should normally be discouraged. If new construction or development does proceed, a detailed analysis or noise reduction requirements must be made and needed noise insulation features must be included in the design.

Zone D. Clearly Incompatible. New construction or development should generally not be undertaken.

Noise Analysis

Traffic Noise

A noise analysis was conducted to model noise of the existing roadway network using the Federal Highway Administration's Highway Noise Prediction Model. In a general plan noise analysis, a 3 dBA increase is considered barely perceptible, and increases over 5 dBA are generally considered readily perceptible. As shown in Table 4, noise-sensitive residential uses are considered normally compatible under ambient noise conditions of 65 dBA CNEL. Because the expected ambient noise increase would occur over a long period of time—over 20 years—

as opposed to an immediate change in noise, the noise analysis considers a noise increase of 3 dB or more to be a threshold of significance that requires mitigation.

Table 5 displays the existing (2014) and projected (2035) traffic noise levels for selected roadway segments under buildout conditions. The table also shows the net change in the ambient noise levels from existing conditions. The noise analysis indicated that the ambient noise environment would be higher than 60 dBA CNEL along most of the studied roadway segments.

While buildout conditions would be expected to result in increased noise levels, the maximum increased would be 1.1 dBA. These incremental increases would be below levels considered “barely perceptible” and would be below thresholds that require mitigation. This does note render the City’s enforcement of its noise ordinance or the requirements that it can impose to plan for and maintain compatibility between sensitive land uses and noise sources.

Table 5. Projected Traffic Noise Levels of Buildout Conditions in 2035

		dBA CNEL		
ROADWAY	**SEGMENT**	**Existing (2014)**	**Projected (2035)**	**Increase**
Los Alamitos Boulevard	North City Limits to Cerritos Avenue	73.3	73.7	0.4
Los Alamitos Boulevard	Cerritos Avenue to Katella Avenue	74.3	74.3	0.0
Los Alamitos Boulevard	Katella Avenue to Farquhar Avenue	76.0	76.1	0.1
Los Alamitos Boulevard	Farquhar Avenue to Orangewood Avenue	76.1	76.1	0.1
Los Alamitos Boulevard	Orangewood Avenue to Bradbury Road	75.7	75.8	0.1
Los Alamitos Boulevard	Bradbury Road to St. Cloud Drive	75.6	75.7	0.1
Katella Avenue	I-605 to Los Alamitos Boulevard	78.3	78.9	0.7
Katella Avenue	Los Alamitos Boulevard to Bloomfield Street	77.3	78.3	1.0
Katella Avenue	Bloomfield Street to Lexington	76.8	78.0	1.1
Katella Avenue	Lexington to Walker Street	76.8	77.8	1.0
Bloomfield Street	Katella Avenue to Cerritos Avenue	69.1	69.8	0.7
Bloomfield Street	Cerritos Avenue to Ball Road	68.6	69.0	0.4
Bloomfield Street	Farquhar Avenue to Katella Avenue	58.7	58.7	0.0
Cerritos Avenue	I-605 to Los Alamitos Boulevard	71.1	71.6	0.5
Cerritos Avenue	Los Alamitos Boulevard to Bloomfield Street	71.1	71.1	0.0
Cerritos Avenue	Bloomfield Street to Lexington	70.2	70.5	0.3
Farquhar Avenue	Los Alamitos Boulevard to Bloomfield Street	61.5	61.5	0.0
Farquhar Avenue	Bloomfield Street to Lexington	59.8	59.8	0.0
Lexington Drive	Farquhar Avenue to Katella Avenue	61.6	61.6	0.0
Source: PlaceWorks 2014.				

Traffic noise contours were estimated for conditions in the year 2035. Figure 7 shows the projected future noise contours from roadway traffic along nearby freeways and major roadways in Los Alamitos and Rossmoor. As shown, several areas will be exposed to noise levels above 60 dBA CNEL. It should be noted, however, that these contours do not account for noise attenuation provided by intervening structures or topographical barriers, which may substantially reduce noise impacts for areas farther from the roadway areas.

Joint Forces Training Base

Aircraft Noise. The JFTB is a military aviation facility and operations involve aircraft and ground vehicle activity. The base does not utilize live ordnance. The major sources of noise are vehicular traffic on roadways, large events, and aircraft operations.

The Airport Environs Land Use Plan (AELUP) is a land-use compatibility plan that describes the effects of aircraft noise on surrounding areas. Land uses within the airport planning area boundaries are required to conform to noise restrictions established in the AELUP. Figure 6 shows the 60 and 65 dBA CNEL noise contours from the AELUP.

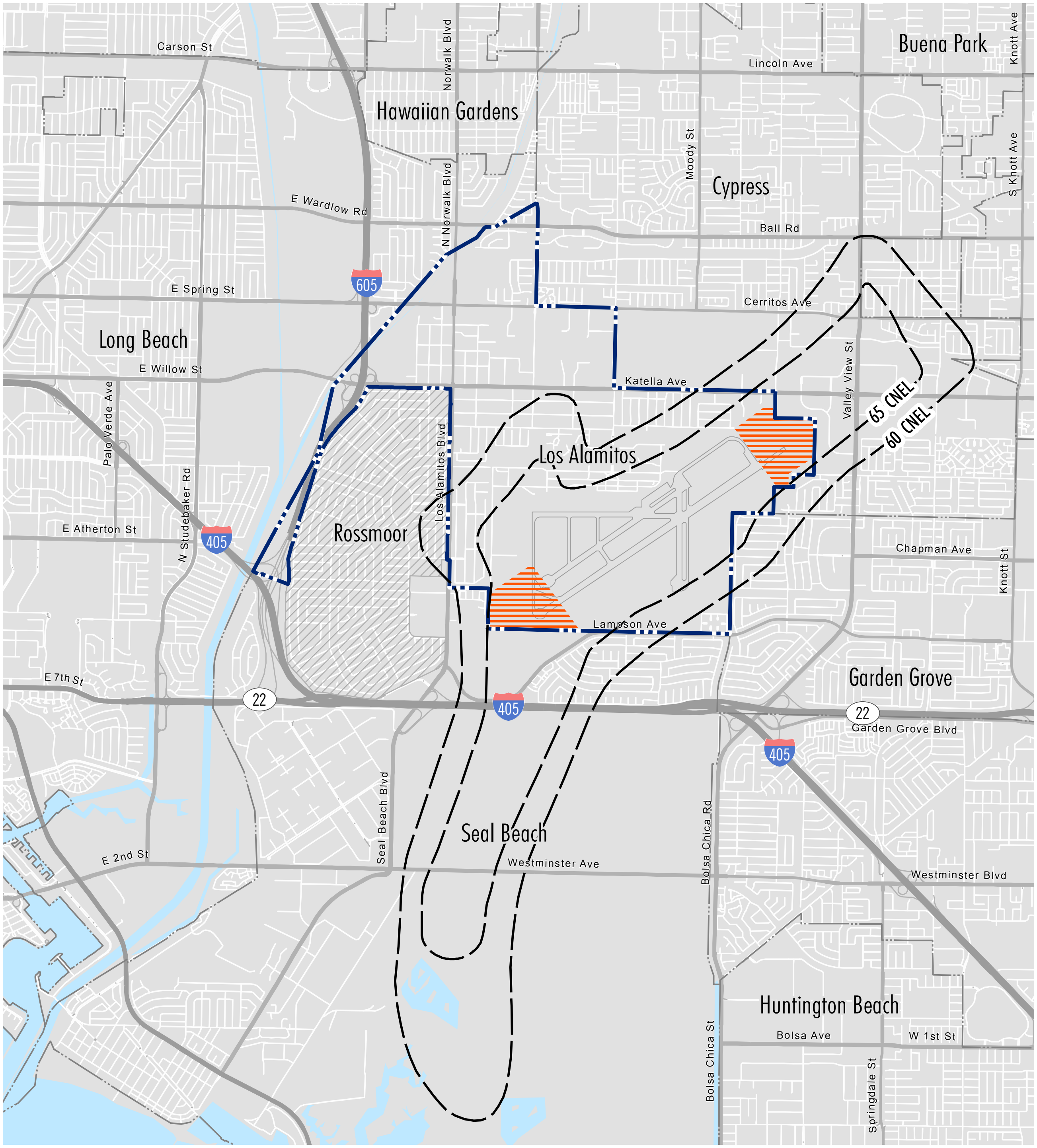
Approximately 50 existing homes are exposed to noise levels above 65 dBA CNEL in the Highlands and New Dutch Haven neighborhoods. These homes have been or should be sufficiently sound attenuated so that noise levels do not exceed an interior standard of 45 dBA CNEL. Homes within the moderate noise impact zone (between 60 and 65 dBA CNEL) could be seriously disturbed by single noise events, but are still considered compatible by the AELUP. Other small areas within the 65 dBA CNEL noise contour consist of planned industrial and professional office uses. However, these are not considered noise sensitive land uses and are therefore considered compatible by the AELUP.

Vehicular Traffic and Events. The JFTB hosts community events and houses educational and recreational facilities used by civilians. On weekends and other select training periods, activities can increase substantially. The base maintains its major point of access off Lexington Drive. An additional point of access is provided for the golf course, but it is not used to access other parts of the Los Alamitos JFTB except in special circumstances. For special events, the base and the City coordinate and open the Orangewood Avenue entry, but it otherwise remains closed.

The projected 2035 noise level contours for the segment of Lexington Drive between Katella Avenue and the JFTB were calculated for a typical traffic condition, without events or military exercises. The nearest homes are outside the 65 dBA CNEL noise contour, which falls within the road’s right-of-way. The other access route to the Lexington Drive entrance is provided via Farquar Avenue, but it is exposed to less noise than Lexington Drive. Therefore, during normal traffic conditions, the residential areas along the roadways are compatible.

According to the JFTB staff, the base hosts major military training exercises approximately once a month, when there is an increase in vehicular activity due to military truck conveys accessing the base. These events would continue to be sporadic, causing noise increases due to truck passbys that occur for short periods of time.

Figure 6 JFTB Impact Zones



Source: Orange County Airport Land Use Commission, 2002

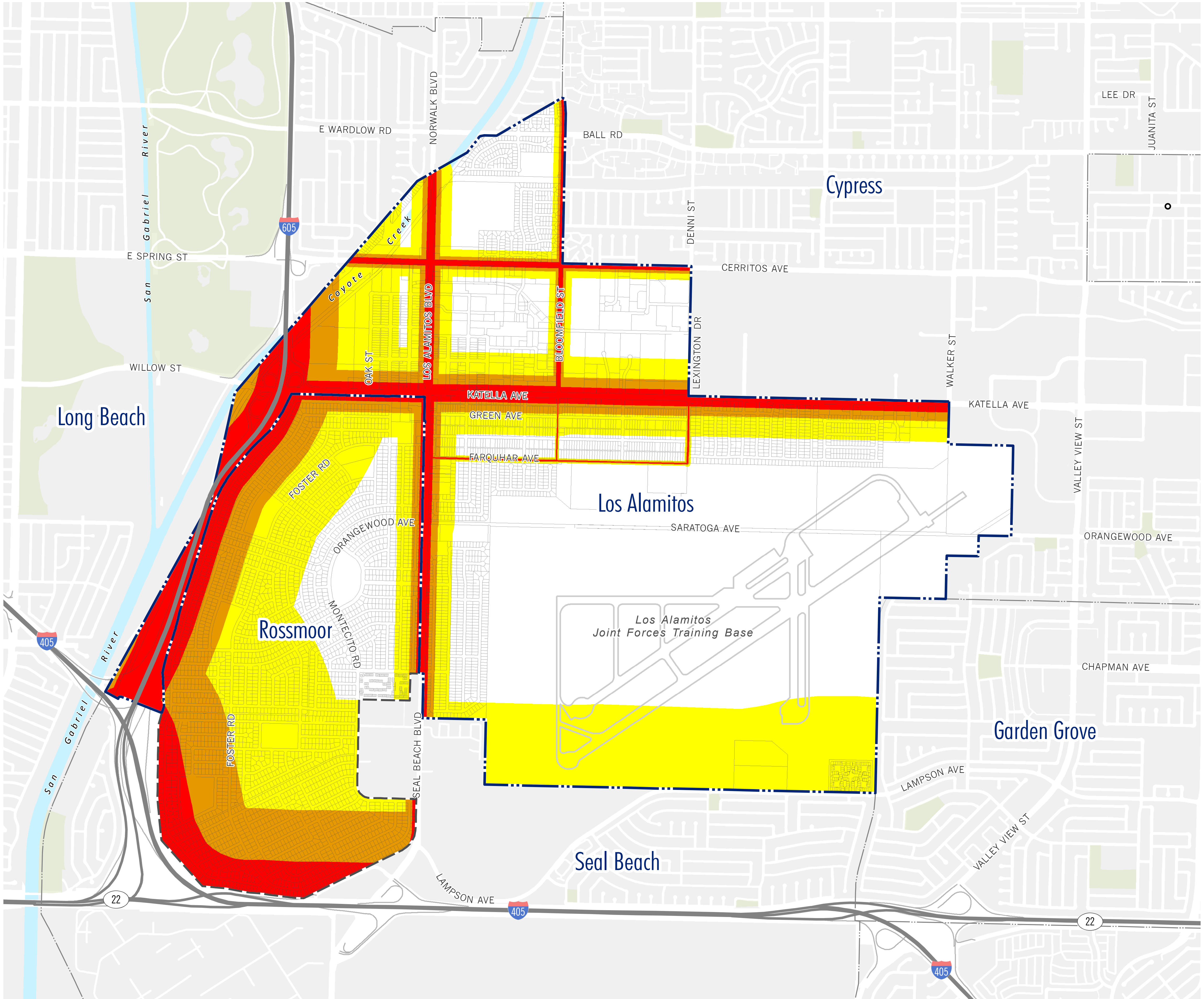
CNEL Contour
City Boundary
JFTB Clear Zone
Rossmoor

0 0.5 1 Miles

LOS ALAMITOS GENERAL PLAN

PLACEWORKS

Figure 7
Traffic Noise Level Contours - 2035 Conditions



LOS ALAMITOS GENERAL PLAN
education · recreation · safety · service

PLACEWORKS

Source: Fehr & Peers, 2014; PlaceWorks, 2014

7/28/2014

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Chapter 17.20 NOISE

17.20.010 Purpose

A. The City establishes the noise regulations in this chapter to control unnecessary, excessive, and annoying sounds emanating from all properties and land uses in the City. It is the declared policy of the City to prohibit these sounds generated from all sources, as specified in this chapter.

B. The City recognizes and declares, based on published scientific and health data, that certain noise levels are detrimental to the public health, welfare, and general safety and contrary to public interest. Therefore, the Council does ordain and declare that creating, maintaining, causing, or allowing to create, maintain, or cause any noise in a manner prohibited by, or not in conformity with the provisions of this chapter, is a public nuisance and shall be abated and when such abated is not achieved, to be punishable as a public nuisance pursuant to Section 17.20.080 (Manner of Enforcement) of this title. (Ord. 19-03 § 3, 2019; Ord. 688 § 1, 2006)

17.20.020 Exemptions

The following activities shall be exempt from the provisions of this chapter.

A. School bands, school athletic events, and school entertainment events, provided these events are conducted on school property or authorized by special permit from the City;

B. Activities lawfully conducted in public parks, public playgrounds, and public or private school grounds;

C. A mechanical device, apparatus, or equipment used, related to, or connected with emergency machinery, vehicle, or work;

D. Noise sources associated with construction, repair, remodeling, or grading of any real property, provided a permit has been obtained from the City, and further provided the activities do not take place between the hours of 8:00 p.m. and 7:00 a.m. on weekdays and on Saturdays, or at any time on Sundays or Federal holidays;

E. Noise sources associated with the maintenance of real property, provided the activities take place between the hours of 8:00 a.m. and 8:00 p.m. on weekdays and on Saturdays, or between the hours of 9:00 a.m. and 6:00 p.m. on Sunday or a Federal holiday;

F. An activity or equipment to the extent that design regulation of it has been preempted by State or Federal laws. (Ord. 19-03 § 3, 2019; Ord. 688 § 1, 2006)

17.20.030 Noise Level Measurement Criteria

Noise level measurements made in compliance with the provisions of this chapter shall be performed using a sound level meter as defined in Division 7 (Definitions). The location selected for measuring exterior noise levels shall be at any point on the property line of the offender or anywhere on the affected property. Interior noise measurements shall be made within the affected building. The measurement shall be made at a point in the affected building at least four feet from the wall, ceiling, or floor nearest the noise source. (Ord. 19-03 § 3, 2019; Ord. 688 § 1, 2006)

17.20.040 Designated Noise Districts

A. **Noise Districts.** For the purposes of controlling noise and its impacts, the City shall be divided into noise districts defined as follows:

1. Noise District 1: All properties zoned R-1, R-2, R-3, and MH.
2. Noise District 2: All properties zoned C-O, C-F, and O-A, and with an MOZ overlay.
3. Noise District 3: All properties zoned C-G and TCMU, and with the ROZ overlay.
4. Noise District 4: All properties zoned P-L-I.

B. **Unclassified.** For any property or group of properties zoned SP, the Director shall assign an applicable noise district based upon the prevailing land uses within the specific plan area. (Ord. 19-03 § 3, 2019; Ord. 688 § 1, 2006)

17.20.050 Exterior Noise Standards

A. **Baseline.** The following noise standards, unless otherwise specifically indicated, shall apply to properties within the identified noise districts. No person shall cause any noise to occur that exceeds these standards except as authorized in subsection B, below.

Table 3-01: Exterior Noise Standards

Noise District	Maximum Noise Level	Time Period
1—Daytime	55 dB(A)	7:00 a.m. to 10:00 p.m.
1—Nighttime	50 dB(A)	10:00 p.m. to 7:00 a.m.
2	55 dB(A)	Anytime
3	60 dB(A)	Anytime
4	70 dB(A)	Anytime

B. **Temporary Exceedances.** It is unlawful for any person to create noise, or to allow the creation of noise, on property owned, leased, occupied, or otherwise controlled by a person, that causes the baseline noise levels established in subsection A, either within or outside of the City, to exceed the applicable noise standard as follows:

1. For a cumulative period of more than 30 minutes in any hour;
2. Plus five dB(A) for a cumulative period of more than 15 minutes in any hour;

3. Plus 10 dB(A) for a cumulative period of more than five minutes in any hour;

4. Plus 15 dB(A) for a cumulative period of more than one minute in any hour; or

5. Plus 20 dB(A) for any period of time.

C. **Maximum Allowable Noise Levels.** In the event the ambient noise level exceeds the noise limit categories described in subsections (B)(1) through (5) of this section above, the cumulative period applicable to the category shall be increased to reflect the ambient noise level. In the event the ambient noise level exceeds the fifth noise limit category, the maximum allowable noise level under that category shall be increased to reflect the maximum ambient noise level. (Ord. 19-03 § 3, 2019; Ord. 688 § 1, 2006)

17.20.060 Interior Noise Standards

A. **Baseline.** Interior noise standards established by the State Health and Safety Code (California Code of Regulations, Title 24, Part 2) shall apply to all multi-family residential construction and uses. For all other uses, the following interior noise standards shall apply.

Table 3-02: Interior Noise Standards

Noise District	Maximum Noise Level	Time Period
1—Daytime	55 dB(A)	7:00 a.m. to 10:00 p.m.
1—Nighttime	45 dB(A)	10:00 p.m. to 7:00 a.m.
2, 3, 4	55 dB(A)	Anytime

B. **Temporary Exceedances.** It is unlawful for any person to create noise, or to allow the creation of noise, on property owned, leased, occupied, or otherwise controlled by a person, that causes the noise level, when measured within structures in the applicable noise district, to exceed:

1. The noise standard for a cumulative period of more than five minutes in an hour;

2. The noise standard plus five dB(A) for a cumulative period of more than one minute in an hour; or

3. The noise standard plus ten 10 dB(A) for any period of time.

C. **Maximum Allowable Noise Levels.** In the event the ambient noise level exceeds either of the first two noise limit categories described in subsections (B)(1) and (2) of this section, the cumulative period applicable to the category shall be increased to reflect the ambient noise level. In the event the ambient noise level exceeds the third noise limit category, the maximum allowable noise level under that category shall be increased to reflect the maximum ambient noise level.

D. **Different Noise Districts.** In the event that the noise source and the affected property are within different noise districts, the noise standards of the affected property shall apply. (Ord. 19-03 § 3, 2019; Ord. 688 § 1, 2006)

17.20.070 Special Provisions—Schools, Hospitals, and Places of Public Assembly

It is unlawful for a person to create noise that causes the noise level at a school, hospital, or place of public assembly—while the facility is in use—to exceed the noise limits specified for exterior noise in this chapter, or which noise level unreasonably interferes with the use of the facility or which unreasonably disturbs or annoys patients in a hospital, provided conspicuous signs are displayed in three separate locations within one-tenth of a mile of the school, hospital, or place of public assembly indicating the presence of such school, hospital, or place of public assembly. (Ord. 19-03 § 3, 2019; Ord. 688 § 1, 2006)

17.20.080 Manner of Enforcement

A. The Director and duly authorized representatives are directed to enforce the provisions of this chapter. The Police Chief and duly authorized representatives are authorized in compliance with Penal Code Section 836.5 to arrest any person without a warrant when they have reasonable cause to believe that a person has committed a misdemeanor in their presence.

B. Persons shall not interfere with, oppose, or resist an authorized person charged with enforcement of this chapter while any person is engaged in the performance of his or her duty. (Ord. 19-03 § 3, 2019; Ord. 688 § 1, 2006)

17.20.090 Relief from Standards—Application Procedure

A. **Application Requirements.** The owner or operator of a noise source that violates any of the provisions of this chapter may file an application with the Director for relief from the provisions, and the owner or operator shall detail all actions taken to comply with the provisions, the reasons why immediate compliance cannot be achieved, a proposed method of achieving compliance, and a proposed time schedule for its accomplishment. The application shall be accompanied by a fee as established by resolution of the Council.

B. **Separate Applications.** A separate application shall be filed for each noise source. However, in the circumstance that several mobile sources are under common ownership, or several fixed sources occur on a single property, such request for relief may be combined into one application. Upon receipt of the application and fee, the Director shall refer it with his/her recommendation in compliance with the provisions of this chapter.

C. **Compliance Required Until Relief Granted.** An applicant for relief shall remain subject to prosecution under the terms of this title until such relief is granted.

D. **Review Authority.** The Planning Commission shall evaluate all applications for relief from the requirements of this chapter and may grant relief with respect to time for compliance subject to the terms, conditions, and requirements as it may deem reasonable to achieve maximum compliance with the provisions of this chapter. These terms, conditions, and requirements may include, but shall not be limited to, limitations on noise levels and operating hours. Each relief application granted shall identify in detail the approved method of achieving maximum compliance and a time schedule for its accomplishment.

E. **Factors to Be Considered.** In its determinations, the Planning Commission shall consider the magnitude of nuisance caused by the offensive noise; the uses of property within the area of impingement by the noise; the time factors related to study, design, financing and construction of remedial work; the economic factors related to age and useful life of equipment; and the general public interest and welfare.

F. **Violations.** Any relief granted shall be by resolution and shall be transmitted to the Director for enforcement. A violation of the terms of the relief is unlawful. (Ord. 19-03 § 3, 2019; Ord. 688 § 1, 2006)

CONSTRUCTION NOISE MODELING

Roadway Construction Noise Model (RCNM),Version 1.1

Report date: 05/11/2023
Case Description: LAUS-05

**** Receptor #1 ****

		Baselines (dBA)		
Description	Land Use	Daytime	Evening	Night
Architectural Coating	Residential	60.0	55.0	50.0

Equipment

Description	Impact Device	Usage (%)	Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Compressor (air)	No	40		77.7	50.0	0.0

Results

	Calculated (dBA)		Noise Limits (dBA) Day		Noise Limits (dBA) Evening		Noise Limits (dBA) Night		Noise Limit Exceedance (dBA) Day		Noise Limit Exceedance (dBA) Evening		Noise Limit Exceedance (dBA) Night	
Equipment	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq
Compressor (air)	77.7	73.7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Total	77.7	73.7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Roadway Construction Noise Model (RCNM),Version 1.1

Report date: 05/11/2023
Case Description: LAUS-05

**** Receptor #1 ****

Baselines (dBA)

Description	Land Use	Daytime	Evening	Night
Asphalt Demolition	Residential	60.0	55.0	50.0

Equipment

Description	Impact Device	Usage (%)	Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Concrete Saw	No	20		89.6	50.0	0.0
Dozer	No	40		81.7	50.0	0.0
Tractor	No	40	84.0		50.0	0.0

Results

	Calculated (dBA)		Noise Limits (dBA) Day		Evening		Night		Noise Limit Exceedance (dBA) Day		Evening		Night	
Equipment	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq
Concrete Saw	89.6	82.6	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Dozer	81.7	77.7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Tractor	84.0	80.0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Total	89.6	85.3	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Roadway Construction Noise Model (RCNM),Version 1.1

Report date: 05/11/2023
Case Description: LAUS-05

**** Receptor #1 ****

Description	Land Use	Baselines (dBA) Daytime	Evening	Night
Building Construction	Residential	60.0	55.0	50.0

Equipment

Description	Impact Device	Usage (%)	Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Crane	No	16		80.6	50.0	0.0
Front End Loader	No	40		79.1	50.0	0.0
Tractor	No	40	84.0		50.0	0.0

Results

	Calculated (dBA)		Noise Limits (dBA) Day		Evening		Night		Noise Limit Exceedance (dBA) Day		Evening		Night	
Equipment	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq
Crane	80.6	72.6	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Front End Loader	79.1	75.1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Tractor	84.0	80.0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Total	84.0	81.8	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Roadway Construction Noise Model (RCNM),Version 1.1

Report date: 05/11/2023
Case Description: LAUS-05

**** Receptor #1 ****

Baselines (dBA)

Description	Land Use	Daytime	Evening	Night
Paving	Residential	60.0	55.0	50.0

Equipment

Description	Impact Device	Spec Usage (%)	Actual Lmax (dBA)	Receptor Lmax (dBA)	Estimated Distance (feet)	Shielding (dBA)
Concrete Mixer Truck	No	40		78.8	50.0	0.0
Paver	No	50		77.2	50.0	0.0
Roller	No	20		80.0	50.0	0.0

Results

	Calculated (dBA)		Noise Limits (dBA) Day		Evening		Night		Noise Limit Exceedance (dBA) Day		Evening		Night	
Equipment	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq
Concrete Mixer Truck	78.8	74.8	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Paver	77.2	74.2	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Roller	80.0	73.0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Total	80.0	78.8	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Roadway Construction Noise Model (RCNM),Version 1.1

Report date: 05/11/2023
Case Description: LAUS-05

**** Receptor #1 ****

Baselines (dBA)

Description	Land Use	Daytime	Evening	Night
Rough Grading	Residential	60.0	55.0	50.0

Equipment

Description	Impact Device	Usage (%)	Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Crane	No	16		80.6	50.0	0.0
Front End Loader	No	40		79.1	50.0	0.0
Tractor	No	40	84.0		50.0	0.0

Results

	Calculated (dBA)		Noise Limits (dBA) Day		Evening		Night		Noise Limit Exceedance (dBA) Day		Evening		Night	
Equipment	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq
Crane	80.6	72.6	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Front End Loader	79.1	75.1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Tractor	84.0	80.0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Total	84.0	81.8	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Roadway Construction Noise Model (RCNM),Version 1.1

Report date: 05/11/2023
Case Description: LAUS-05

**** Receptor #1 ****

Baselines (dBA)

Description	Land Use	Daytime	Evening	Night
Site Preparation	Residential	60.0	55.0	50.0

Equipment

Description	Impact Device	Spec Usage (%)	Actual Lmax (dBA)	Receptor Lmax (dBA)	Estimated Distance (feet)	Shielding (dBA)
Grader	No	40	85.0		50.0	0.0

Results

	Calculated (dBA)		Noise Limits (dBA) Day		Evening		Night		Noise Limit Exceedance (dBA) Day		Evening		Night	
Equipment	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq
Grader	85.0	81.0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Total	85.0	81.0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Roadway Construction Noise Model (RCNM),Version 1.1

Report date: 05/11/2023
Case Description: LAUS-05

**** Receptor #1 ****

Baselines (dBA)

Description	Land Use	Daytime	Evening	Night
Utilities Trenching	Residential	60.0	55.0	50.0

Equipment

Description	Impact Device	Usage (%)	Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Excavator	No	40		80.7	50.0	0.0
Tractor	No	40	84.0		50.0	0.0
Front End Loader	No	40		79.1	50.0	0.0

Results

	Calculated (dBA)		Noise Limits (dBA)						Noise Limit Exceedance (dBA)					
			Day		Evening		Night		Day		Evening		Night	
Equipment	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq
Excavator	80.7	76.7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Tractor	84.0	80.0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Front End Loader	79.1	75.1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Total	84.0	82.6	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

LAUS-05 - Construction Noise Modeling Attenuation Calculations

		Levels in dBA Leq				
Phase		**RCNM Reference Noise Level**	**Single-Family Residence at 3682 Fenley Drive (North)**	**Single-Family Residence at 10211 Humbolt Street (East)**	**Los Alamitos HS Dance Building (South)**	**Los Alamitos HS Gymnasium Building G (West)**
	Distance in feet	*50*	*740*	*730*	*300*	*130*
Asphalt Demolition		85.0	61.6	61.7	69.4	76.7
Site Preparation		81.0	57.6	57.7	65.4	72.7
Rough Grading		82.0	58.6	58.7	66.4	73.7
	Distance in feet	*50*	*615*	*650*	*190*	*20*
Building Construction		82.0	60.2	59.7	70.4	90.0
Architectural Coating		74.0	52.2	51.7	62.4	82.0
	Distance in feet	*50*	*740*	*730*	*300*	*130*
Paving		79.0	55.6	55.7	63.4	70.7
	Distance in feet	*50*	*615*	*650*	*190*	*20*
Utilities Trenching		83.0	61.2	60.7	71.4	91.0

Attenuation calculated through Inverse Square Law: Lp(R2) = Lp(R1) - 20Log(R2/R1)

LAUS-05 - Vibration Damage Attenuation Calculations

		Levels, PPV (in/sec)			
	Vibration Reference Level	**Residence at 3682 Fenley Drive**	**Residence at 10211 Humbolt Street**	**Dance Building (South)**	**Gymnasium Building G (West)**
Distance in feet	**at *25 feet***	*610*	*650*	*185*	*20*
Vibratory Roller	0.21	0.002	0.002	0.010	0.293
Static Roller	0.05	0.000	0.000	0.002	0.070
Hoe Ram	0.089	0.001	0.001	0.004	0.124
Large Bulldozer	0.089	0.001	0.001	0.004	0.124
Caisson Drilling	0.089	0.001	0.001	0.004	0.124
Loaded Trucks	0.076	0.001	0.001	0.004	0.106
Jackhammer	0.035	0.000	0.000	0.002	0.049
Small Bulldozer	0.003	0.000	0.000	0.000	0.004

LAUS-05 - Vibration Annoyance Attenuation Calculations

Levels in VdB

Equipment *Distance in feet*	Vibration @ 25 ft	Single-Family Residence at 3682 Fenley Drive (North) *610*	Single-Family Residence at 10211 Humbolt Street (East) *650*	Single-Family Residence at 10411 El Dorado Way (South) *300*	Single-Family Residence at 3196 Lilly Avenue (West) *1200*
Vibratory Roller	94.0	52.4	51.6	61.6	43.6
Static Roller	82.0	40.4	39.6	49.6	31.6
Hoe Ram	87.0	45.4	44.6	54.6	36.6
Large Bulldozer	87.0	45.4	44.6	54.6	36.6
Caisson Drilling	87.0	45.4	44.6	54.6	36.6
Loaded Trucks	86.0	44.4	43.6	53.6	35.6
Jackhammer	79.0	37.4	36.6	46.6	28.6
Small Bulldozer	58.0	16.4	15.6	25.6	7.6

STATIONARY NOISE MODELING

LAUS-05 - Stationary Noise Modeling Attenuation Calculations

Phase	Reference Noise Level	Single-Family Residence at 3682 Fenley Drive (North)
Distance in feet	*50*	*125*
HVAC	55.0	47.0

Attenuation calculated through Inverse Square Law: Lp(R2) = Lp(R1) - 20Log(R2/R1)

Appendix D Access and Pedestrian Safety Memo

Appendix

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LOS ALAMITOS HIGH SCHOOL GYMNASIUM
LOS ALAMITOS UNIFIED SCHOOL DISTRICT
FOCUSED ACCESS/CIRCULATION ANALYSIS

Prepared for: Los Alamitos Unified School District and PlaceWorks

Prepared by: Garland Associates – Traffic/Transportation Consultants

Date: May 2, 2023

Introduction and Project Description

Los Alamitos Unified School District is proposing to develop a new 2,000-seat gymnasium on the campus of the existing Los Alamitos High School. The high school is located in the northeast quadrant of Cerritos Avenue and Los Alamitos Boulevard in Los Alamitos. The new gymnasium will be located on the north side of the campus west of the track and field stadium, east of the swimming pool, and northeast of the existing gymnasium, which will remain after the new gym is completed.

A qualitative analysis has been conducted to evaluate the access/circulation features associated with the new gymnasium. The analysis includes an evaluation of the vehicular traffic and pedestrian circulation features. In addition, the volumes of traffic that would be generated by the facility have been quantified and the issue of vehicle miles traveled (VMT) has been addressed.

Existing Street Network

The school site is bounded by Cerritos Avenue on the south, Los Alamitos Boulevard on the west, a creek and a residential area on the north, and a residential area on the east. Cerritos Avenue is a four lane east-west street that has bike lanes and sidewalks on both sides of the street. The north side of Cerritos Avenue has a passenger loading/unloading zone along the school frontage and the south side of the street accommodates parking.

Los Alamitos Boulevard is a four lane north-south street that has sidewalks on both sides of the street. The east side of Los Alamitos Boulevard has a passenger loading/unloading zone along the school frontage and the west side of the street has a restriction that states “No Parking During School Hours.”

The intersection of Cerritos Avenue and Los Alamitos Boulevard is signalized and has pedestrian signals and crosswalks on all four legs of the intersection. The intersection of Cerritos Avenue and the main school access driveway is also signalized and has pedestrian signals and crosswalks on the west leg of the intersection and on the driveway on the north side of the intersection. There are signs along Cerritos Avenue and Los Alamitos Boulevard that state “No Pedestrian Crossing Between Intersections.” This restriction enhances pedestrian safety by discouraging students from crossing the street at midblock locations and encouraging them to cross at the signalized intersections.

Vehicular and Pedestrian Access/Circulation System at the School

The school has three primary parking lots. The one closest to the new gym is located on the east side of the school campus immediately south of the track and field stadium. It is near the southeast corner of the new gym. This parking lot would be used by most of the spectators and participants of the gymnasium because of its convenient location. The second parking lot is located on the south side of the school campus adjacent to Cerritos Avenue. This parking lot has a drop-off/pick-up zone along the north side of the lot. The third parking lot is located on the west side of the school campus adjacent to Los Alamitos Boulevard.

Access to the large parking lot adjacent to the new gym site is provided by the signalized driveway on Cerritos Avenue on the south side of the school site. An on-site north-south circulation road extends from the signalized driveway to the west end of the parking lot. The circulation road and driveway accommodate ingress and egress traffic.

Access to the parking lot on the south side of the school site is provided by the signalized driveway on Cerritos Avenue, which leads to the east end of the parking lot. Egress from this parking lot is provided by an exit-only driveway at the west end of the parking lot as well as the signalized driveway on Cerritos Avenue.

Access to the parking lot on the west side of the school site is provided by two driveways on Los Alamitos Boulevard: one at the south end of the parking lot and the other near the north end of the lot. These driveways both accommodate ingress and egress traffic movements.

Pedestrian access to the gymnasium will be provided via a gate at the northwest corner of the adjacent parking lot and by on-site walkways that provide links between the gymnasium and other areas of the school campus. Pedestrian access from the public sidewalks would be accommodated by several pedestrian entrances along the Cerritos Avenue and Los Alamitos Boulevard frontages that lead to on-site walkways throughout the campus. Pedestrians could walk through the campus to the gym when school is in session. When the campus is closed to pedestrian access, pedestrians would access the gym by walking along the north-south circulation road that runs between Cerritos Avenue and the large parking lot. The gymnasium site will be designed so that pedestrians can walk around the building to gain access to whichever door they want to use.

Emergency Access

The existing and proposed access and circulation features at the school, including the driveways, on-site circulation roads, parking lots, and fire lanes, would accommodate emergency ingress and egress by fire trucks, police units, and ambulance/paramedic vehicles. In addition to the existing on-site access routes, a fire lane will be provided on all sides of the new gymnasium. This fire lane will connect to an existing fire lane that runs east-west between the gymnasium site and the driveway on Los Alamitos Boulevard. Emergency vehicles could, therefore, readily access the new gym site and all other areas of the school via the existing and proposed travel corridors. The proposed project would not result in inadequate emergency access.

Project Generated Traffic

The volumes of traffic that would be generated by the gymnasium for a capacity-level event (2,000 spectators) are shown in Table 1. The trip generation rates reflect the assumption that the gymnasium would generate a demand of one vehicle for every three seats (for vehicles that remain parked at the site) and that an additional ten percent of the vehicles arriving at the gymnasium would drop passengers off then leave. The rate of one vehicle for every three seats is based on the parking requirements in the City of Los Alamitos Municipal Code. The Municipal Code indicates that the parking requirement for public assembly facilities is one space per 3 fixed seats.

TABLE 1
PROJECT GENERATED TRAFFIC

Facility	Evening Hour – Pre-Event			Daily Traffic
	Inbound	Outbound	Total	
TRIP GENERATION RATES				
Gymnasium (vehicle trips per seat)	0.367	0.033	0.40	0.80
GENERATED TRAFFIC VOLUMES				
Gymnasium (2,000 seats)	734	66	800	1,600

Table 1 indicates that a capacity-level event with 2,000 spectators would generate an estimated 800 vehicle trips during the peak hour (734 inbound and 66 outbound) and 1,600 daily trips. The peak hour for this analysis represents the one-hour time period prior to the beginning of an event at the gymnasium when patrons are traveling to the gym. Approximately the same level of traffic would be generated at the end of an event when patrons are exiting (with the inbound and outbound traffic volumes reversed).

It should be noted that the traffic volumes shown in Table 1 would only occur when a capacity-level event were to be scheduled at the gym. It would not be a daily occurrence. The gym would generate substantially lower traffic volumes on a typical day when the gym would be used for practices and minor events. Traffic generated by this new gym would be in addition to traffic generated by the existing gym and the track and field stadium; however, the District has indicated that capacity-level events would not be scheduled simultaneously with events at the other facilities.

Vehicle Miles Traveled (VMT)

The County of Orange "Guidelines for Evaluating VMT Under CEQA" state that the development of public facilities, which includes institutional/government and public service uses, can be screened from a CEQA VMT analysis. The proposed project, which is an expansion of an existing high school's recreational facilities, is included in the public facilities category. The proposed project would not, therefore, result in a significant VMT impact.

Findings Regarding Vehicular and Pedestrian Access/Circulation

The conclusions of the analysis regarding the new gymnasium's vehicular and pedestrian access/circulation system are outlined below.

- The new gym will be located adjacent to the school' primary parking lot, which is located immediately southeast of the gymnasium site. This adjacency renders it convenient for spectators and participants of the activities at the gym. There are two other parking lots on the school campus that could be used for overflow parking.
- Vehicular access to the primary parking lot is provided via a signalized driveway on Cerritos Avenue and a north-south on-site circulation road that extends from the driveway to the parking lot.
- Pedestrian access to the gymnasium will be provided via a gate at the northwest corner of the adjacent parking lot and by on-site walkways that provide links between the gymnasium and other areas of the school campus.
- Pedestrian access from the public sidewalks would be accommodated by several pedestrian entrances along the Cerritos Avenue and Los Alamitos Boulevard frontages that lead to on-site walkways throughout the campus. When the campus is closed to pedestrian access, pedestrians would access the gym by walking along the north-south circulation road that runs between Cerritos Avenue and the large parking lot.
- Emergency vehicles could readily access the new gym site and all other areas of the school via the existing and proposed travel corridors. A fire lane will be provided on all sides of the new gymnasium that will connect to an existing fire lane that runs east-west between the gymnasium site and the driveway on Los Alamitos Boulevard.
- A capacity-level event with 2,000 spectators would generate an estimated 800 vehicle trips during the peak hour (734 inbound and 66 outbound) and 1,600 daily trips.
- The gymnasium project can be screened from a CEQA VMT analysis because the County of Orange CEQA guidelines state that the development of public facilities, which includes institutional/government and public service uses such as a school, can be screened from a VMT analysis. So there are no VMT impacts.
- In summary, the school's access and circulation features can readily accommodate the safe and efficient movement of vehicles and pedestrians to and from the new gym and the adjacent parking lot.