Castilleja School Project

Draft Environmental Impact Report

(SCH # 2017012052)

City of Palo Alto

Prepared by Dudek

July 2019

Castilleja School Project
Draft Environmental Impact Report

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TABLE OF CONTENTS

Section			Page No.

APPENDICES

FIGURES

TABLES

ACRONYMS AND ABBREVIATIONS

Acronym/Abbreviation	Definition
AB	Assembly Bill
ADT	average daily traffic
APN	Assessor's Parcel Number
BAAQMD	Bay Area Air Quality Management District
BMP	best management practice
C_2F_6	Hexafluoroethane
CAA	Clean Air Act
CalEEMod	California Emissions Estimator Model
CalEPA	California Environmental Protection Agency
CAL FIRE	California Department of Forestry and Fire Protection
CALGreen	California Green Building Standards
CalRecycle	California Resources Recycling and Recovery
Caltrans	California Department of Transportation
CARB	California Air Resources Board
CBC	California Building Code
CCR	California Code of Regulations
CEC	California Energy Commission
CEQA	California Environmental Quality Act
CFC	cholorofluorocarbon
CFR	Code of Federal Regulations
CF_4	Tetrafluoromethane
CH_4	methane
CHHSL	California Human Health Screening Level
CIP	Capital Improvement Plan
City	City of Palo Alto
CNDDB	California Natural Diversity Database
CNEL	Community Noise Equivalent Level
CO	carbon monoxide
CO_2	carbon dioxide
CO_2E	carbon dioxide equivalent
CPAU	City of Palo Alto Utilities
CPUC	California Public Utilities Commission
CWA	Clean Water Act
dB	decibel
dBA	A-weighted decibel
DOE	U.S. Department of Energy
DOT	U.S. Department of Transportation
DMP	diesel particulate matter
DTSC	Department of Toxic Substances Control
EDR	Environmental Data Resources Inc.
EIR	environmental impact report
EO	Executive Order

Acronym/Abbreviation	Definition
EPA	U.S. Environmental Protection Agency
ESA	Environmental Site Assessment
FAR	floor-area ratio
FHWA	Federal Highway Administration
FICON	Federal Emergency Committee on Noise
GHG	greenhouse gas
GWP	Global Warming Potential
HAP	hazardous air pollutant
HCFC	hydrochlorofluorocarbon
HFC	hydrofluorocarbon
Hz	Hertz
IPCC	Intergovernmental Panel on Climate Change
kBtu	kilos British thermal units
kWh	kilowatt-hour
LCFS	Low Carbon Fuel Standard
L_{dn}	day/night average noise level
L_{eq}	equivalent sound level
LID	Low Impact Development
L_{max}	maximum noise level
L_{min}	minimum noise level
LOS	level of service
MMRP	mitigation monitoring and reporting program
mph	miles per hour
MPO	metropolitan planning organization
MT	metric ton
MTP	Metropolitan Transportation Plan
N_2O	nitrous oxide
NAAQS	National Ambient Air Quality Standards
NESHAP	National Emission Standards for Hazardous Air Pollutants
NF_3	nitrogen trifluoride
NHTSA	National Highway Traffic Safety Administration
NOP	Notice of Preparation
NPDES	National Pollutant Discharge Elimination System
O_3	ozone
OES	Office of Emergency Services
OPR	Office of Planning and Research
PFC	perfluorocarbon
PM_{10}	particulate matter equal to or less than 10 microns in aerodynamic diameter
$PM_{2.5}$	particulate matter equal to or less than 2.5 microns in aerodynamic diameter
ppm	parts per million
ROG	reactive organic gas
RPS	Renewable Portfolio Standard
RTP	Regional Transportation Plan

Acronym/Abbreviation	Definition
RWQCB	Regional Water Quality Control Board
SB	Senate Bill
SCS	Sustainable Communities Strategy
SDWA	Safe Drinking Water Act
SF_6	Sulfur hexafluoride
SLCP	short-lived climate pollutant
SLF	sacred lands file
SO_2	sulfur dioxide
SWPPP	stormwater pollution prevention plan
SWRCB	State Water Resources Control Board
TAC	toxic air contaminant
UBC	Uniform Building Code
USGS	U.S. Geological Survey
v/c	volume-to-capacity
VMT	vehicle miles traveled
ZNE	zero net energy

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CHAPTER 1
EXECUTIVE SUMMARY

1.1 PROJECT LOCATION

Castilleja School Foundation (the project applicant) requests approval from the City of Palo Alto (City) of an amendment to the school's existing Conditional Use Permit (CUP) to increase student enrollment at the campus, architectural review of a phased campus modification plan (referred to by the applicant as the Master Plan); a Tentative Map with Exception to merge two small parcels containing dwelling units with the larger parcel; a variance for below-grade setback encroachments related to the proposed underground parking garage; and a variance to maintain existing floor-area-ratio to rebuild 84,124 square feet above grade in a different configuration. The Castilleja School Project site includes three parcels located at 1310 Bryant Street (current campus), as well as 1235 and 1263 Emerson Street. The project site is bounded by Embarcadero Road to the north, Bryant Street to the east, Kellogg Avenue to the south and Emerson Street to the east, shown in Figure 3-1 in Chapter 3, Project Description. Embarcadero Road is a major arterial and Bryant Street is a bike boulevard and safe route to school.

Figures 3-1 and 3-2 in Chapter 3, Project Description, show the location of the project site and an aerial photograph of the site. The project site is 286,783 square feet comprised of three parcels, identified as Santa Clara County Assessor's Parcel Numbers (APN) 124-12-034 (1310 Bryant Street, the current school campus), APN 124-12-031 (1235 Emerson Street, a single family residence), and APN 124-12-033 (1263 Emerson Street, the Lockey/Alumnae House). Automobile access to the site is currently provided via eleven driveways from Emerson Street, Kellogg Avenue, and Bryant Street (three driveways on Bryant Street, four driveways on Kellogg Avenue, and four driveways on Emerson Street including the two driveways accessing the two residential structures). The proposed project would reduce this to six driveways (two on Bryant Street, one on Kellogg Avenue, three on Emerson Street).

1.2 PROJECT SITE CHARACTERISTICS

Castilleja School is an all-girls, non-religiously-affiliated private school in Palo Alto that has been educating girls from grades six through twelve since 1907. The campus has been located at the current site since 1910. As shown in Figure 3-3, Existing Site Plan, the school's facilities include an administrative and chapel theater building, classroom building, campus center building, fitness and athletic center and fine arts building, outdoor pool, surface parking, and a sports field. The project site also includes two adjacent residential properties also owned by the Castilleja School Foundation. The project site does not include the residential property at 1215 Emerson Street, which is a National Register of Historic Places and California Register of Historic Resources Eligible property on the same side of Emerson Street and within the same block as Castilleja's property. 1215 Emerson Street is located on the corner of Emerson Street and Embarcadero Road.

There are a variety of native and non-native trees throughout the project site, including coast live oak, coast redwood, pear trees, Japanese plum, and other ornamental trees.

The project site is zoned R-1; the Palo Alto Municipal code allows for operation of a private school in the R-1 zone district subject to a CUP. Castilleja School operates under an existing CUP applicable to the parcel at 1310 Bryant Street that defines a student enrollment cap and regulates the frequency of large special events that may be held at the site. Castilleja School has been operating at a student enrollment level that is in excess of the CUP limits. The proposed CUP amendment would include increasing the student enrollment cap to 540 students and would define the frequency and size of permitted special events, as summarized in the Special Events Description included in Appendix B to this EIR.

Before construction of the school and its surrounding residential neighborhood, the project site supported agricultural uses. Castilleja School first opened in another location but moved to the site at 1310 Bryant Street in 1910 with the construction of four structures: a three-story dormitory, a recitation building, a domestic science building and a gymnasium. In the 1920s, Castilleja added the pool and chapel, a science lab, the Orchard House, and an auditorium. The Arrillaga Family Campus Center, which included classrooms and dormitories, was built in 1962, and a library and additional classroom building (Rhoades Hall) were constructed in 1965. Additional construction and campus modification efforts occurred between 1974 and 2007. The first CUP for the school was issued in 1960, and additional CUPs were approved between 1965 and 1999.

1.3 PROJECT OBJECTIVES

Castilleja School has set forth the following objectives for the project:

1. Maintain a single integrated campus for the middle and upper school in the current location, while providing new structures that integrate state-of-the-art technology and teaching practices and retain flexibility to adapt to unanticipated changes.

2. Achieve better architectural compatibility with adjacent neighborhoods through a well-articulated building and improve site aesthetics and harmony with the surrounding neighborhoods through enhanced landscaping.

3. Increase enrollment to 540 students to allow more young women the unique opportunity to receive an all-girls education.

4. Increase on-site parking via an underground parking garage in order to reduce both parking visibility and surface parking spaces.

5. Improve vehicular, pedestrian, and bicycle access for students and staff through design efficiencies and a robust Transportation Demand Management Plan.

6. Ensure no increase in vehicle trips to and from the campus during AM and PM peak hours relative to recent (baseline) traffic volumes. Reduce the number of service deliveries and relocate deliveries within the campus and below grade, to decrease nuisance effects to neighbors.
7. Improve the campus's sustainability and energy efficiency by developing new facilities.
8. Phased development of the project to allow Castilleja School to continue to operate during construction and to reduce impacts on the neighborhood.

1.4 DESCRIPTION OF PROPOSED PROJECT CHARACTERISTICS

Castilleja School Foundation has submitted an application for: 1) an amendment of the school's existing CUP, 2) Architectural review to assess the proposed physical changes to the campus, 3) a Tentative Map with Exception(s) to merge the three aforementioned parcels, and 4) two variances – one to allow construction of 84,124 square feet of above-grade gross floor area in replacement of the buildings proposed for demolition and the second to allow below-grade encroachment into the special setbacks for Embarcadero Road to accommodate construction of the proposed subterranean garage. Additional discretionary and ministerial approvals that would be necessary to allow the project to proceed are identified in Section 1.7.

The applicant's proposed amendment to the school's CUP would allow for an increase in the maximum enrollment cap to 540 students in conjunction with the proposed campus expansion and phased redevelopment of portions of the project site. The project would demolish the two residential structures (located at 1235 and 1263 Emerson Street) and merge the two parcels with the current campus parcel via a Tentative Map with Exception (to allow for the resulting parcel to exceed the maximum lot size in the R-1 (10,000) zone district). Three existing buildings within the current campus would also be demolished. In total, the phased proposal is to demolish 6,021 square feet of gross floor area in the two residential structures and 84,572 square feet of above ground floor area within the existing school campus and replace the floor area within a new building on the project site having approximately 84,124 square feet above grade floor area as well as basement floor area. The applicant requests the increase in student enrollment to be phased, with a first phase increase to 490 students following construction of a below-grade parking structure, which would increase the number of on-site parking spaces from 74 to 142. Castilleja School would instruct students and families that vehicle drop-offs and pick-ups should occur in the below grade parking structure via a one-way traffic pattern starting at Bryant Street just off Embarcadero Road through the small existing surface parking lot, ramping below grade and exiting from below grade via a ramped driveway onto Emerson Street. All traffic would exit onto Emerson Street and would be required to turn right upon exiting, and then would turn right at Embarcadero Road. The project also includes implementation of an expanded Transportation Demand Management Plan that would provide measures to ensure that there is a maximum of 440 vehicle trips to and from the school during the AM and PM peak hours. The proposed Transportation Demand Management Plan is provided in Appendix B3 to this EIR. Refer to Chapter 7, Transportation, for additional discussion of the plan. Deliveries and trash/recycling pick-ups would occur in a below-grade service area located between the new pool and the new Academic building, with vehicular access off of Emerson Street.

The proposed Master Plan anticipates development to occur in the following phases, as shown in Figure 3-5, Phasing Plan, in Chapter 3, Project Description. The development components of the plan are subject to the Architectural Review process(es) which include phased Architectural Review approval for each construction phase. It is expected that construction of all four phases would require approximately three years:

Phase 1. Demolish the two residential structures on the project site and construct a below-grade parking structure under the merged parcels to accommodate 115 vehicles. Drop-off and pick-up would be re-routed through the garage with an entrance-only ramp accessed from the surface parking lot accessible via Bryant Street and an exit ramp on Emerson Street. Construct a pedestrian tunnel from the garage to the central part of the campus, with access located between the athletic center and chapel. Increase enrollment to a maximum of 490 students.

Phase 2. Establish a temporary campus by placing portable and/or modular buildings above the parking garage (in the current location of Spieker Field).

Phase 3. Demolish the Fine Arts Center and relocate the pool to the current location of the Fine Arts Center building; lower the pool 15 feet below existing grade and construct an adjacent sound wall along Emerson Street; increase enrollment to a maximum of 520 students.

Phase 4: Demolish the classroom building, Campus Center building, accessory building at the southern end of the campus, and maintenance building; reconstruct the Circle and construct a new Academic building and vehicle ramp to the below-grade trash enclosure and service/loading area within the basement of the new Academic building; implement the proposed Sustainability Road Map (Appendix B), including reducing the number of food service deliveries by ten percent. Construct Emerson Park as a privately-owned open space that will be accessible to neighbors of the school, located west of the Emerson Street exit ramp of the subterranean parking garage; remove temporary campus facilities and restore Spieker Field; increase enrollment to a maximum of 540 students.

The proposed campus modifications would result in an increase in the amount of open space areas on the project site by 12,257 square feet to 128,460 square feet. As discussed in Chapter 7, Transportation, the proposed Transportation Demand Management (TDM) Plan would function as a supplement to the existing TDM plan. The new TDM components would be implemented as each construction phase is completed to ensure that there is a maximum of 440 vehicle trips to and from the school in the AM and PM peak hours.

1.5 AREAS OF KNOWN CONTROVERSY AND ISSUES RAISED

Section 15123 (b)(2) of the California Environmental Quality Act (CEQA) Guidelines (14 CCR 15000 et seq.) requires the executive summary of an environmental impact report (EIR) to disclose areas of controversy known to the lead agency that have been raised by the agencies and the public. The City received 139 letters and verbal comments from 40 individuals in response to the Notice of Preparation (NOP) that was circulated in 2017 to solicit agency and public comments on the scope and environmental analysis to be included in the EIR. The NOP and the comments received by the City are included in Appendix A of this Draft EIR. The following concerns were raised in the responses to the NOP and at the public scoping meeting for this EIR:

- Increase in traffic due to increased student enrollment;
- Increase in noise levels in the adjacent neighborhood;
- Compatibility of the proposed buildings, tree loss, and the scale and massing of the project with the surrounding neighborhood, appearance of the garage, proposed setbacks and building heights;
- Safety risks to bicyclists;
- Past violations of the existing CUP;
- Potential presence of hazardous materials within the buildings to be demolished and in the soil to be disturbed;
- Emissions of air pollutants and greenhouse gases during construction and generated by vehicle traffic and garage operations;
- Potential for increased enrollment to increase demands for services, reduction in size of the utility easement where Melville Street previously extended into the site;
- Adequacy of the geotechnical analysis assessment of the potential for the project to increase seismic hazards in the vicinity, potential for subsidence, the extent of soil displacement;
- Potential need for dewatering during construction, increases in stormwater runoff, reductions in water quality, flooding at the Embarcadero underpass;
- Tree loss in conflict with the City's Tree Ordinance;

- Demolition of two residential structures;
- Potential loss of cultural resources; and
- Consideration of alternatives to the proposed project, including relocating or splitting the campus, omitting the parking garage, retaining both of the residential structures, relocating the Lockey House, maintaining the enrollment cap at 415 students, omitting all underground work, providing satellite parking and increased use of shuttles, reducing the number of events onsite, and retaining more trees.

1.6 PROJECT ALTERNATIVES

The alternatives chapter of the EIR (Chapter 13, Project Alternatives) was prepared in accordance with Section 15126.6 of the CEQA Guidelines. The alternatives analyzed in this EIR in addition to the proposed project are briefly summarized below. Refer to Chapter 13 for additional description of each alternative and analysis of each alternative's potential impacts in comparison to those of the proposed project.

1. **Alternative 1: No Project Alternative.** This alternative assumes no development would occur, and the site would remain in its current condition. All buildings and other site improvements would be retained at existing locations and the proposed parcels would not be merged. The school would continue to operate under the existing CUP, which would require reducing enrollment to 415 students from the existing enrollment of 434 students.
2. **Alternative 2: Moderate Enrollment Increase.** This alternative seeks to reduce the impacts of the proposed project associated with traffic and noise by establishing a maximum enrollment of 506 students. This would increase maximum enrollment compared to the existing CUP by 91 students, and increase the enrollment compared to current conditions by 72 students. With 506 students, it is expected that the campus would require 30 classrooms; thus the proposed new academic building would be slightly reduced in size. The number of off-street parking spaces would also be slightly reduced commensurate with the reduction in the number of classrooms.
3. **Alternative 3: Moderate Enrollment Increase with Reduced Parking.** This alternative would also attempt to reduce the impacts of the proposed project associated with traffic and noise by establishing a maximum enrollment of 506 students; it would also reduce the amount of on-site parking. The proposed project includes more parking spaces than are required by the Palo Alto Municipal Code Chapter 18.52.040. Under Alternative 3, there would be 92 on-site parking spaced provided, which is the minimum amount of parking required by code. The below-grade parking garage would be reduced to 52 parking spaces and the amount of on-site surface parking would increase by expanding the proposed parking lot at the corner of Emerson Street and Kellogg Avenue. The reduced parking

within the garage would allow for the garage design to be modified to substantially reduce encroachment into the Embarcadero Road setbacks and the Public Utilities Easement located to the south of the proposed garage.

1.7 REQUIRED APPROVALS AND PERMITS

Table 1-1 lists the entitlements and approvals required from the City and from other responsible agencies for the proposed project. Following the table is a discussion of each of the entitlements and approvals required from the City and the approvals and permits required from other agencies.

Table 1-1
Required Approvals/Permits for Castilleja

Required Permit/Approval	Permitting Agency
Certify the EIR	City of Palo Alto
Conditional Use Permit Amendment	City of Palo Alto
Tentative Map with Exception(s)	City of Palo Alto
Phased Architectural Review Approvals and Variance(s)	City of Palo Alto
Demolition Permit(s)*	City of Palo Alto
Grading Permit(s)*	City of Palo Alto
Building Permit(s)*	City of Palo Alto
Tree Removal Permit(s)*	City of Palo Alto
Section 402 National Pollutant Discharge Elimination System Permit Compliance	Regional Water Quality Control Board–San Francisco Bay

* Ministerial permits.

Certify the EIR. A public hearing on the Draft EIR at the Planning and Transportation Commission would be followed by hearings before the Architectural Review Board and Historic Resources Board. A Final EIR would be prepared to address all comments received by the City during the Draft EIR public comment period. Prior to considering action on the requested project entitlements, CEQA requires that the City Council certify that the Draft EIR has been prepared in accordance with CEQA (California Public Resources Code, Section 21000 et seq.), and the CEQA Guidelines (14 CCR 15000 et seq.) and that the EIR meets CEQA's requirements to serve as an informational document that provides public disclosure of potential impacts of the project. If the City Council certifies the EIR, the Council would also be required to adopt the mitigation monitoring and reporting program and CEQA Findings of Fact (which would include a statement of overriding considerations addressing any significant and unavoidable impacts).

Conditional Use Permit Amendment. The project would require an amendment to the existing CUP that authorizes Castilleja School to operate at their 1310 Bryant Street campus, which is located in the R-1 zone district. The Planning and Transportation Commission would review the proposed CUP amendment and make a recommendation to the City Council for final consideration of this entitlement.

Tentative Map with Exceptions. The Tentative Map with Exceptions is proposed to merge the three existing parcels owned by the Castilleja School Foundation into a single parcel which exceeds the maximum allowable lot size within the R-1 (10,000) zone district. The Planning and Transportation Commission would review the proposed Tentative Map with Exceptions and make a recommendation to the City Council for the final action on this entitlement.

Architectural Review. The Historic Resources Board and Architectural Review Board would conduct hearings on the Architectural Review application and make recommendations to the City Council for the final decision on the Architectural Review application(s).

Variance. Two variances are requested to allow the project to be constructed as proposed. This includes a variance to allow for below-grade encroachment into the special setback area along Embarcadero Road and a variance to allow the replacement Floor Area Ratio within the project site to exceed the maximum Floor Area Ratio in the R-1 zone district. The Planning and Transportation Commission would review the requested variances and make a recommendation to City Council for action on these entitlements.

Demolition Permits, Grading Permits, Building Permits. If campus modifications are approved by the City Council, the City of Palo Alto's Development Services and Public Works staff would process demolition, grading, and building permits for each development phase.

Tree Removal Permits. If campus modifications are approved by the City Council, the City of Palo Alto's Urban Forestry Department staff would process tree removal permits for each development phase.

1.8 SUMMARY OF IMPACTS AND MITIGATION MEASURES

Table 1-2 lists all of the impacts associated with the proposed project, as evaluated in this EIR. The table identifies the level of significance of each impact and presents the mitigation measures necessary to reduce impacts to a less than significant level. Table 1-3 identifies those impacts associated with the proposed project for which the Initial Study analysis demonstrated that there would be no impact, a less than significant impact, or an impact that would be less than significant with implementation of the mitigation measures identified in the Initial Study that was circulated with the NOP for this EIR (Appendix A).

Table 1-2
EIR Impacts and Mitigation Measures Summary

Impact	Significance Before Mitigation	Mitigation	Significance After Mitigation
Land Use and Planning			
4-1 Conflict with land use plan, policy, or regulation of an agency with jurisdiction over the project (including, but not limited to the general plan, specific plan, or zoning ordinance) adopted for the purpose of avoiding or mitigating an environmental effect	Significant	**Mitigation Measure 4a:** The Castilleja School Conditional Use Permit shall include the following restrictions for special events held at the project site: 1. No special events may occur on campus on Sundays. 2. Athletic competitions may occur only on weekdays and shall be complete by 8 pm. 3. There shall be a maximum of 90 events with more than 50 guests each year. 4. Parking during special events shall occur on Spieker Field; all parking for events with fewer than 50 guests shall occur within the Castilleja campus. 5. For events with between 50 and 80 guests, Castilleja shall prepare a parking plan identifying the amount of on-street parking available around the project site's frontage on Kellogg Avenue and Emerson Street, additional on-street parking opportunities in the neighborhood, and nearby park and ride parking lots that guests could use to facilitate ride sharing. 6. For events with more than 80 guests, Castilleja shall identify one or more satellite parking locations and provide shuttle service for guests using those locations. Further, Castilleja shall retain traffic monitors to help direct event traffic to appropriate parking locations. 7. No events may be held on campus that do not directly relate to Castilleja. **Mitigation Measure 4b:** Prior to issuance of demolition, grading, and/or building permits for each construction phase, Castilleja School shall submit to the City Arborist a Tree Protection, Removal, and Relocation Plan. This shall include an inventory of the species, size, and condition of all trees within 50	Less than significant

Table 1-2
EIR Impacts and Mitigation Measures Summary

Impact	Significance Before Mitigation	Mitigation	Significance After Mitigation
		feet of the construction area. For the trees to be retained in place, the Tree Protection, Removal, and Relocation Plan must identify specific tree protection measures to be in place during construction, consistent with Section 8.10 of the Palo Alto Municipal Code. For all trees to be removed, the Tree Protection, Removal, and Relocation Plan must identify their species and size and identify specific locations where new tree planting would occur to replace the removed trees. For trees that are protected under the Municipal Code, replacement planting must include trees of the same species as any regulated tree to be removed, and must include sufficient new trees to replace the removed trees on an inch-for-inch basis. For trees that are not protected under the Municipal Code, replacement planting must be sufficient to provide no net loss of tree canopy after 10 years. For trees to be relocated, the Tree Protection, Removal, and Relocation Plan must identify the specific methods for tree location for each individual tree, including the location where the tree would be replanted and when that replanting would occur. For all trees to be removed and to be relocated, replacement planting must comply with the replanting ratios in Table 3-1, Tree Canopy Replacement Standard of the Palo Alto Tree Technical Manual, based on the size of the tree at the time of removal or relocation. For relocated trees, the relocated tree shall be included as one of the required replacement trees. For example, if the Tree Canopy Replacement Standard would require planting three trees, the applicant would replant the relocated tree and two new trees. Any trees relocated or replaced shall be monitored for a period of five years after planting/replanting to ensure they have successfully established. Should any trees not survive, they shall be replaced and monitored for a period of five years.	

Table 1-2
EIR Impacts and Mitigation Measures Summary

Impact	Significance Before Mitigation	Mitigation	Significance After Mitigation
		Mitigation Measures 7a, 7b, and 7c (see Transportation section below), and **Mitigation Measures 8a and 8b** (see Noise section below)	
4-2 Create land use incompatibility or physically divide an established community	Potentially significant	**Mitigation Measure 4a** (see above) **Mitigation Measures 7a, 7b and 7c** (see Transportation section below) **Mitigation Measures 8a and 8b** (see Noise section below)	Significant and Unavoidable
4-3 Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance	Potentially significant	**Mitigation Measure 4b** (see above)	Less than significant
4-4 Substantially contribute to cumulative land use impacts	No impact	None required	No impact
Aesthetics			
5-1 Would the project substantially degrade the existing visual character or quality of the site and its surroundings	Less than significant	None required	Less than significant
5-2 Would the project substantially shadow public open space (other than public streets and adjacent sidewalks)?	No impact	None required	No impact
5-3 Would the project create a new source of substantial light or glare which would adversely affect day or nighttime views in the area?	Potentially significant	**Mitigation Measure 5a:** Prior to issuance of building permits for each construction phase, Castilleja School shall submit a lighting plan that identifies the specific light fixtures to be used and their proposed locations. The lighting plan shall also identify the expected light levels within the property and at the property boundaries.	Less than significant

Table 1-2
EIR Impacts and Mitigation Measures Summary

Impact	Significance Before Mitigation	Mitigation	Significance After Mitigation
5-4 Substantially contribute to cumulative impacts to the visual character of the region.	No impact	None required	No impact
		Cultural Resources	
6-1 Cause a substantial adverse change in the significance of a historical or archeological resource.	Potentially significant	**Mitigation Measure 6a:** A protection plan shall be implemented for the Administration/Chapel Theater building and the residence at 1215 Emerson Street during proposed new construction and renovation activities to prevent damage to these structures. A clear and concise preservation protection plan shall be developed to provide these details. The protection plan shall be prepared by a qualified historic preservation specialist and shall be appended to the final set of construction plans for each construction phase. At a minimum, the protection plan shall include the following: • Protective fencing shall be installed approximately 15 feet from the perimeter of the Administration/Chapel Theater building and from the southern and eastern property lines of the residence at 1215 Emerson Street, or a lesser distance if recommended by a qualified historic preservation specialist. All construction workers shall be instructed to keep all people, materials, and equipment outside of the areas surrounded by protective fencing. The protective fencing shall consist of brightly-colored mesh fencing at least four feet in height. The mesh shall be mounted on six-foot tall poles, with at least two feet below ground, and spaced a maximum of six feet apart. • Material and equipment delivery and stockpile areas shall be identified on the protection plan, and shall be located as far as practicable from the Administration/Chapel Theater building and the residence at 1215 Emerson Street. • If cranes are used to install buildings or building components, no materials or structures shall be suspended above or within 30 feet measured horizontally from the exterior walls of the	Less than significant

Table 1-2
EIR Impacts and Mitigation Measures Summary

Impact	Significance Before Mitigation	Mitigation	Significance After Mitigation
		Administration/Chapel Theater building and the residence at 1215 Emerson Street. • For demolition of the existing Classroom building, the protection plan shall document the specific nature of demolition activities that would occur on any portion of the building that touches or is within 25 feet of the Administration/Chapel Theater building and provide recommendations for equipment usage and demolition techniques that will avoid adverse effects to the Administration/Chapel Theater building. • The protection plan shall prescribe measures for containment of dust during demolition, excavation, and construction. This may include wetting soils and materials to prevent wind-blown dust; covering exposed materials, soil, and unfinished buildings; and use of temporary barriers to prevent any wind-blown dust from reaching historic structures.. **Mitigation Measure 6b:** Prior to initiation of construction for each construction phase, all construction crew members, consultants, and other personnel shall receive project-specific Cultural Resource Awareness training. The training shall be conducted in coordination with qualified cultural resource specialists and shall inform project personnel of the potential to encounter sensitive archaeological material. In the event that archaeological resources (sites, features, or artifacts) are exposed during construction activities for the proposed project, all construction work occurring within 100 feet of the find shall immediately stop until a qualified archaeologist, meeting the Secretary of the Interior's Professional Qualification Standards, can evaluate the significance of the find and determine whether additional study is warranted. Prehistoric archaeological deposits may be indicated by the presence of discolored or dark soil, fire-affected material, concentrations of fragmented or	

Table 1-2
EIR Impacts and Mitigation Measures Summary

Impact	Significance Before Mitigation	Mitigation	Significance After Mitigation
		whole marine shell, burned or complete bone, non-local lithic materials, or the characteristic observed to be atypical of the surrounding area. Common prehistoric artifacts may include modified or battered lithic materials; lithic or bone tools that appeared to have been used for chopping, drilling, or grinding; projectile points; fired clay ceramics or non-functional items; and other items. Historic-age deposits are often indicated by the presence of glass bottles and shards, ceramic material, building or domestic refuse, ferrous metal, or old features such as concrete foundations or privies. Depending upon the significance of the find under CEQA (14 CCR 15064.5(f); PRC Section 21082), the archaeologist may simply record the find and allow work to continue. If the discovery proves significant under CEQA, additional work, such as preparation of an archaeological treatment plan, testing, or data recovery may be warranted and would be implemented if recommended by the qualified archeologist.	
6-2 Disturb any human remains, including those interred outside of dedicated cemeteries	Less than significant	None required	Less than significant
6-3 Contribute to a cumulative loss of cultural resources.	No Impact	None required	No Impact
Transportation			
7-1 Conflict with an applicable plan, ordinance or policy establishing measures of effectiveness for the performance of the circulation system, taking into account all modes of transportation including mass transit and non-motorized travel	Potentially significant	**Mitigation Measure 7a:** Castilleja School shall implement the proposed enhanced Transportation Demand Management (TDM) plan to reduce the number of project-related trips by between 12 and 22 percent. As described in the TDM plan (Appendix B), this is expected to include: 1. late afternoon shuttle departures 2. off-site drop-off/pick-up area 3. expanded carpool/trip planning program	Significant and Unavoidable

Table 1-2
EIR Impacts and Mitigation Measures Summary

Impact	Significance Before Mitigation	Mitigation	Significance After Mitigation
		4. additional off-site parking 5. parking/carpool incentives program for employees 6. alternative transportation information 7. bike tune-up day and on-site repair stations 8. Guaranteed Ride Home program 9. on-site car or bike sharing program 10. provide transit passes 11. mandatory ridesharing 12. other TDM measures developed by Castilleja in coordination with the City of Palo Alto (City), including the monitoring and enforcement provisions identified in Appendix B. In addition, Castilleja School shall modify the proposed enhanced TDM plan to include the following 13. educating staff, students, and families regarding the importance of an efficient and safe student drop-off operation to prevent excessive queuing in the garage, 14. conduct ongoing monitoring of drop-off lane discharge rates and ingress and egress queues; 15. if vehicle queues are causing spillover into the public right of way on Bryant Street, modify the drop-off procedures and TDM program to include greater staggering of bell schedules or other strategies that would decrease vehicle trips or otherwise spread out the number of peak hour vehicle trips accessing the underground garage; 16. Provide bicycle safety education for students, parents, and staff to encourage students and staff to ride bicycles to and from school; and 17. Host school-wide bicycle encouragement events (such as competitions, incentives, and other fun events) to support biking, walking, carpooling, and transit use so that the	

Table 1-2
EIR Impacts and Mitigation Measures Summary

Impact	Significance Before Mitigation	Mitigation	Significance After Mitigation
		school community understands that active transportation is a community-held value.	
7-2 Conflict with an applicable congestion management program, including, but not limited to level of service standards and travel demand measures, or other standards established by the County congestion management agency for designated roads or highways?	No impact	None required	No impact
7-3 Result a change in air traffic patterns, including either an increase in traffic levels or a change in location resulting in substantial safety risks?	No impact	None required	No impact
7-4 Substantially increase hazards due to a design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment)?	Potentially significant	**Mitigation Measure 7b:** Castilleja School shall maintain vegetation within 40 feet of the school's driveways onto public streets such that vegetation is trimmed down to a height of less than three feet and trees trimmed up so that nothing hangs below a height of seven feet from the surface of the roadway. Vegetation shall be trimmed no less once per month. Castilleja School shall provide the City with evidence of a landscaping management plan or active landscape maintenance contract annually. Castilleja School and the City shall provide curb markings to prohibit on-street parking within 35 feet of each driveway.	Less than significant
7-5 Result in inadequate emergency access?	No impact	None required	No impact
7-6 Conflict with adopted policies, plans, or programs supporting	No impact	None required	No impact

Table 1-2
EIR Impacts and Mitigation Measures Summary

Impact	Significance Before Mitigation	Mitigation	Significance After Mitigation
alternative transportation or otherwise decrease the performance or safety of such facilities?			
7-7 Contribute to a cumulative increase in traffic that conflicts with adopted policies and plans related to intersection and roadway segment function, including consideration of LOS and ADT	Significant	**Mitigation Measure 7a** (see above) **Mitigation Measure 7c:** The City shall consider adding signalization of the Alma Street/Kingsley Avenue intersection to the Capital Improvement Program.	Significant and Unavoidable
Noise			
8-1 Expose people to or generate noise levels in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies; or create a substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project	Potentially significant	**Mitigation Measure 4a** (see above) **Mitigation Measure 8a:** Prior to issuance of a building permit for the outdoor pool, Castilleja School shall submit to the City a technical analysis documenting the specific loudspeaker equipment proposed for use at the pool, the locations and positioning of speakers, and the likely noise levels for each of the receptor locations evaluated in the Environmental Noise Study for the proposed Castilleja School Conditional Use Permit Amendment and Master Plan. The technical analysis shall demonstrate that use of the loudspeaker would not generate noise levels that are more than 6 dB greater than existing noise levels	Less than significant
8-2 Create a substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the proposed project	Potentially significant	**Mitigation Measure 4a** (see above) **Mitigation Measure 8a** (see above) **Mitigation Measure 8b:** Prior to issuance of demolition, grading and/or building permits for each construction phase, Castilleja School shall submit to the City a technical analysis of the noise levels that could be generated during construction and recommended measures to ensure that noise levels during construction meet the City's standards. This analysis must	Less than significant

Table 1-2
EIR Impacts and Mitigation Measures Summary

Impact	Significance Before Mitigation	Mitigation	Significance After Mitigation
		include and be based on a list of the construction equipment proposed to be used (including horsepower), a schedule for the use of each piece of equipment during that phase, and the general location where each piece of equipment would operate. Noise reduction measures may include modifying the equipment list, restrictions on the number of individual pieces of equipment that may be used at one time, modifying the location of individual pieces of equipment, providing shielding for individual pieces of equipment, use of temporary noise attenuation barriers, and/or other measures that are demonstrated to be sufficient to ensure that the maximum noise level at the property boundary would remain at or below 110 dB and increases in hourly noise levels at the property boundary would not exceed 10 dBA above the ambient noise level for two or more hours per day, more than five days per week, for a period of 12 months or more.	
8-3 Expose people to or generate excessive ground borne vibrations or ground borne noise levels	Potentially significant	**Mitigation Measure 6a** (see above)	Less than significant
8-4 Expose people to noise levels that exceed established noise standards or generate a substantial permanent increase in ambient noise levels in cumulative plus project conditions	No Impact	None required	No Impact
Air Quality			
9-1 Conflict with or obstruct implementation of the applicable air quality plan.	Potentially significant	**Mitigation Measure 9a:** Prior to issuance of demolition permits, grading permits, or building permits for the proposed project, the City of Palo Alto shall ensure that site plan notes include requirements for the construction contractor to implement the following Basic Construction Emission Control Measures. Visual	Less than significant

Table 1-2
EIR Impacts and Mitigation Measures Summary

Impact	Significance Before Mitigation	Mitigation	Significance After Mitigation
		site inspections shall be conducted throughout construction to ensure these measures are implemented appropriately: A. All exposed surfaces shall be watered two times daily. Exposed surfaces include, but are not limited to parking and staging areas, soil piles, graded areas, and unpaved access roads. B. Haul trucks transporting soil, sand, or other loose material off-site shall be covered. C. Wet power vacuum street sweepers shall be used to remove any visible trackout of mud or dirt onto adjacent public roads at least once a day. Use of dry power sweeping is prohibited. D. Vehicle speeds on unpaved roads to shall be limited to a maximum of 15 miles per hour. E. All roadways, driveways, sidewalks, and parking lots to be paved shall be completed as soon as possible. In addition, building pads shall be laid as soon as possible after grading unless seeding or soil binders are used. F. Idling times shall be minimized either by shutting equipment off when not in use or reducing the maximum idling time to 5 minutes (as required by the California airborne toxics control measure Title 13, Section 2485 of California Code of Regulations [CCR]). Clear signage shall be provided for construction workers at all access points. G. All construction equipment shall be maintained and properly tuned in accordance with manufacturer's specifications. All equipment shall be checked by a certified mechanic and determined to be running in proper condition prior to operation. H. The construction contractor shall post a publicly visible sign with the telephone number and person to contact at	

Table 1-2
EIR Impacts and Mitigation Measures Summary

Impact	Significance Before Mitigation	Mitigation	Significance After Mitigation
		the City of Palo Alto regarding dust complaints. This person shall respond and take corrective action within 48 hours. The BAAQMD phone number shall also be visible.	
9-2 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	None required	Less than significant
9-3 Expose sensitive receptors to substantial pollutant concentrations	Potentially significant	**Mitigation Measure HAZ-1** (see Table 1-3)	Less than significant
9-4 Result in other emissions (such as those leading to odors) adversely affecting a substantial number of people.	Less than significant	None required	Less than significant
Greenhouse Gas Emissions			
10-1 Generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment	Less than significant	None required	Less than significant
10-2 Conflict with an applicable plan, policy, or regulation adopted for the purpose of reducing the emission of greenhouse gases	Less than significant	None required	Less than significant
10-3 Make a cumulatively considerable contribution to emissions of greenhouse gases in the cumulative scenario	Less than significant	None required	Less than significant

Table 1-2
EIR Impacts and Mitigation Measures Summary

Impact	Significance Before Mitigation	Mitigation	Significance After Mitigation
		Energy	
11-1 Result in wasteful, inefficient, or unnecessary consumption of energy	Less than significant	None required	Less than significant
11-2 Conflict with existing energy standards and regulations	Less than significant	None required	Less than significant
		Geology, Soils, and Seismicity	
12-1 Exposure to hazards involving rupture of a known earthquake fault, strong seismic ground shaking, seismic-related ground failure including liquefaction, or landslides	Potentially Significant	**Mitigation Measure 12a:** Project design and construction shall show compliance with and implement all of the recommendations contained in the geotechnical investigation prepared by Silicon Valley Soil Engineering in January 2017 or provide an acceptable equivalent to these measures to the satisfaction of the Director of Public Works Engineering in order to reduce hazards related to expansive soils and the stability of soil and landforms. These include but are not limited to: 1. the basement foundation system should use a concrete mat slab with a minimum thickness of 12 inches and underlain by 6 inches of ¾-inch clean crushed rock and waterproofed; 2. shoring shall be provided for trenches and excavation in excess of five feet in depth; 3. a geotechnical engineer shall be retained to observe and inspect all earthwork and grading; 4. within construction areas, organic materials shall be stripped from the soil and the soil shall be scarified by machine to a depth of 12 inches and thoroughly cleaned of vegetation and other deleterious matter; 5. soil shall be compacted to not less than 90 percent relative maximum density and moisture conditioned; and 6. a contingency dewatering plan shall be prepared that provides for collection of any surface runoff water and	Less than significant

Table 1-2
EIR Impacts and Mitigation Measures Summary

Impact	Significance Before Mitigation	Mitigation	Significance After Mitigation
		perched groundwater and use of the water as approved by the City and consistent with the City's dewatering requirements, such as for on-site dust suppression, street-sweeping, and other City programs.	
12-2 Location on a geologic unit or soil that is unstable or that would become unstable as a result of the project, and potentially result on-site or off-site landslide, lateral spreading, excessive expansion, subsidence, liquefaction, or collapse	Potentially Significant	**Mitigation Measure 12a:** (see above)	Less than significant
12-3 Substantial erosion or loss of topsoil	Less than significant	None required	Less than significant
12-4 Substantially alter existing landforms	Potentially significant	**Mitigation Measure 12a:** (see above)	Less than significant
12-5 Directly or indirectly destroy paleontological resources	Potentially significant	**Mitigation Measure 12b:** A discovery of a paleontological specimen during any phase of the project shall result in a work stoppage in the vicinity of the find until it can be evaluated by a professional paleontologist. Any paleontological resource discovered on site should be either preserved at its location or adequately documented as a condition of removal. Should loss or damage be detected, additional protective measures or further action (e.g., resource removal), as determined by a professional paleontologist, shall be implemented to ensure that the information potential represented by the resource is retained.	Less than significant
12-6 Substantially contribute to cumulative impacts associated with geology, seismicity, soils and paleontological resources	No Impact	None required	No Impact

Table 1-3
Initial Study Impacts and Mitigation Measures Summary

Impact	Significance Before Mitigation	Mitigation	Significance After Mitigation
Agriculture and Forestry Resources			
II.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	None required	No Impact
II.b Conflict with existing zoning for agricultural use, or a Williamson Act contract	No Impact	None required	No Impact
II.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	None required	No Impact
II.d Result in the the loss of forest land or conversion of forest land to non-forest use	No impact	None required	No Impact
II.e Involve other changes in the existing environment which, due to their location or nature, could result in conversion of Farmland, to non-	No impact	None required	No Impact

Table 1-3
Initial Study Impacts and Mitigation Measures Summary

Impact	Significance Before Mitigation	Mitigation	Significance After Mitigation
agricultural use or conversion of forest land to non-forest use			
Biological Resources			
IV.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 Game or U.S. Fish and Wildlife Service	Less than Significant with Mitigation Incorporated	**Mitigation Measure BIO-1:** If feasible, vegetation on the project site shall be removed outside of the bird-nesting season. If the start of site clearing, tree removal, or building demolition occurs between February 1 and August 31, a pre-construction survey for nesting birds protected under the Migratory Bird Treaty Act shall be conducted by a qualified biologist to identify the location of nests in active use that were established prior to the start of project implementation activities. The pre-construction survey shall take place no more than 7 days prior to initiation of construction. All trees and shrubs on the site and on adjacent properties shall be surveyed, with particular attention to any trees or shrubs that would be removed or directly disturbed. If an active nest of a protected bird is found on site, the biologist shall, in consultation with the California Department of Fish and Wildlife (CDFW), determine whether construction work would affect the active nest or disrupt reproductive behavior. Criteria used for this evaluation shall include presence of visual screening between the nest and construction activities, and behavior of adult birds in response to the surveyors or other ambient human activity. If construction could affect the nest or disrupt reproductive behavior, the biologist shall, in consultation with CDFW, determine an appropriate construction-free buffer zone around the nest to remain in place until the young have fledged or other appropriate protective measures are taken to ensure no take of protected species occurs. If it is determined that construction will affect an active raptor nest or disrupt reproductive behavior, then avoidance is the only mitigation available. Construction shall not be permitted within	Less than Significant

Table 1-3
Initial Study Impacts and Mitigation Measures Summary

Impact	Significance Before Mitigation	Mitigation	Significance After Mitigation
		300 feet of such a nest until a qualified biologist determines that the subject nests are no longer active. Prior to issuance of a demolition permit or tree removal permit, the City of Palo Alto (City) shall verify that pre-construction surveys have been conducted within 10 days of the proposed start of demolition. If active bird nests are present, the City shall verify that CDFW has been consulted and either determined that construction will not affect an active bird nest or that appropriate construction-free buffer zones have been established or other appropriate protective measures have been taken. **Mitigation Measure BIO-2:** No earlier than 30 days prior to initiation of demolition activities, a pre-construction survey shall be conducted by a qualified biologist (i.e., a biologist holding a California Department of Fish and Wildlife (CDFW) collection permit and a Memorandum of Understanding with CDFW allowing the biologist to handle bats) to determine if active bat roosts or maternal colonies are present on or within 300 feet of the demolition area. Should an active maternity roost be identified, the roost shall not be disturbed and demolition and construction within 300 feet of the maternity roost shall be postponed or halted until the juveniles have fledged and the roost is vacated, as determined by a qualified biologist. Consultation with CDFW shall also be initiated. Under no circumstance shall an active roost be directly disturbed. If nonbreeding bat hibernacula are found on the project site, the individuals shall be safely evicted under the direction of a qualified bat biologist and with consultation with CDFW. These actions shall allow bats to leave during nighttime hours, thus increasing their chance of finding new roosts with a minimum of potential predation during daylight.	

Table 1-3
Initial Study Impacts and Mitigation Measures Summary

Impact	Significance Before Mitigation	Mitigation	Significance After Mitigation
		If it is determined that demolition or construction will not affect roosting behavior or disrupt a maternal colony, demolition or construction may proceed without any restriction or mitigation measure. If it is determined that demolition or construction will affect an active bat roost or disrupt reproductive behavior, then avoidance is the only mitigation available. Under no circumstance shall an active roost be directly disturbed. Demolition or construction within 300 feet shall be postponed or halted until the roost is naturally vacated as determined by a qualified biologist. Prior to issuance of a demolition permit, the City of Palo Alto (City) shall verify that pre-construction surveys have been conducted within 30 days of the proposed start of demolition. If bats are present, the City shall verify that CDFW has been consulted and either determined that construction will not affect an active bat roost or disrupt a maternal colony, or that individuals in a nonbreeding bat hibernacula have been safely evicted. Due to regulations from the California Health Department, direct contact by construction workers with any bat is not allowed.	
IV.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 Game or U.S. Fish and Wildlife Service	No Impact	None required	No Impact
IV.c Have a substantial adverse effect on federally protected wetlands as defined by Section 404 of the Clean Water Act	No Impact	None required	No Impact

Table 1-3
Initial Study Impacts and Mitigation Measures Summary

Impact	Significance Before Mitigation	Mitigation	Significance After Mitigation
(including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means			
IV.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	None required	Less than Significant
IV.e Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance	Potentially Significant	See Impact 4-3 in Table 1-2 and Chapter 4, Land Use and Planning	
IV.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	None required	No Impact
Geology and Soils			
VI.e Have soils incapable of adequately supporting the use of septic tanks or alternative waste water disposal systems where sewers are not available for the disposal of waste water [Note items VI.a through VI.d are addressed in Table 1-2 and Chapter	No Impact	None required	No Impact

Table 1-3
Initial Study Impacts and Mitigation Measures Summary

Impact	Significance Before Mitigation	Mitigation	Significance After Mitigation
12, Geology, Soils, Seismicity, and Paleontology.]			
		Hazards and Hazardous Materials	
VIII.a Create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials	Less than Significant with Mitigation Incorporated	**Mitigation Measure HAZ-1:** Prior to building demolition, the project applicant shall demonstrate to the satisfaction of the City of Palo Alto that a survey of the existing buildings has been conducted by a qualified environmental specialist who meets the requirements of the current U.S. Environmental Protection Agency regulations for suspected lead-containing materials (LCMs), including lead-based paint/coatings; asbestos containing materials (ACMs); and the presence of polychlorinated biphenyls (PCBs). Any demolition activities likely to disturb LCMs or ACMs shall be carried out by a contractor trained and qualified to conduct lead- or asbestos-related construction work. If found, LCMs and ACMs shall be disposed of properly. If PCBs are found, these materials shall be managed in accordance with the Metallic Discards Act of 1991 (California Public Resources Code, Sections 42160–42185) and other state and federal guidelines and regulations. Demolition plans and contract specifications shall incorporate any necessary abatement measures in compliance with the Metallic Discards Act, particularly Section 42175, Materials Requiring Special Handling, for the removal of mercury switches, PCB-containing ballasts, and refrigerants.	Less than Significant
VIII.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 with Mitigation Incorporated	**Mitigation Measure HAZ-1:** (see above)	Less than Significant
VIII.c Emit hazardous emissions or handle hazardous or acutely	Less than Significant with Mitigation Incorporated	**Mitigation Measure HAZ-1:** (see above)	Less than Significant

Table 1-3
Initial Study Impacts and Mitigation Measures Summary

Impact	Significance Before Mitigation	Mitigation	Significance After Mitigation
hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school			
VIII.d Be located on a site that 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	None required	No Impact
VIII.e For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project result in a safety hazard for people residing or working in the project area	No Impact	None required	No Impact
VIII.f For a project within the vicinity of a private airstrip, would the project result in a safety hazard for people residing or working in the project area	Less than Significant	None required	Less than Significant
VIII.g Impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan	Potentially Significant	See Impact 7-5 in Table 1-2 and Chapter 7, Transportation	
VIII.h Expose people or structures to a significant risk of loss, injury or death involving wildland fires, including where wildlands are	No Impact	None required	No Impact

Table 1-3
Initial Study Impacts and Mitigation Measures Summary

Impact	Significance Before Mitigation	Mitigation	Significance After Mitigation
adjacent to urbanized areas or where residences are intermixed with wildlands			
Hydrology and Water Quality			
IX.a Violate any water quality standards or waste discharge requirements	Less than Significant	None required	Less than Significant
IX.b Substantially deplete groundwater supplies or interfere substantially with groundwater recharge such that there would be a net deficit in aquifer volume or a lowering of the local groundwater table level (e.g., the production rate of pre-existing nearby wells would drop to a level which would not support existing land uses or planned uses for which permits have been granted)	No Impact	None required	No Impact
IX.c Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, in a manner which would result in substantial erosion or siltation on- or off-site	Less than Significant	None required	Less than Significant
IX.d Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, or substantially increase the rate or	Less than Significant	None required	Less than Significant

Table 1-3
Initial Study Impacts and Mitigation Measures Summary

Impact	Significance Before Mitigation	Mitigation	Significance After Mitigation
amount of surface runoff in a manner which would result in flooding on- or off-site			
IX.e 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	No Impact	None required	No Impact
IX.f Otherwise substantially degrade water quality	Less than Significant	None required	Less than Significant
IX.g Place housing within a 100-year flood hazard area as mapped on a federal Flood Hazard Boundary or Flood Insurance Rate Map or other flood hazard delineation map	No Impact	None required	No Impact
IX.h Place within a 100-year flood hazard area structures which would impede or redirect flood flows	No Impact	None required	No Impact
IX.i Expose people or structures to a significant risk of loss, injury or death involving flooding, including flooding as a result of the failure of a levee or dam	No Impact	None required	No Impact
IX.j Inundation by seiche, tsunami, or mudflow	No Impact	None required	No Impact
Land Use and Planning			
X.c Conflict with any applicable habitat conservation plan or natural community conservation plan	No Impact	None required	No Impact

Table 1-3
Initial Study Impacts and Mitigation Measures Summary

Impact	Significance Before Mitigation	Mitigation	Significance After Mitigation
[Note items X.a and X.b are addressed in Table 1-2 and Chapter 4, Land Use.]			
Mineral Resources			
XI.a Result in the loss of availability of a known mineral resource that would be of value to the region and the residents of the state	No Impact	None required	No Impact
XI.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	None required	No Impact
Noise			
XII.e For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project expose people residing or working in the project area to excessive noise levels	No Impact	None required	No Impact
XII.f For a project within the vicinity of a private airstrip, would the project expose people residing or working in the project area to excessive noise levels [Note items XII.a through XII.d are addressed in Table 1-2 and Chapter 8, Noise.]	No Impact	None required	No Impact

Table 1-3
Initial Study Impacts and Mitigation Measures Summary

Impact	Significance Before Mitigation	Mitigation	Significance After Mitigation
Population and Housing			
XIII.a Induce substantial population growth in an area, either directly (for example, by proposing new homes and businesses) or indirectly (for example, through extension of roads or other infrastructure	No Impact	None required	No Impact
XIII.b Displace substantial numbers of existing housing, necessitating the construction of replacement housing elsewhere	Less than Significant [see Initial Study revisions in Appendix A]	None required	Less than Significant
XIII.c Displace substantial numbers of people, necessitating the construction of replacement housing elsewhere	No Impact	None required	No Impact
Public Services			
XIV.a 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:	Less than significant	None required	Less than significant
Fire protection?	Less than Significant	None required	Less than Significant
Police protection?	Less than Significant	None required	Less than Significant

Table 1-3
Initial Study Impacts and Mitigation Measures Summary

Impact	Significance Before Mitigation	Mitigation	Significance After Mitigation
Schools?	No Impact	None required	No Impact
Parks?	No Impact	None required	No Impact
Other public facilities?	Less than Significant	None required	Less than Significant
Recreation			
XV.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	No Impact	None required	No Impact
XV.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	None required	No Impact
Utilities and Service Systems			
XVIII.a Exceed wastewater treatment requirements of the applicable Regional Water Quality Control Board?	Less than Significant	None required	Less than Significant
XVIII.b Require or result in the construction of new water or wastewater treatment facilities or expansion of existing facilities, the construction of which could cause significant environmental effects?	Less than Significant	None required	Less than Significant
XVIII.c Require or result in the construction of new storm water	Less than Significant	None required	Less than Significant

Table 1-3
Initial Study Impacts and Mitigation Measures Summary

Impact	Significance Before Mitigation	Mitigation	Significance After Mitigation
drainage facilities or expansion of existing facilities, the construction of which could cause significant environmental effects?			
XVIII.d Have sufficient water supplies available to serve the project from existing entitlements and resources, or are new or expanded entitlements needed?	Less than Significant	None required	Less than Significant
XVIII.e 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?	Less than Significant	None required	Less than Significant
XVIII.f Be served by a landfill with sufficient permitted capacity to accommodate the project's solid waste disposal needs?	Less than Significant	None required	Less than Significant
XVIII.g Comply with federal, state, and local statutes and regulations related to solid waste?	Less than Significant	None required	Less than Significant

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CHAPTER 2
INTRODUCTION

This environmental impact report (EIR) examines the potentially significant effects on the environment resulting from the proposed Castilleja School Project, as described in detail in Chapter 3, Project Description.

2.1 PURPOSE AND INTENDED USE OF THIS EIR

The City of Palo Alto (City) prepared this EIR in compliance with the requirements of the California Environmental Quality Act (CEQA) (California Public Resources Code Section 21000 et seq.), the CEQA Guidelines (14 California Code of Regulations (CCR) 15000 et seq.), and Title 15 of the City of Palo Alto Municipal Code. As provided under CEQA, an EIR is a tool for disclosing to the general public, the local community, responsible agencies, trustee agencies and other interested public agencies, and the City's recommending and decision-making bodies (Planning and Transportation Commission, Architectural Review Board, Historic Resources Board, and City Council) the potential significant environmental effects (i.e., impacts) resulting from implementation of the proposed project, as well as possible measures to mitigate those significant effects and alternatives to the proposed project that could avoid significant impacts. In a practical sense, an EIR functions as a method of fact-finding, allowing the lead agency, the public, and other public agencies an opportunity to review and evaluate baseline conditions and project impacts. The Draft EIR is not intended to serve as a recommendation of either approval or denial of the project. As lead agency, the City is responsible for the adequacy and objectivity of the draft EIR.

This Draft EIR provides the primary source of environmental information for the City and other public agencies to consider when exercising any permitting authority or approval power directly related to implementation of this project. As stated in CEQA Guidelines, Section 15121(a):

> An EIR is an informational document which will inform public agency decision-makers and the public generally of the significant environmental effect of the project, identify possible ways to minimize the significant effects, and describe reasonable alternatives to the project. The public agency shall consider the information in the EIR along with other information which may be presented to the agency.

2.2 TYPE OF EIR

This EIR provides a project-level analysis for the proposed Castilleja School Conditional Use Permit Amendment and phased development (referred to by the project applicant as their "Campus Master Plan"). The EIR analysis focuses primarily on the changes in the physical environment that would result from construction and operation of the project, as required by CEQA Guidelines Section 15168. This EIR identifies the environmental setting and regulatory framework under which the proposed Campus Master Plan would be implemented and presents mitigation measures that would be applied to each individual construction project undertaken in implementation of the project to ensure that impacts are reduced to the extent feasible. Where the analysis in this EIR determines that the project may result in a significant environmental effect, mitigation measures are provided, where feasible, to avoid, reduce, or compensate for those impacts. The mitigation measures identify clear performance standards that Castilleja School must achieve to reduce the identified impact.

Further, this EIR is consistent with the description of a Project EIR under CEQA Guidelines Section 15161. A project EIR examines the environmental impacts of a specific project. This type of EIR focuses on the changes in the environment that would result from implementation of the project, including construction and operation. As the lead agency for this project, the City is required to consider the information in the EIR along with any other available information in deciding whether to approve the project entitlements requested. The basic requirements for an EIR include providing information that establishes the environmental setting (or project baseline), and identifying environmental impacts, mitigation measures, project alternatives, growth-inducing impacts, and cumulative impacts. In a practical sense, an EIR functions as a method of fact-finding, allowing an applicant, the public, other public agencies, and agency staff an opportunity to collectively review and evaluate baseline conditions and project impacts through a process of full disclosure. Additionally, this EIR provides the primary source of environmental information for the lead agency to consider when exercising any permitting authority or approval power directly related to implementation of this project.

The Campus Master Plan anticipates a series of demolition and construction projects throughout the project site, proposed to be implemented in four discrete phases. The Master Plan defines footprints for structures, hardscape, and landscape area; student capacity for each phase; school programming characteristics; a Sustainability Plan; and a Transportation Demand Management Plan. It also includes construction-level improvement plans for the facility improvements included in the first and fourth phases.

Detailed construction plans for phases 2 and 3 would be submitted following the City Council's action on the requested entitlements. City staff would review the proposed plans to ensure that they are consistent with the assumptions, impact analyses, and mitigation measures presented in this EIR, including the Initial Study (Appendix A).

2.3 LEAD, RESPONSIBLE, AND TRUSTEE AGENCIES

As required by CEQA, this EIR defines lead, responsible, and trustee agencies. The City is the lead agency for the project because it holds principal responsibility for approving the project. A responsible agency is a public agency other than the lead agency that has discretionary approval over the project. As noted in Chapter 3, Project Description, each construction phase would require a National Pollutant Discharge Elimination System permit because each phase would disturb at least one acre of land. The National Pollutant Discharge Elimination System permit would be issued by the San Francisco Bay Regional Water Quality Control Board, thus this Board would serve as a responsible agency for this project. A trustee agency is defined as a state agency that has jurisdiction by law over natural resources that are held in trust for the people of the state. As an example, the California Department of Fish and Wildlife would be a trustee agency if the project required disturbance to land within the banks of a stream or other feature that supports riparian vegetation because such actions would require the issuance of a Streambed Alteration Agreement. The project site does not support any resources that fall within the jurisdiction of a trustee agency.

2.4 SCOPE OF THE EIR

The scope of this EIR includes analysis of environmental issues identified as potentially significant in the Notice of Preparation (NOP) and submitted as comments on the NOP (see Appendix A for the NOP and comment letters in response to the NOP). This EIR evaluates the direct impacts, reasonably foreseeable indirect impacts, and cumulative impacts resulting from planning, construction, and operation of the proposed project in accordance with the provisions set forth in the CEQA Guidelines. All of the following environmental resource areas are evaluated in this EIR:

- Land Use and Planning
- Aesthetics
- Cultural Resources
- Transportation and Circulation
- Noise
- Air Quality
- Greenhouse Gas Emissions
- Energy Consumption and Conservation
- Geology, Soils, Seismicity, and Paleontology

As documented in the Initial Study circulated with the NOP for this EIR and summarized here, there are several environmental resource areas for which the project is expected to have no impacts or impacts that would be reduced to less than significant levels with implementation of mitigation. The mitigation measures identified in the Initial Study are identified in Table 1-3 in Chapter 1, Executive Summary, and will be incorporated in the Mitigation Monitoring and Reporting Program for the project.

- There are no agricultural or forestry resources located on or adjacent to the site. There are no known mineral resources located on or adjacent to the site and the site is not zoned for mineral extraction. The project would have no impacts associated with these resources and these topics are not addressed in this EIR.

- Impacts to biological resources would remain less than significant with implementation of Mitigation Measures BIO-1 and BIO-2 as identified in the Initial Study and presented in Table 1-2, and thus, this topic is not addressed in this EIR. The project site does not contain any habitats or biological resources with the potential to support any plant or wildlife species that are designated as threatened or endangered; however, there is potential for nesting birds to be present in trees on site that are proposed for removal or may be trimmed or otherwise affected by construction and there is potential for roosting bats to be present within the existing buildings proposed to be demolished. Mitigation Measures BIO-1 and BIO-2would ensure that impacts remain less than significant by requiring the project applicant to conduct surveys and follow bird and/or bat protection protocols. The project site does not contain any riparian habitat, sensitive natural community, or federally protected wetlands, does not function as a potential wildlife movement corridor or habitat linkage, and is not subject to a Habitat Conservation Plan or Natural Community Conservation Plan. The project would have no impacts associated with these types of biological resources or regulatory guidance. The project would require removal of trees regulated under the City's Tree Ordinance; these impacts are evaluated in Chapter 4, Land Use.

- Impacts associated with hazards and hazardous materials would remain less than significant with implementation of Mitigation Measure HAZ-1 as identified in the Initial Study and presented in Table 1-2, and thus, this topic is not addressed in this EIR. The project site is not identified as a site where previous releases of hazardous materials have occurred. The project would involve the use of hazardous materials during construction and as part of routine property maintenance. Use, transportation and disposal of these materials would be required to comply with all local, state and federal regulations, which would ensure that potential impacts associated with their use would remain less than significant. The buildings proposed to be demolished may contain asbestos, lead-based paints, polychlorinated biphenyls, and other hazardous building materials that could be released into the environment during demolition. Mitigation Measure HAZ-1, as identified in the Initial Study, would reduce the impact to a less than significant level by requiring that a building survey be completed to identify any hazardous materials and that measures for the containment and safe handling of such materials, consistent with regulatory requirements, are identified on construction and demolition plans.

- No significant impacts to hydrology and water quality would occur, and thus, this topic is not addressed in this EIR. The project would not result in a substantial increase in impervious surface at the project site; it would increase the amount of open space within the project site by 12,257 square feet. The proposed site plans include bio-retention basins and other Best Management Practices to collect and treat all stormwater runoff from the project site. If the project is approved, staff of the City of Palo Alto Planning and Community Environment Department and Public Works Department would review the detailed building, drainage, and landscaping plans prior to issuance of grading and building permits to ensure that the project complies with all city, state and federal standards pertaining to stormwater runoff and water quality, including the requirements of the Regional Municipal Stormwater Permit and the City's standard conditions of approval regarding the use of best management practices.

- No significant impacts to population and housing would occur, and thus, this topic is not addressed in this EIR. The Initial Study incorrectly stated that the project would not demolish any residential units. The project would demolish the Lockey House, which was originally in residential use but is currently used to support school functions and programming. The project would also demolish a single-family residence that is currently used as rental housing. Thus the project would result in a less than significant impact associated with a substantial loss of housing. The Initial Study has been revised for accuracy. The revisions are shown in redline/strikethrough format in Appendix A. The project would not construct new housing, would not generate a substantial number of new jobs, and would not induce population growth in the area.

- No significant impacts to public services, recreation, or utilities and service systems would occur, and thus, these topics are not addressed in this EIR. The project would not construct new housing, would not generate a substantial number of new jobs, and would not induce population growth in the area, thus it is not expected to increase the demand for public services and utilities. As noted in Chapter 3 Project Description, the project proposes to relocate an existing utilities easement (formerly Melville Avenue right-of-way) to accommodate construction of the below-grade parking garage and of a pedestrian tunnel between the garage and the central part of the campus, with access located between the athletic center and chapel. The relocation of the easement is not expected to result in any environmental effects.

In addition, the EIR recommends potentially feasible mitigation measures, where possible, and considers project alternatives that would reduce or eliminate significant adverse environmental effects. As shown in Table 1-2 in Chapter 1, Executive Summary, the proposed project is expected to result in one significant and unavoidable impact related to land use, two significant and unavoidable impacts related to traffic, and 14 significant impacts requiring mitigation in the areas of land use and planning, aesthetics, cultural resources, transportation, noise, air quality, and geology, soils, seismicity, and paleontology. These impacts would be reduced to less than significant levels with implementation of the mitigation measures included in this Draft EIR.

The alternatives chapter of the EIR (Chapter 13, Project Alternatives) was prepared in accordance with Section 15126.6 of the CEQA Guidelines. The alternatives analyzed in this EIR in addition to the proposed project are briefly described below. Refer to Chapter 13 for additional description of the alternatives, reasons why these were selected for analysis, and evaluation of the relative impacts of each.

1. **Alternative 1: No Project Alternative.** This alternative assumes no development would occur, and the site would remain in its current condition. All buildings and other site improvements would be retained at existing locations, and the smaller R-1 zoned parcels (7,500 square feet and 10,500 square feet) parcels would not be merged with the existing campus parcel. The school would continue to operate under the existing Conditional Use Permit, which would require reducing enrollment to 415 students from the existing enrollment of 434 students.
2. **Alternative 2: Moderate Enrollment Increase.** This alternative seeks to reduce the impacts of the proposed project associated with traffic by establishing a maximum enrollment of 506 students, which is 36 fewer students than the proposed project and would require that the new academic building include 30 classrooms rather than the 32 classrooms that are proposed. The number of off-street parking spaces would also be slightly reduced commensurate with the reduction in the number of classrooms but would still be greater than that required by code. The parking garage would contain 115 parking spaces, the surface parking lot along Bryant Street would contain 14 spaces, and the surface parking lot at the corner of Emerson Street and Kellogg Avenue would contain 4 spaces.
3. **Alternative 3: Moderate Enrollment Increase with Reduced Parking.** This alternative would also seek to reduce the impacts of the proposed project associated with traffic and noise and preserve the existing single-family residence at 1263 Emerson Street by establishing a maximum enrollment of 506 students and reducing the amount of on-site parking. In addition, under Alternative 3, the minimum amount of parking required by the Palo Alto Municipal Code would be provided; the below-grade parking garage would contain 52 parking spaces, the surface parking lot along Bryant Street would contain 14 spaces, and the surface parking lot at the corner of Emerson Street and Kellogg Avenue would contain 26 spaces.

2.5 ENVIRONMENTAL REVIEW PROCESS

This EIR has been prepared to meet all of the substantive and procedural requirements of CEQA. As the lead agency, the City has primary responsibility for conducting the environmental review and approving or denying the project. The City may use this EIR to approve the proposed project, make findings regarding identified impacts, and, if necessary, adopt a statement of overriding considerations regarding these impacts.

Notice of Preparation

To initiate the EIR process, the City circulated an NOP to solicit agency and public comments on the scope of the environmental analysis to be included in the EIR. The public review period for the NOP began on January 23, 2017, and comments were received through May 12, 2017. The NOP was submitted to the Santa Clara County Clerk Recorder and the Governor's Office of Planning and Research State Clearinghouse. It was also posted on the City's website.

The City held a public scoping session on March 8, 2017. The purposes of this scoping session were to provide the public and governmental agencies with information on the proposed project and the CEQA process and to give attendees an opportunity to identify environmental issues that should be considered in the EIR. Verbal comments were received from 40 members of the public at this meeting. Attendees were also invited to mail or email their comment letters to the City during the NOP public review period.

The City received 101 comment letters, which included comments from the public as well as from the California Department of Toxic Substances Control. The NOP, Initial Study, and comments received in response to the NOP are provided in Appendix A. The comments addressed the following general topics:

- Traffic – the project's effects on trip generation, traffic volumes within the neighborhood, changes in traffic distribution, congestion on Embarcadero and other roadways in the vicinity, operation of the proposed parking garage, use of the Circle for deliveries, and disruption to traffic flow during construction

- Bicycle traffic and safety – effects of construction and operation of the project on the Bryant Street Bike Boulevard, effects of the project on bicycle safety in the vicinity

- Tree loss and protection – the extent of tree loss, the viability of transplanting existing trees

- Land use – compatibility of the school with the surrounding R1 neighborhood; adequacy of the project site to support the proposed increase in enrollment

- Population and housing – proposal to demolish two dwelling units

- Aesthetics – compatibility of the proposed buildings, tree loss, and the scale and massing of the project with the surrounding R1 neighborhood, appearance of the garage, proposed setbacks and building heights

- Historic resources – requesting analysis of whether the Lockey House is a historic resources and the degree to which the project would adversely affect historic resources

- Noise – noise effects to surrounding neighbors during construction and resulting from the proposed increase in enrollment, the parking garage, and truck traffic to the site (deliveries, garbage pickup)

- Hazards – potential presence of hazardous materials within the buildings to be demolished and in the soil to be disturbed

- Air quality and climate change – emissions of air pollutants and greenhouse gases during construction and generated by vehicle traffic and garage operations

- Public services and utilities – potential for increased enrollment to increase demands for services, reduction in size of the utility easement where Melville Street previously extended into the site

- Geology, soils, and seismic hazards – adequacy of the geotechnical analysis assessment of the potential for the project to increase seismic hazards in the vicinity, potential for subsidence, the extent of soil displacement

- Hydrology and water quality – potential need for dewatering during construction, increases in stormwater runoff, reductions in water quality, flooding at the Embarcadero underpass

- Alternatives – relocate campus, split campus, omit garage, avoid demolishing two homes, relocate Lockey House, return to maximum enrollment of 415 students, omit all underground work, satellite parking with increased shuttles, reduce number of events onsite, retain more

Draft EIR

CEQA requires that a Draft EIR be available for public review for a minimum of 45 days. However, given the degree of public interest in the project, timing for release of the Draft EIR, and the anticipated public hearing schedule, the City is providing a 60-day public review period. In accordance with Section 15087 of the CEQA Guidelines, the City published a Notice of Availability of the Draft EIR at the same time it submitted a Notice of Completion and copies of the Draft EIR to the State Clearinghouse to initiate the public review period. Comments on the adequacy of the Draft EIR and the City's compliance with CEQA may be submitted in writing to the City, as lead agency, prior to the end of the public review period. During the public review period, the City's Planning Commission will hold a public workshop to receive public comments on the Draft EIR.

Final EIR

Following the close of the public review period for this Draft EIR, the City will prepare a Final EIR, which will include written responses to all comments received during the Draft EIR public review period. The Final EIR will consist of the Draft EIR, comments received during the public review period, responses to those comments, and any revisions to the Draft EIR as a result of agency comments and public comments. The Final EIR must be certified before it can be used as the basis for decision making.

Findings and Statement of Overriding Considerations

Pursuant to CEQA Guidelines, Section 15091, no public agency shall approve or carry out a project for which a certified EIR identifies one or more significant effects of that project unless the public agency makes one or more of the following findings, which must be supported by substantial evidence in the record:

- Changes or alterations have been required in, or incorporated into, the project that avoid or substantially lessen the significant environmental effect as identified in the Final EIR.
- Such changes or alterations are within the responsibility and jurisdiction of another public agency and not the agency making the finding. Such changes have been adopted by such other agency or can and should be adopted by such other agency.
- Specific economic, legal, social, technological, or other considerations make the mitigation measures or project alternatives identified in the Final EIR unfeasible.

CEQA requires that the City Council first certify the Final EIR before considering whether to approve the proposed project and make the required findings to approve the proposed project if the EIR finds that the project would result in a significant environmental impact that cannot be mitigated to a less than significant level.

Mitigation Monitoring and Reporting Program

Pursuant to Section 15097 of the CEQA Guidelines, if the City Council approves the proposed project and the EIR identifies significant impacts and mitigation measures, the City must adopt a mitigation monitoring and reporting program (MMRP). The purpose of the MMRP is to ensure compliance with required mitigation during implementation of the project. An MMRP defines the requirements for monitoring and reporting on the implementation of revisions to the project or compliance with conditions of approval that the lead agency has required as mitigation measures to lessen or avoid significant environmental effects. The MMRP will be prepared concurrently with the Final EIR.

EIR Adequacy

The level of detail contained in this EIR is consistent with Section 15151 of the CEQA Guidelines, which states the following:

> An EIR should be prepared with a sufficient degree of analysis to provide decision makers with information which enables them to make a decision which intelligently takes account of the environmental consequences. An evaluation of the environmental effects of a proposed project need not be exhaustive, but the sufficiency of an EIR is to be reviewed in the light of what is reasonably feasible. Disagreement among experts does not make an EIR inadequate, but the EIR should summarize the main points of disagreement among the experts. The courts have looked not for perfection but for adequacy, completeness, and a good faith effort at full disclosure.

2.6 DOCUMENT ORGANIZATION

This EIR was designed for easy use and reference. To help the reader locate information of particular interest, a brief summary of the contents of each section of the EIR is provided:

- **Executive Summary (Chapter 1)** – Includes a summary of impacts and mitigation measures proposed by the project in a table format.
- **Introduction (Chapter 2)** – Provides a brief background description for the project and description of the EIR, including its purpose, intended use, type, scope, and standards for adequacy; and identification of lead, responsible, and trustee agencies; a description of the environmental review process; and a summary of how the document is organized.
- **Project Description (Chapter 3)** – Includes a discussion of the project site; a statement of project objectives; a general description of the project site's environmental characteristics, including proposed plans for development; and required agency approvals.
- **Environmental Analysis (Chapters 4 through 12)** – Includes a topic-by-topic analysis of baseline environmental conditions without the project and impacts that would or could result from development of the project. It also identifies potentially feasible mitigation measures that, if adopted, would reduce the level of significance of environmental impacts. The results of field visits, and data collection, and the findings of technical reports are included in the analysis.

- **Project Alternatives (Chapter 13)** – Includes an assessment of alternative methods for accomplishing most of the basic objectives of the proposed project while avoiding or substantially lessening at least one significant impact of the project. This assessment provides information for decision makers to make a reasoned choice among potentially feasible alternatives based on comparing the impacts of the alternatives to the impacts of the proposed project.
- **Additional CEQA Analysis (Chapter 14)** – Includes a discussion of additional issues required by CEQA, including significant unavoidable adverse impacts, irreversible environmental changes, growth inducement, and energy consumption. The analysis of cumulative impacts is included in the technical analysis contained in Chapters 4 through 12.
- **EIR Preparers (Chapter 15)** – Lists the organizations and individuals involved in the preparation of the EIR.
- **Appendices** – Contains reference items and reports providing support and documentation of the analysis presented in the EIR:
  - **Appendix A**: Notice of Preparation, Initial Study, and comments in response to the Notice of Preparation
  - **Appendix B**: Project Materials:
    - Appendix B1 Castilleja Campus Master Plan plan set, March 2018
    - Appendix B2 Castilleja School Architectural Review Board Resubmission #1, July 2019
    - Appendix B3 Transportation Demand Management Program (existing and supplemental programs, with Exhibit 1 monitoring memorandum)
    - Appendix B4 Sustainability Road Map
    - Appendix B5 Special Events Calendar
  - **Appendix C:** Tree Inventory and Arborist Report
  - **Appendix D:** Project Site Historic Resources Evaluation
  - **Appendix E:** Traffic Impacts Analysis
  - **Appendix F:** Noise Assessment
  - **Appendix G:** Air Quality and Greenhouse Gas Emissions Modeling
  - **Appendix H:** Geotechnical Site Investigation

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CHAPTER 3
PROJECT DESCRIPTION

This chapter defines existing conditions at the project site and the surrounding areas (section 3.1), summarizes land use and zoning designations for the project site (section 3.2), identifies project objectives (section 3.3), provides a detailed description of the proposed Castilleja School Project (proposed project) (section 3.4), and identifies entitlements and approvals that have been requested by the owner/applicant, the Castilleja School Foundation ("Castilleja" or "Castilleja School") to allow implementation of the proposed project (section 3.5). Figures are provided to facilitate a thorough understanding of the project's regional location, site characteristics, and components. The description of the project included in this chapter sets forth the characteristics upon which the evaluation of potential impacts in this draft Environmental Impact Report (EIR) is based. Portions of the project application materials are provided in Appendix B to this Draft EIR to facilitate the reader's understanding of the project details. This includes:

- Appendix B1 Castilleja Campus Master Plan plan set, March 2018
- Appendix B2 Castilleja School ARB Submittal, July 2019
- Appendix B3 Castilleja School Proposed Expanded TDM Plan, June 2016; Castilleja School adopted TDM Program, October 2013; Castilleja School TDM Plan Supplement Memo June 2019
- Appendix B4 Castilleja School Master Plan Sustainability Road Map, June 2016,
- Appendix B5 Castilleja School Special Events Calendar, March 2018

All of the project application materials are also available at the City of Palo Alto website:

https://cityofpaloalto.org/gov/topics/castilleja_school/project_documents_.asp

3.1 STUDY AREA CHARACTERISTICS

Project Location

The project site consists of three parcels, including the existing Castilleja School campus located at 1310 Bryant Street in Palo Alto, California and two separate adjacent parcels which are owned by Castilleja School but do not currently support classrooms or other academic facilities and activities. These parcels are located at 1235 and 1263 Emerson Street in Palo Alto, California. The project site is shown on Figure 3-1, Project Location, and Figure 3-2, Site and Vicinity. The project site encompasses three parcels identified as Assessor Parcel Numbers (APN) 124-12-034 (1310 Bryant Street), 124-12-031 (1235 Emerson Street), and 124-12-033 (1263 Emerson Street).

Project Site Description

The project site is relatively flat and is located within a residential neighborhood in an urbanized area of the City of Palo Alto zoned R-1 (10,000) and designated as Single Family Residential land use under the City's Comprehensive Plan (Palo Alto 2017). Single family homes are present on the west, south, and east sides of the project site while the four-lane main arterial thoroughfare of Embarcadero Road is adjacent to the northern site boundary. Bryant Street, alongside the campus, is a segment of Palo Alto's first bicycle boulevard. Other land uses in the project vicinity include residential uses under the R-2 zoning district, Palo Alto High School, a church, and Town and Country Village, a retail shopping center. The three parcels that comprise the project site are all zoned R-1(10,000) and owned by Castilleja School. The project site includes 286,783 square feet (6.58 acres). The parcel at 1310 Bryant Street (268,783 square feet) serves as the existing Castilleja School Campus, the parcel at 1263 Emerson Street (10,500 square feet) supports the Lockey Alumnae House, and the parcel at 1235 Emerson Street (7,500 square feet) supports a single family residential rental home.

As shown in Table 3-1, the project site currently supports approximately 122,318 square feet of above-grade building space (counted toward maximum gross floor area) and 43,913 square feet of below-grade building space (not counted toward maximum gross floor area), for a total of 166,231 square feet of usable space. There are also 74 parking stalls in at-grade lots accessed from Bryant Street, Kellogg Avenue, and Emerson Street. The majority of the existing buildings and improvements are located along the perimeter of the project site. These include the Campus Center building and the Gunn Administration building along Bryant Street; the new Academic building along both Bryant Street and Kellogg Avenue; and the rental house and Lockey alumnae house located along Emerson Street. The Elizabeth Hughes Chapel Theater building is located in the site interior, southeast of Spieker Field, which functions as a soccer and baseball field for the Castilleja School sports programs and is located in the northern portion of the site, adjacent to Embarcadero Road. The Leonard Ely Fine Arts Center building, a maintenance building, and a pool equipment building are located in the southern portion of the property, along Kellogg Avenue and Emerson Street. Other improvements within the campus include the Fitness and Athletic Center, an outdoor pool, and a large grassy circle generally in the center of the campus (the Circle), as shown in Figure 3-3, Existing Site Plan.

Habitats and Vegetation

The project site has been developed and operated as a school since the early 1900s. The project site does not contain any habitats or biological resources with the potential to support any plant or wildlife species designated as threatened or endangered, nor does the site contain any riparian habitat, sensitive natural community, or federally protected wetlands. However, there is potential for nesting birds to be present in on-site trees that are proposed for removal or may be trimmed or otherwise affected by construction, and there is a low potential for roosting bats to be present within the existing buildings. The Arborist Report prepared for the project (Appendix C) identified 174 trees that could be affected by the proposed project (128 trees located within the project site and 46 trees adjacent to the site). Due to safety concerns, one tree was removed at the end of 2016, under the authorization of a tree removal permit granted by the City Arborist. Figure 3-4, Existing Trees, identifies the trees within the project site and whether they are proposed to be retained, transplanted, or removed. Refer to Chapter 4, Land Use and Planning, for discussion of the potential for the tree removal and impacts associated with the project to conflict with the City's Tree Preservation Ordinance (Palo Alto 2018).

An additional arborist memo (Bench 2019) submitted in early June 2019 identifies that one additional tree (a large blue atlas cedar, tree #45) is diseased, dying, and structurally unstable, and therefore is recommended for removal. This removal is unrelated to the proposed project. The proposed building plans anticipated retention of this tree. Castilleja School has submitted a separate Architectural Review application for their proposed removal of tree #45.

Historic and Archaeological Resources

The project site contains nine buildings including the classroom building, four school program buildings (administration/chapel building, campus center, fine arts center, and athletic center), a residence that is used as rental housing, a second residential building that is used as the Lockey Alumnae house, a maintenance building and the pool building. The administration and chapel building is listed as a Category 3 resource on the City's Historic Resources Inventory. Four of the other buildings on the project site are more than 45 years old – the classroom building, the campus center, and the two residences. None of these are listed on any city, state or national inventory. The project site does not include the residential property at 1215 Emerson Street, which is a National Register of Historic Places and California Register of Historic Resources Eligible property on the same side of Emerson Street and within the same block as Castilleja's campus.

A Historic Resources Evaluation was completed for the project (Appendix D). It found that the administration-chapel building is eligible for listing on the California Register of Historic Resources and that none of the other buildings or features within the project site meet the eligibility criteria to be listed on the National Register of Historic Places, California Register of Historic Resources, or City of Palo Alto Inventory. Refer to Chapter 6, Cultural Resources, for discussion of the potential for the project to adversely affect historic resources within the project site.

Geology and Soils

The project site is located in an area subject to seismic events. The mapped faults closest to the site are San Andreas, Hayward and San Gregorio; they are located approximately 5.2 miles to the southwest, 13.7 miles northeast, and 15.6 miles southwest, respectively (Appendix H). The soils on the project site include properties susceptible to liquefaction and expansion. Refer to Chapter 12, Geology, Soils, Seismicity, and Paleontology for discussion of the specific types of soil present on the site, their effect on the proposed development, and the extent of excavation and grading necessary to construct the campus modifications anticipated under the proposed project, and potential exposure of structures and people within the project site to hazards associated with seismic activity.

Hydrology and Drainage

The project site lies in the north-central portion of the Santa Clara Valley. Matadero Creek is located approximately 2.5 miles to the southwest and Francisquito Creek is located approximately 2.5 miles to the north. These creeks drain from the Los Altos Hills region within the Santa Cruz Mountains south-southwest of the project site, and flow in a northeasterly direction towards the San Francisco Bay. The depth to groundwater ranges between 23 feet and 31 feet below the ground surface (Appendix H).

There are no streams or rivers located on or adjacent to the project site thus construction and operation of the project would not result in any changes to streams or rivers. The project site is not located within a 100-year flood hazard area nor is the project site located within a dam failure inundation area (Santa Clara County 2012). Refer to the Initial Study provided in Appendix A to this EIR for additional discussion of the project’s effects related to hydrology and water quality. The Initial Study determined that such effects would remain less than significant and thus they are not evaluated further in this EIR.

Hazards

The Phase I Environmental Site Assessment (ESA) prepared for the project site noted that two small underground storage tanks (UST) that contained fuel were removed from the site in the 1980s and early 1990s, respectively. There were no other recognized environmental conditions at or adjacent to the project site identified in the historical research performed for the project site and the project vicinity (Appendix H). The project site and surrounding properties are not included on the Department of Toxic Substance Control’s EnviroStor list of hazardous sites within California (DTSC 2017). As discussed in the Initial Study provided in Appendix A to this EIR, the proposed project is not expected to result in any adverse environmental effects associated with past releases of hazardous materials and associated soil and groundwater contamination in the project vicinity.

The proposed project involves demolition of four existing buildings that were constructed before 1968 (Appendix D). Given the date of construction, these buildings have potential to contain asbestos containing materials and lead-based paints. As discussed in the Initial Study provided in Appendix A to this EIR, Mitigation Measure HAZ-1 requires that surveys be conducted and proper disposal methods be followed to ensure that demolition of the existing buildings does not result in significant hazards to people in the project vicinity due to release or disposal of hazardous materials present within the buildings. The Initial Study determined that the project's effects related to hazards and hazardous materials would remain less than significant with implementation of Mitigation Measure HAZ-1 and thus these effects are not evaluated further in this EIR.

3.2 COMPREHENSIVE PLAN AND ZONING DESIGNATIONS

Project Site

The project site consists of three parcels totaling 6.58 acres. Each parcel is designated in the City of Palo Alto Comprehensive Plan as Single Family Residential land use, and is zoned R-1 (10,000). The development standards for the R-1 (10,000) zone include a minimum lot size of 10,000 square feet and maximum lot size of 19,999 square feet; front and rear yard setbacks of 20 feet and street side yard setback of 16 feet; maximum site coverage for multiple story development of 35 percent, with an additional 5 percent permitted to be covered by a patio or overhang; and maximum floor area ratio of 0.45 for the first 5,000 square feet of lot size and 0.30 for square footage of the lot size in excess of 5,000 square feet (Palo Alto 2018). No modifications to the existing land use and zoning designations are included in the proposed project. Refer to Chapter 4 for analysis of the project's consistency with the City's Comprehensive Plan and Municipal Code.

Under the city's zoning code, a Conditional Use Permit (CUP) is required for the operation of a private school use in the R-1 zone. Castilleja School currently is subject to an existing Conditional Use Permit (CUP 00-23) pertaining to the existing campus parcel at 1310 Bryant Street (Appendix B). This CUP controls the allowable uses of and the permitted facilities within the current campus parcel (such as the maximum student enrollment per year, types of special events, and the square footage and floor area of buildings within the campus).

Adjacent Parcels

The project site is located in a residential neighborhood, with single-family residences present to the west, south, and east. Embarcadero Road, a four-lane main arterial road, forms the northern boundary of the project site. Bryant Street borders the project to the east, Kellogg Avenue to the south, and Emerson Street to the west (see Figure 3-2). There is one residential parcel (the corner lot) that is not owned by Castilleja within the block formed by these streets. This parcel and all of the other properties surrounding the project site support single-family residences. These properties are designated in the City of Palo Alto Comprehensive Plan for Single Family Residential use and are zoned R-1 (10,000), consistent with the project site. Properties zoned R-2 are present one block southwest of the project site, along Alma Street. The Elizabeth Gamble Garden and Historic House site is located one block northeast of Castilleja School, at Waverley Street and Kellogg Avenue, on land zoned Public Facilities (PF). A lawn bowling green operated by Palo Alto Lawn Bowls, a private club, is adjacent to the Elizabeth Gamble Garden and Historic House, on land designated for Park use and zoned Public Facilities (PF).

3.3 PROJECT OBJECTIVES

Castilleja School has set forth the following objectives for the project:

1. Maintain a single integrated campus for the middle and upper school in the current location, while providing new structures that integrate state-of-the-art technology and teaching practices and retain flexibility to adapt to unanticipated changes.

2. Achieve better architectural compatibility with adjacent neighborhoods through a well-articulated building and improve site aesthetics and harmony with the surrounding neighborhoods through enhanced landscaping.

3. Increase enrollment to 540 students to allow more young women the unique opportunity to receive an all-girls education.

4. Increase on-site parking via an underground parking garage in order to reduce both parking visibility and surface parking spaces.

5. Improve vehicular, pedestrian, and bicycle access for students and staff through design efficiencies and a robust Transportation Demand Management Plan.

6. Ensure no increase in vehicle trips to and from the campus during AM and PM peak hours relative to recent (baseline) traffic volumes. Reduce the number of service deliveries and relocate deliveries within the campus and below grade, to decrease nuisance effects to neighbors.

7. Improve the campus's sustainability and energy efficiency by developing new facilities.

8. Phased development of the project to allow Castilleja School to continue to operate during construction and to reduce impacts on the neighborhood.

3.4 PROJECT DESCRIPTION

Castilleja School Foundation has submitted an application for (i) an amendment to the school's existing Conditional Use Permit (CUP), (ii) Architectural Review of a phased campus modification plan (referred to by the applicant as the Master Plan); (iii) a Tentative Map with Exception to merge two small parcels containing dwelling units with the larger parcel; (iv) a Variance for below-grade setback encroachments related to the proposed underground parking garage; and (v) a Variance to maintain existing floor-area-ratio to rebuild 84,124 square feet above grade in a different configuration. Additional discretionary approvals that would be necessary to allow the project to proceed are identified in Section 3.5.

The proposed amendment to the school's CUP and request for Architectural Review with Tentative Map with Exceptions and Variances would allow for an increase in the maximum enrollment cap and guide redevelopment of portions of the campus under a phased development plan. The phased construction would include removing five campus buildings and an existing pool (located at grade) and replacing them with an academic building, a below-grade parking structure, a new below-grade pool with sound wall, below-grade delivery and trash enclosures/waste pick-up, and reconstruction of the Circle in the center of the campus. The campus modification plan (which the applicant refers to as the Master Plan) includes an increase in the amount of open space on the project site, which includes an approximately 0.33-acre privately-owned open space that project site neighbors would be permitted to access.

The proposed campus modification plan anticipates development will occur in the following phases, as shown in Figure 3-5, Phasing Plan:

Phase 1. Demolish the two on-site residences and construct a below-grade parking structure under the merged parcels to accommodate 115 vehicles; re-route drop-off and pick-up through the garage with an entrance only ramp accessed from Bryant Street, an exit ramp egress onto Emerson Street, and a pedestrian tunnel from the garage to the central part of the campus, with access located between the athletic center and chapel; increase enrollment to a maximum of 490 students;

Phase 2. Establish a temporary campus by placing portable and/or modular buildings above the parking garage (on Spieker Field);

Phase 3. Demolish the Fine Arts Building; construct a below-grade pool with sound-attenuation barrier adjacent to Emerson Street; increase enrollment to a maximum of 520 students.

Phase 4: Demolish the existing classroom building, Campus Center building, the at-grade pool, pool equipment building, and maintenance building; reconstruct the Circle; construct new Academic building with adjacent bicycle parking and repair station, construct vehicle ramp to below-grade trash enclosure and service/loading area within the basement of the new Academic building; implement the proposed Sustainability Road Map (Appendix B), including reducing the number of food service deliveries by 10%; construct Emerson Park as a privately-owned open space area which project site neighbors would be permitted to access west of the Emerson Street exit ramp of the below-grade parking garage; remove temporary campus facilities and restore Spieker Field; increase enrollment to a maximum of 540 students.

Project Construction Schedule

Project construction is anticipated to occur in four phases, as described previously. Construction of the parking garage in Phase 1 is expected to take approximately 15 months. The temporary campus, which is Phase 2 of the campus modifications, would be established on the roof of the parking garage in the final 5 months of the 15-month construction period. Demolition of the Fine Arts building, construction of the new pool, and adjacent bike parking in Phase 3 is expected to require 9 months. There would be approximately 3 months of overlap between the end of Phase 1 and the beginning of Phase 2. Construction of the new Academic building is expected to begin at the same time as Phase 3, and thus would also overlap the end of Phase 1 by 3 months. Construction of the building is estimated to require 20 months. The total construction period is expected to span approximately 3 years.

Project Components

The proposed campus modifications are summarized in Table 3-1 and described in more detail in the following paragraphs. The proposed site plan is shown in Figure 3-6, Proposed Campus Plan.

Table 3-1
Existing Conditions and Proposed Campus Modifications

Project Component/Detail	Existing Project Site	Proposed Campus Modifications			Final Conditions
		Demolition	Retained Features	New Construction	
Gross Floor Area (above-grade building square footage)	**122,318 sf**	**90,593 sf**	**31,725 sf**	**84,124 sf**	**115,849 sf**
Fine Arts building		*5,868 sf*			
Maintenance		*1,901 sf*			
Campus Center		*33,600 sf*			
Academic building, including at-grade connection between library/arts and classroom wings		*42,000 sf*		*84,124 sf*	
Pool equipment building		*1,203 sf*		*[relocated below-grade]*	
Lockey House and rental house		*6,021 sf*			
Fitness/Athletic Facility			*13,944 sf*		
Administration/Chapel			*17,781 sf*		
Below grade basement square footage (not counted toward FAR)	**43,913 sf**	**14,726 sf**	**29,187 sf**	**98,979 sf**	**128,166**
Fitness/Athletic Facility			*19,661 sf*		
Administration/Chapel/Theater			*9,526 sf*		
Pool equipment building				*1,711 sf*	
Parking garage				*50,500 sf*	
Classroom building		*14,726 sf*		*46,768 sf*	
Total building square footage	**166,231 sf**				**244,015 sf**
Floor Area Ratio (FAR) (above grade)	0.43				0.40
Maximum Building Height	34’6”				30’
Vehicle Parking					
Underground	0 spaces			115 spaces	115 spaces
Surface Lots	74 spaces			Remove 47 spaces	27 spaces
Total vehicle parking spaces	**74 spaces**				**142 spaces**
Bicycle Parking					
Adjacent to athletic facility			61 spaces		61 spaces
Adjacent to library				35 spaces	35 spaces
Adjacent to pool				44 spaces	44 spaces
Total bicycle parking spaces					**140 spaces**
Site Coverage	22.8%				25.6%
Open Space (undeveloped area, including the 0.33 acre open space/private park area)	116,203 sf				128,460 sf

Source: Appendix B

Enrollment Cap

Enrollment records for the 2018/2019 school year show that the school enrolled 434 students and employed 109 permanent, year-round full time staff. The proposed Conditional Use Permit amendment would allow an increase in student enrollment from the current CUP cap of 415 students (and current enrollment of 434 students) to a maximum of 540 students over the course of a phased implementation plan. This would allow an increase of 125 students over the current CUP cap (which is an increase of 106 students as compared to current enrollment). The school anticipates that an additional 10 staff would be needed at full enrollment under the proposed CUP cap. Student enrollment would be increased by no more than 27 students each year contingent on the effective implementation of transportation demand measures included in the Transportation Demand Management (TDM) Plan to be implemented as part of the project, as well as specific physical improvements to the site. The proposed Transportation Demand Management Plan is included in Appendix B to this Draft EIR. It is also presented in Tab K of the Castilleja School Project application materials, which are available for review at the City's website. The proposed TDM Plan is supplemental to and an enhancement of the 2013 TDM Plan, which is currently in effect; the existing TDM Plan is also included in Appendix B to this Draft EIR.

The specific enrollment increase for each academic year would be determined based on the prior year enrollment. In other words, if in year 3, enrollment had increased by only 20 students, the additional 7 from the maximum increase of 27 students would not be carried over to the following year. Thus, the maximum increase in year 4 would remain at 27 students; the 7 surplus "spots" from year 3 would <u>not</u> be added to this annual cap to allow an increase in year 4 enrollment of up to 35 students. This would not reduce the total enrollment cap; rather it would increase the total number of years elapsed before Castilleja reaches its maximum enrollment. Castilleja School would submit a verification report to the City annually to allow the City to verify that the school remains in compliance with the CUP.

Vehicle and Bicycle Parking

Implementation of the proposed campus modification plan would result in an increase in the number of onsite parking spaces, from 74 to 142. Of these, 115 parking spaces would be in a new below-grade approximately 50,500 square foot parking structure, as shown in Figure 3-7, Garage Plan, while 27 spaces would be in surface parking lots. This would reduce the overall number of surface parking spaces by 47 compared to existing conditions. The project would retain the existing 25-foot wide Public Utility Easement (PUE) located along the old alignment of Melville Avenue through the campus, but shift the location by 15 feet to the southeast to accommodate construction of the proposed subterranean garage. There is an existing sewer line within the PUE; the garage walls would be placed a minimum of 5 feet from the sewer line so that the sewer line would not be affected by the project. The parking garage would include an underground pedestrian tunnel providing access from the garage to the central part of the campus, between the athletic center and chapel. The tunnel would be approximately 36 feet long with a standard section of 12 feet by 11 feet (which would provide an inside dimension of 10 feet by 7.5 feet). Both ends of the tunnel would include appropriate provisions for access required under the Americans with Disabilities Act. This tunnel is proposed as a permanent encroachment within the 25-foot PUE.

The total number of bicycle spaces would also increase from 108 surface level spaces to approximately 140 spaces, consistent with the proposed Sustainability Plan discussed below. These spaces would be provided in three new bicycle parking areas. One would be located at grade along the front of the proposed library within the new Academic building, along the site access driveway on Bryant Road (and provide approximately 35 rack spaces). The second surface-level bike parking area would be located between the proposed pool and the parking garage exit ramp (and provide approximately 44 rack spaces). These areas would provide a total of 83 bicycle parking spaces. An additional 61 existing bicycle parking spaces near the athletic building would be retained.

Transportation Demand Management

Castilleja School has been implementing a Transportation Demand Management (TDM) plan since 2012 to reduce vehicle trips to and from the site. The existing TDM plan includes encouraging students to ride their bicycles or walk to school, providing shuttles to and from the nearest Caltrain station, offering free bussing from surrounding communities, and emphasizing carpooling. As part of the proposed amendment to the CUP, Castilleja proposes to increase their TDM efforts to meet a "no new AM or PM peak hour trips" standard. Thus the project anticipates that the potential peak hour traffic effects associated with the increase in enrollment would be offset by the additional TDM strategies as defined in the proposed TDM plan provided in Appendix B. The CUP amendment proposes to limit the school's peak hour vehicle traffic to 440 trips as a condition of project approval and updating the TDM plan to achieve this standard.

Pool

The proposed campus modification plan would relocate the existing outdoor pool closer to Emerson Street, in the general location of the existing Leonard Ely Fine Arts Center, adjacent to the existing athletic center. There would be no direct basement walk-out access onto the pool deck from the athletic center's basement floor. The pool would be located outdoors and would be placed 15 feet below existing grade, with stepped bleachers facing northwest (towards the interior of the campus). The pool equipment area would be located below grade under a portion of the bleachers and adjacent to the driveway ramp to the below-grade trash enclosures and service/loading area. A noise attenuation wall would be constructed adjacent to Emerson Street. The wall would be 6 feet in height with a kicker at the top that would extend vertically upwards for an additional 2 feet but would be slanted inwards towards the pool, extending 3 feet towards the interior of the project site. This design is intended to reduce the total perceived height from the sidewalk and from Emerson Street. Refer to Chapter 8, Noise, for additional discussion of pool operations, such as event schedules and use of amplified sound.

Temporary Campus and Spieker Field

After completion of the proposed parking garage, the roof of the garage would be used to support placement of buildings that would form the temporary campus. The roof would be engineered to meet or exceed the load bearing requirements of the proposed temporary campus facilities plan. It would also be engineered to support use of the field for vehicle parking during special events.

As shown in Figure 3-8, Temporary Campus Plan, the temporary campus would include 40 classrooms within two-story buildings that would each have a footprint of approximately 1,920 square feet (40x48 feet). All drop offs and pick-ups for the temporary campus would occur in the below-grade parking garage. The temporary campus would also include restrooms, a kitchen facility with service areas for deliveries and waste pick up, dining facilities including three areas of shaded outdoor seating, a library, a student cubbies building, a storage building and several storage sheds, and a maintenance building. The temporary campus would be served by temporary utilities. The temporary buildings would not exceed 28 feet in height and the buildings would not encroach into the Embarcadero Road special setback.

At the end of Phase 4, following construction of the proposed new Academic building, the temporary facilities would be removed from the roof of the underground parking garage and Spieker Field would be reconstructed to support athletic use and overflow parking. Spieker Field would be surfaced with turf. No lighting is proposed to be installed at Spieker Field.

New Academic Building

The new Academic building is planned to be constructed in the fourth phase of Master Plan implementation. The building layout would be in an L-shape and would include programmatic spaces for teaching stations, library, classrooms, fine arts, the Bourn lab which is a maker space, engineering design studio and robotics lab, cafeteria, offices, and common areas. The library and fine arts space would be housed in the wing facing Bryant Street, adjacent to the Gunn Administration building, as shown in Figure 3-9, New Academic Building Floor Area Diagrams. The longer portion of the building located along the project site's Kellogg Avenue frontage would house the majority of the teaching stations, the cafeteria, offices and common areas. This wing would extend from Bryant Street to the parking lot proposed at the corner of Kellogg Avenue and Emerson Street.

The library/fine arts wing is proposed to have a footprint of approximately 8,237 square feet (not including the covered exterior portion of the building) and include two floors above grade and one level below grade. The building would be set back from Bryant Street by a minimum of 34 feet and would have a maximum height of 30 feet. The library would also include a level below the first floor that extends easterly beyond the library/fine arts wing footprint to connect with the academic wing. This connecting portion of the lower level would consist of 3,532 square feet. This area is included in the below-grade square footage identified in Table 3-1 and would not contribute to the total gross floor area within the project site. At the ground level, the majority of this area would be hardscaped with pervious pavers, which would be bordered by a narrow landscaped area adjacent to the academic wing. A landscaped area with pedestrian access into the campus would be created between the library/fine arts wing and existing Gunn Administration building; the portion of this area immediately adjacent to the library would function as a bio-retention swale. Pavement details for this portion of the campus are shown in Figure 3-10, Grading and Drainage Section 1, while landscaping details for the full campus are shown in Figure 3-11, Landscaping Plan.

The classroom wing of the Academic building is proposed to have a footprint of approximately 33,036 square feet (not including the covered exterior portion of the building). The frontage on Bryant Street would be 68 feet wide. The building would extend southerly approximately 401.5 feet along Kellogg Avenue. As shown on Figure 3-9, the 68-foot width would be generally maintained along the length of the building, but would incorporate horizontal articulation such that the building frontage along Kellogg Avenue would have varying setback depths ranging between 20 and 32 feet. The building would include two floors above grade and one floor below grade. Light-wells and sunken patios would provide natural light to portions of the lower level. The Academic building would include 32 teaching stations, with 12 for the middle grades (6 through 8) and 20 for the high school grades (9 through 12).

A small parking lot with 13 stalls would remain at the corner of Emerson Street and Kellogg Avenue, providing approximately 71 feet of space between the new Academic building and Emerson Street, where the required setback is 20 feet. All setbacks proposed for the project are equal to or greater than the setbacks on the existing campus (Appendix B).

Basement Trash Enclosure and Service/Loading Area

The existing campus has all trash enclosures and service/loading areas located at grade. The proposed campus modification plan includes construction of a 26-foot wide paved vehicle ramp to provide below grade access from Emerson Street into the basement area of the proposed Academic building. This would provide access to the trash enclosure and service/loading area in the basement. The driveway would end in a hammerhead configuration to allow for trucks to turnaround within the basement before returning to Emerson Street. The ramp would be located adjacent to the driveway accessing the at-grade Circle, as discussed below.

The Circle

The Circle currently exists in the center of the property and serves as an open-space organizing feature of the campus. The proposed Master Plan includes reconstruction of the Circle in a slightly smaller configuration and shifted easterly. The edge of the Circle closest to Bryant Street would be approximately 40 feet further from Bryant Street than the current Circle. A driveway would continue to provide access to the Circle from Emerson Street. This driveway would continue around the perimeter of the Circle for on-site circulation of buses and other vehicles, as needed. The Circle would be surfaced with artificial turf requiring no irrigation.

Sustainability Plan

Castilleja School proposes to implement a Sustainability Road Map (Appendix B) to improve energy and water efficiency, reduce vehicle travel, prioritize use of environmentally sensitive materials, and reduce light pollution. The sustainability plan is organized in the following categories:

- Fossil fuel-free building operation
- Zero net energy
- Transportation
- Site work, water efficiency and landscape
- Environmentally preferable materials & indoor air quality
- Light pollution reduction
- Operational practices
- Leadership in Energy and Environmental Design (LEED)

The project would be required to comply with the green building standards set forth in the Green Building programs required by the State of California and the City of Palo Alto. The City requires the project to attain a LEED silver standard, which requires a minimum of 50 points on the LEED ranking system. As stated in the Sustainability Road Map, the applicant is seeking a LEED platinum standard, which requires an additional 80 points beyond the silver standard. This would ensure that water conservation and solid waste reduction measures are included in the project and that the project meets all local, state and federal regulations related to solid waste. Specific measures that are proposed to be implemented include:

- Onsite renewable energy used to meet the majority of energy demand – e.g., photovoltaics, solar water heating, wastewater heat recovery;
- Electric vehicle recharging facilities;
- A minimum of 112 bicycle parking spaces;
- Student shuttle;
- Ultra-water-efficient bathroom fixtures in new buildings (below State-mandated flow/flush levels);
- Low-water and low-volume consumption irrigation system (drip emitters, bubblers, etc.);
- No overhead sprinklers or spray type heads except at turf grass areas;
- No turf grass except on sports fields;
- 90% drought-tolerant/climate-adapted plant species in non-turf grass areas;
- Low-VOC and use of healthy building materials in new buildings;
- Provide fresh-air ventilation in new buildings;
- High-performance filters to control air pollutants in new buildings;
- Meet dark sky standards (per LEED credit) – for all exterior luminaires, meet uplight and light trespass requirements, using the backlight-uplight-glare (BUG) method or the calculation method; and
- Minimal scheduling of night-time events.

Emerson Park

Emerson Park is proposed as a 0.33-acre privately owned and maintained open space area that neighbors of the project site would be permitted to access. The open space area would be located in the northwest corner of the campus, on the properties that currently support the two residential structures at 1235 and 1263 Emerson Street. As noted previously, these parcels are proposed to be merged with the existing campus parcel at 1310 Bryant Street and the two residential structures are proposed to be demolished. The open space area would include trees, landscaping, a meandering walkway around the perimeter of the park, benches and perimeter fencing. The fence would be located along the property line between the park and the adjacent residence, while all park features would be set back a minimum of eight feet from the property line.

Landscaping

The proposed site plan includes new landscaping along the perimeter of the project site to enhance compatibility with the adjacent residential neighborhood. Of the 174 trees surveyed on and immediately adjacent to the project site, a total of 35 trees are proposed to be removed (3 of which are located adjacent to the project site) due to poor health, as identified in the Arborist Report (Appendix C) and 40 trees are proposed to be relocated. As noted previously, one tree has already been removed subject to and in accordance with a City tree removal permit due to a safety concern; an additional tree (blue atlas cedar tree #45) - was recently identified as terminal due to a fungus disease (Bench 2019). This tree is recommended for removal due to safety concerns, but the potential removal of this tree is unrelated to the proposed project evaluated in this EIR because the proposed building plans anticipated retention of this tree. Castilleja School has submitted a separate Architectural Review application for their proposed removal of tree #45.

Of the remaining trees, there are 9 palm trees that are proposed to be removed from the project site and relocated to an offsite location and 97 trees that would remain in place. As shown in Figure 3-11, the proposed project includes planting 103 new trees on or adjacent to the project site. Most of the existing street trees along Kellogg Avenue and many of the existing street trees along Emerson Street would be retained. Refer to Chapter 4, Land Use and Planning, for a discussion regarding consistency with the City's requirements related to tree preservation and Chapter 5, Aesthetics, for additional information regarding the proposed landscaping plan.

Public Utilities

The current and proposed school facilities would receive water and wastewater services from the City, including storm drainage. New buildings within the site would connect to the City's existing wastewater infrastructure and all flows would be directed to the Regional Water Treatment Plant. The project would not require new construction or expansion of the City's existing stormwater (drainage) infrastructure. The project would result in a decrease in the total impervious surface area within the project site. Because the project would replace more than 50% of the existing impervious surface within the project site, the project is required to meet the County of Santa Clara standards to upgrade stormwater treatment throughout the site. Stormwater treatment facilities and strategies proposed to be used onsite include using pervious pavers in the at-grade parking areas and pedestrian pathways, having a self-treating green roof on the parking garage (which would be part of Speiker Field), routing runoff from the ramps accessing the parking garage to landscaped planters and strips to provide bio-retention treatment, and routing runoff from the hardscaped areas throughout the campus to bio-retention swales, as shown on Figure 3-11. Refer to Chapter 4 for additional discussion of the project's compliance with applicable local and state stormwater treatment requirements.

Project Access

The current campus has drop offs and pick-ups dispersed at various locations around the perimeter, as shown on Figure 3-3. The proposed site plan, Figure 3-6, provides vehicle ingress and egress for the project site with three driveways on Bryant Street, a small parking lot at the corner of Kellogg Avenue and Emerson Street with a driveway onto each street, and the below-grade parking garage exit onto Emerson Street near Embarcadero Road, as shown on Figure 3-6 and Figure 3-7. Service delivery facilities would be relocated below grade and away from the perimeter of the campus. Castilleja School would instruct all students and families that vehicle drop-offs and pick-ups must occur in the underground garage or in the looped driveway on Bryant Street. All traffic would exit the garage via Emerson Street. The project applicant proposes to restrict all outgoing traffic exiting the garage to right-turn movements onto Emerson Street and again onto Embarcadero Road.

3.5 ENTITLEMENTS AND REQUIRED APPROVALS

The following entitlements, permits, and approvals are required from the City of Palo Alto and from other responsible agencies for the proposed project. Chapter 1, Executive Summary, includes a table listing these entitlements, permits, and approvals, and an explanation of each. Different aspects of the project would require review by the City's Planning and Transportation Commission (PTC) and Architectural Review Board (ARB). The PTC and ARB would review the project and provide a recommendation to City Council for final project consideration. In addition, the project will be reviewed by the Historic Resources Board (HRB).

- Conditional Use Permit (CUP) Amendment
- Variance for below grade setback encroachments related to underground parking garage
- Variance to maintain existing above grade FAR
- Tentative Map with Exception
- Architectural Review (phased development approval(s))
- Grading Permits (by phase)
- Tree Removal Permits (by phase)
- Building Permits (by phase)
- National Pollutant Discharge Elimination System Permits (by phase)

3.6 REFERENCES CITED

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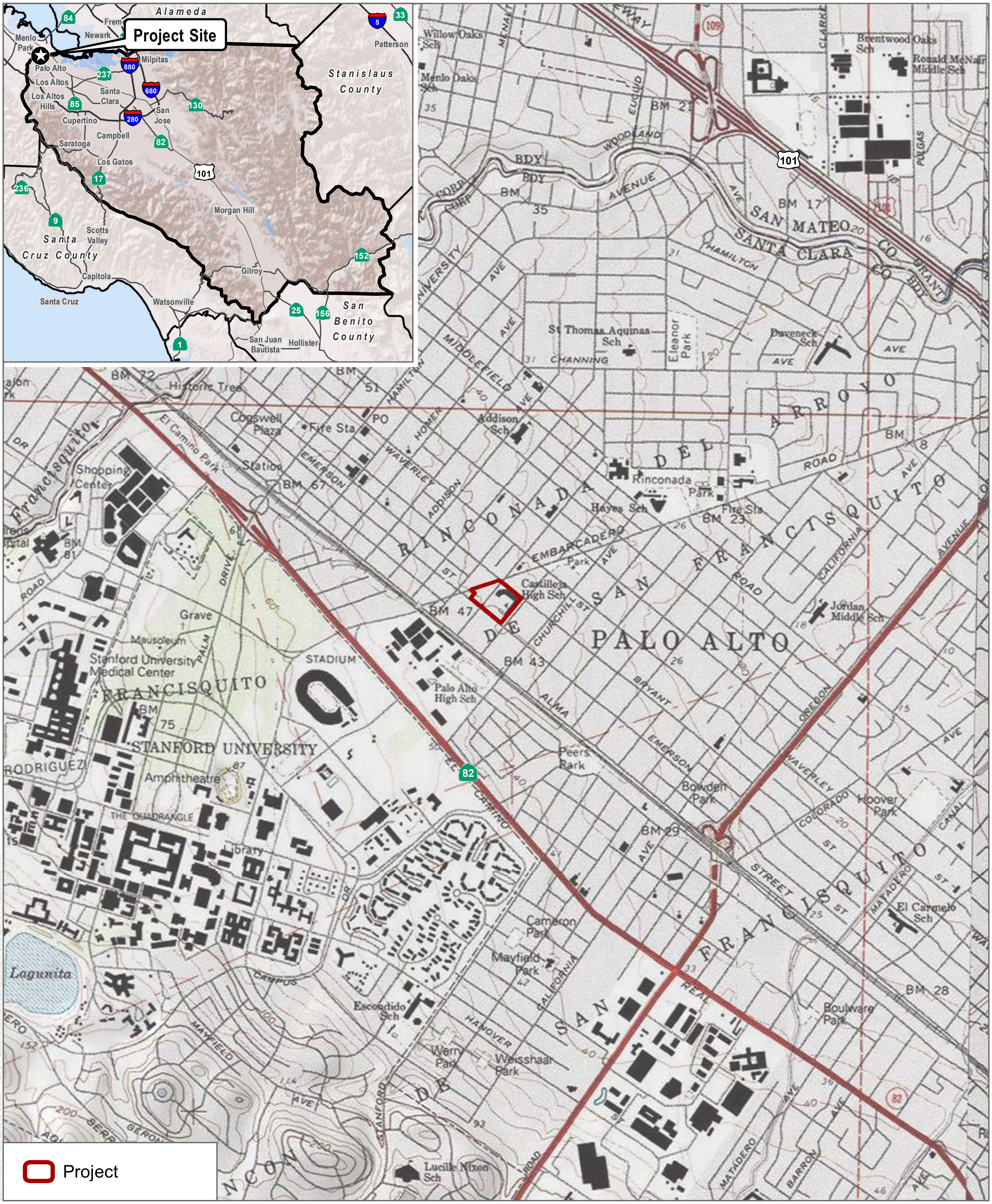

SOURCE: USGS 7.5 minute series Palo Alto quadrangle

DUDEK

0 1,000 2,000 Feet

FIGURE 3-1

Project Location

Castilleja School Project EIR

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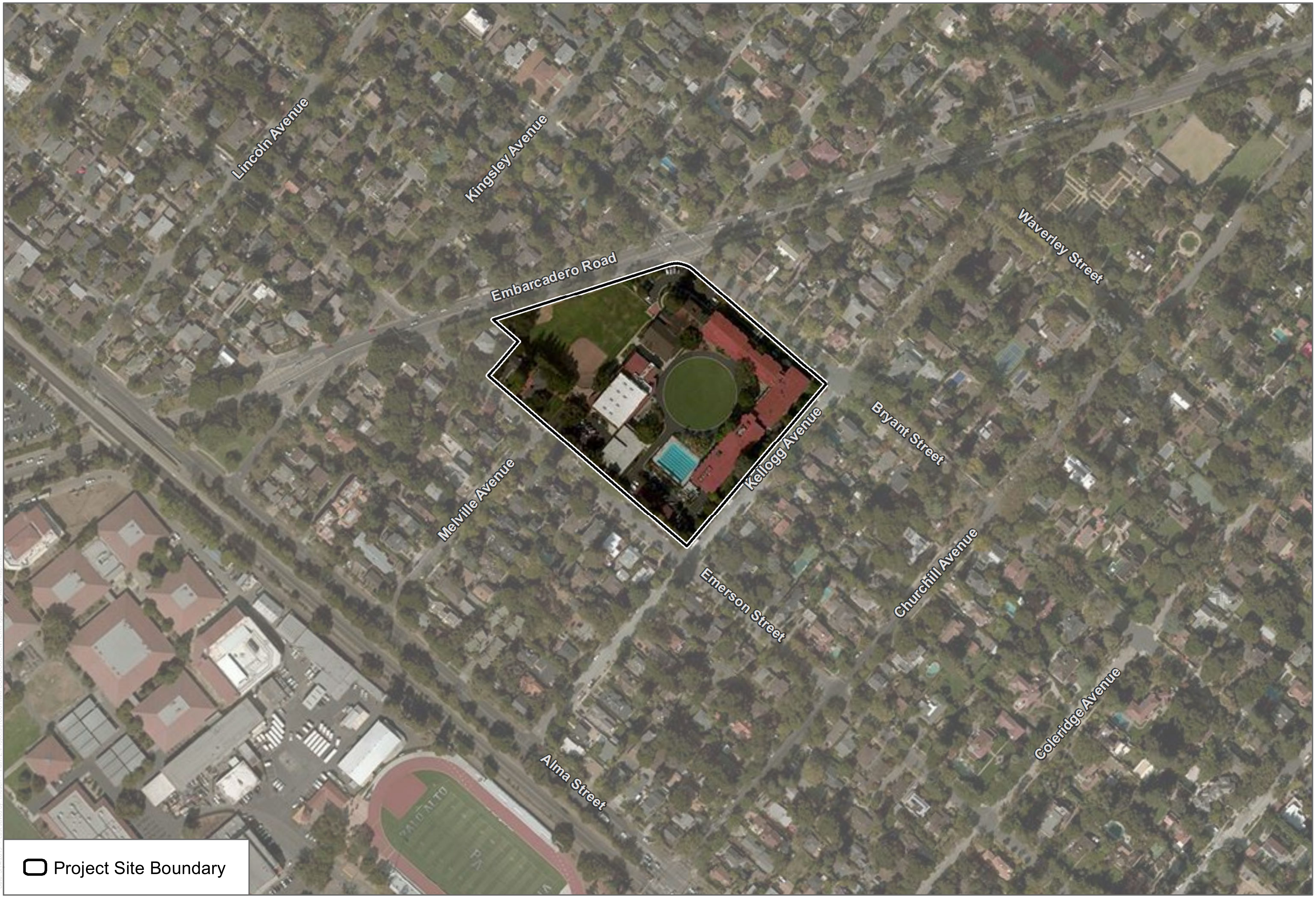

SOURCE: Bing Maps 2018

DUDEK

0 150 300 Feet

FIGURE 3-2

Site and Vicinity

Castilleja School Project EIR

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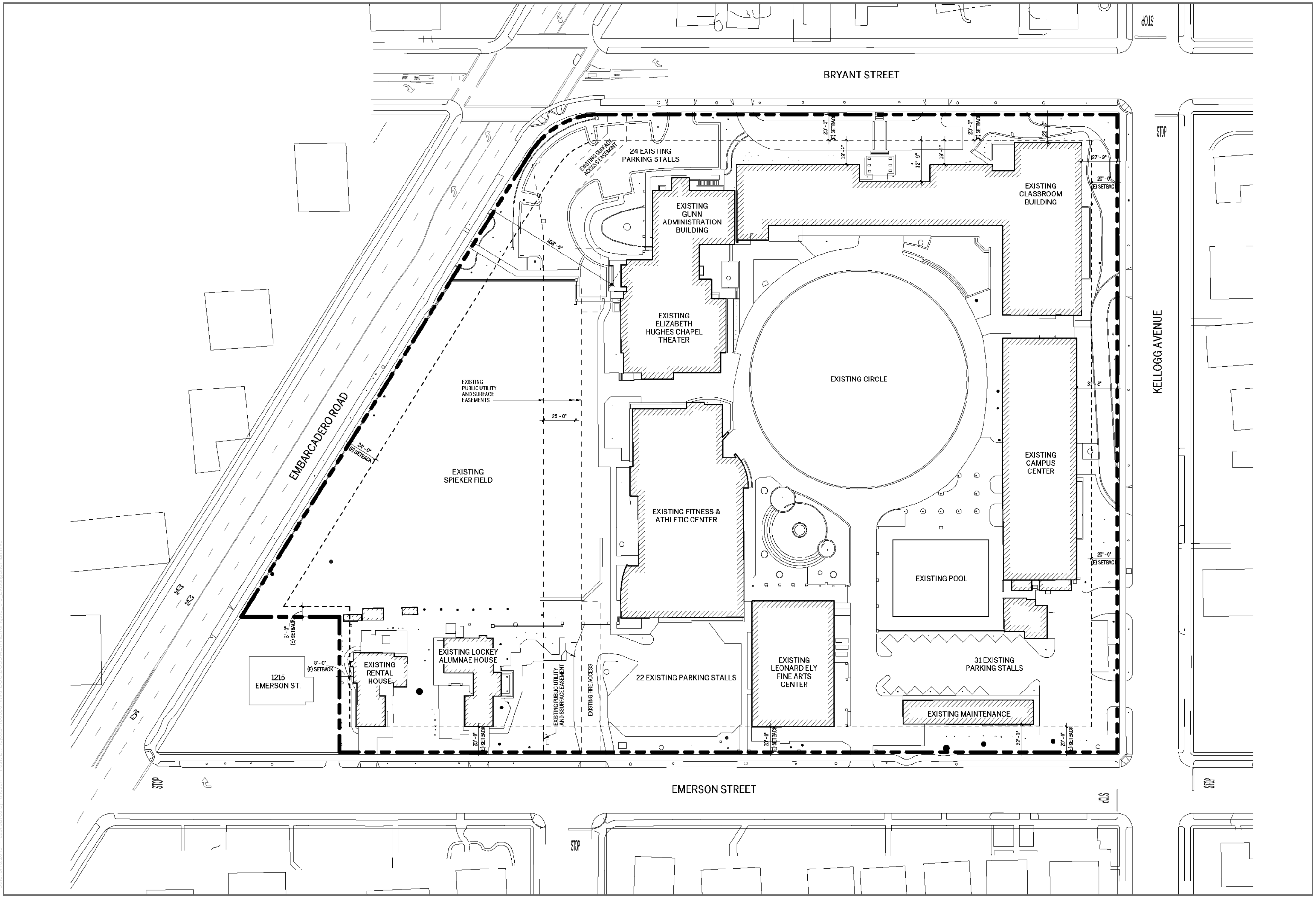

SOURCE: Steinberd Hart 2018

DUDEK Not to scale

FIGURE 3-3

Existing Site Plan

Castilleja School Project EIR

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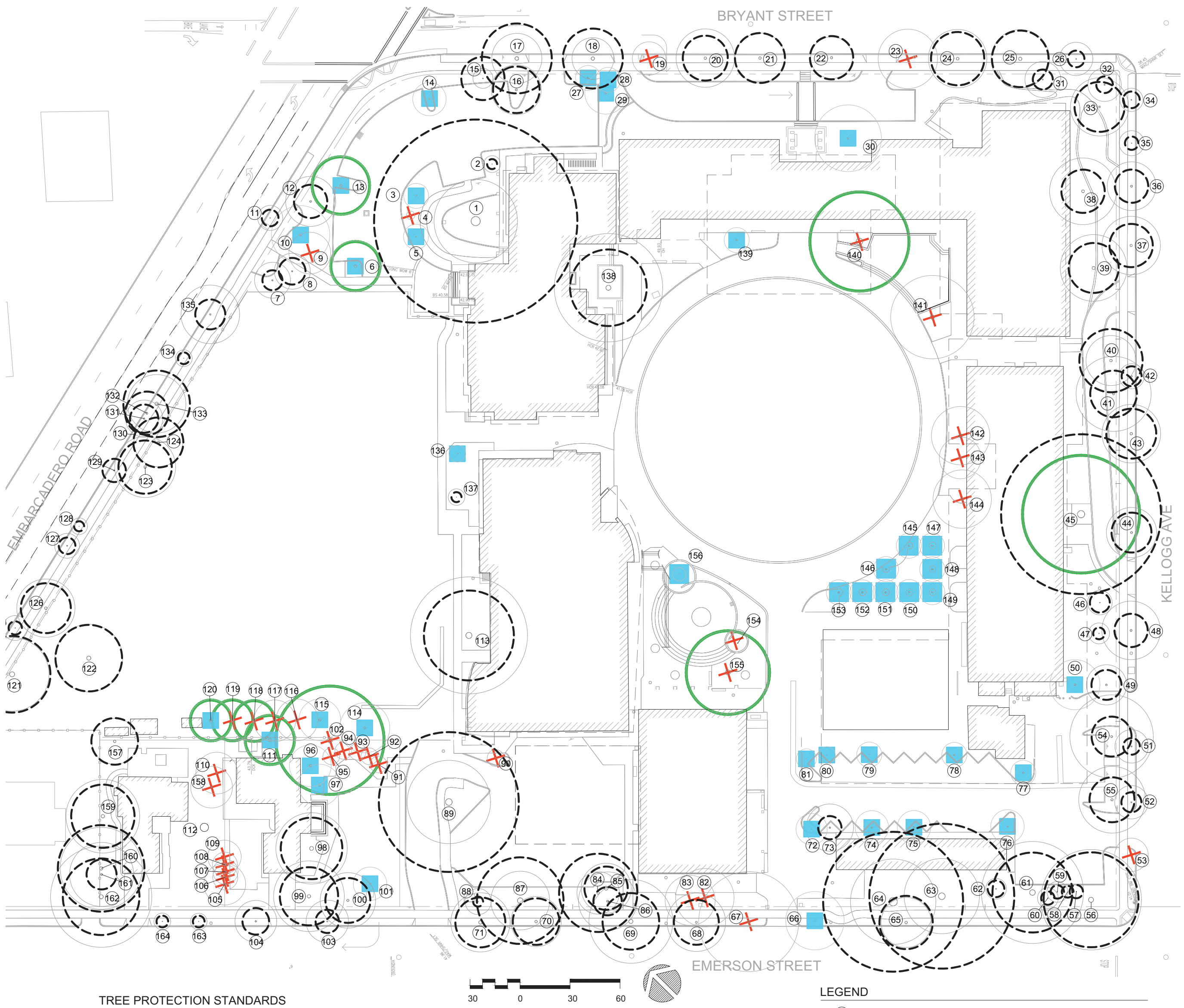

TREES TO BE REMOVED

Tree #	Tree Name	DBH	Height / Spread	Protected?
4	Cornus sp.	1	7/5	
9	Pyrus calleryana	8	35/25	
19	Liquidambar styraciflua	13	70/20	
23	Liquidambar styraciflua	21	60/35	
53	Celtis australis	5	20/20	
67	Ulmus parvifolia	21	35/60	
82	Acacia melanoxylon	12/12	60/35	
83	Acacia melanoxylon	12/12	45/30	
90	Laurus nobilis	2	10/10	
91	Crataegus sp.	4	10/10	
92	Crataegus sp.	3	10/10	
93	Crataegus sp.	3	10/10	
94	Crataegus sp.	3	10/10	
95	Crataegus sp.	3	10/10	
102	Quercus agrifolia	39	60/65	YES
105	Pittosporum tenuifolium	9	25/25	
106	Pittosporum tenuifolium	3/3	20/15	
107	Pittosporum tenuifolium	6/5/3	20/15	
108	Pittosporum tenuifolium	5/4	25/15	
109	Pittosporum tenuifolium	6/6/5/5	25/20	
110	Pittosporum tenuifolium	8/7/6	35/25	
112	Sequoia sempervirens	44/27	-	
116	Sequoia sempervirens	15	85/25	
117	Sequoia sempervirens	14	90/25	
118	Sequoia sempervirens	18	90/25	YES
119	Sequoia sempervirens	22	95/25	YES
130	Celtis australis (dead)	7	-	
140	Quercus agrifolia	36	35/60	YES
141	Pinus pinea	27	35/50	
142	Afrocarpus gracilior	23	60/35	
143	Magnolia grandiflora	18/10	40/25	
144	Xylosma congestum	15	35/35	
154	Acer palmatum	5	6/12	
155	Quercus agrifolia	27	30/50	YES
158	Prunus cerasifera	4/2/2	20/25	

TREES TO BE RELOCATED

Tree #	Tree Name	DBH	Height / Spread	TPZ	Protected?
3	Arbutus 'Marina'	5	10/15	8	
5	Arbutus 'Marina'	4	10/15	7	
6	Quercus agrifolia	17	30/30	17	YES
10	Quercus agrifolia	11	30/35	18	
13	Quercus agrifolia	16	25/35	27	YES
14	Quercus agrifolia	7	15/20	12	
27	Acer palmatum	3/3/3	10/15	14	
28	Prunus sp.	8	10/15	14	
29	Acer palmatum	4/3/3	15/25	14	
30	Acer buegerianum	11	40/40	18	
50	Pistacia chinensis	10	30/30	17	
66	Pistacia chinensis	14	30/35	24	
72	Pistacia chinensis	5	15/15	8	
74	Arbutus 'Marina'	8	15/20	14	
75	Arbutus 'Marina'	8	15/20	14	
76	Pistacia chinensis	6	15/20	10	
77	Pistacia chinensis	7	20/15	12	
78	Arbutus 'Marina'	5	10/15	8	
79	Arbutus 'Marina'	4	10/15	7	
80	Arbutus 'Marina'	5	10/10	8	
81	Pistacia chinensis	5	12/12	8	
96	Acer palmatum	5/4/3/3	20/25	15	
97	Acer palmatum	4/3/3/3	20/25	12	
101	Crataegus laevigata	6	25/20	10	
111	Quercus agrifolia	22	50/30	37	YES
114	Pistacia chinensis	13	30/30	22	
115	Sequoia sempervirens	14	80/25	24	
120	Sequoia sempervirens	24	95/25	40	YES
136	Cercis canadensis	3	8/10	6	
139	Acer palmatum	6	10/15	10	
145	Syagrus romanzoffiana	10	20/15	17	
146	Syagrus romanzoffiana	10	20/15	17	
147	Syagrus romanzoffiana	9	20/15	16	
148	Syagrus romanzoffiana	9	20/15	16	
149	Syagrus romanzoffiana	8	20/15	14	
150	Syagrus romanzoffiana	10	20/15	17	
151	Syagrus romanzoffiana	9	20/15	16	
152	Syagrus romanzoffiana	8	20/15	14	
153	Syagrus romanzoffiana	8	20/15	14	
156	Olea europea	3/2	7/8	8	

TREE PROTECTION STANDARDS

1. Regulated Trees are protected by Palo Alto Municipal Code Chapter 8.10.030.

2. For required and recommended practices for all existing tree protection, see Tree Protection & Preservation Plan for SUMC Facilities Renewal and Replacement Project, Palo Alto CA, December 2010.

3. All trees shown for relocation will be tagged on site by the Landscape Architect. Prior to boxing, spray foliage with an antidescicant, "Wiltproof" or equal. Excavate around the tree to a depth and width as determined by a certified Landscape Contractor or Arborist. Construct a standard nursery practice box around the sides of the rootball and cinch with metal straps or other approved securing methods. Trees to be hand-watered until automatic irrigation system is operable. The arborist shall perform an annual evaluation report of the re-located trees for a period of (5) years concerning the health of the relocated trees. The report shall include replacement recommendations if any of the relocated trees do not survive.

LEGEND

- 1 — Indicates tree number as referenced in Forest Management Plan
- Existing Tree with Tree Protection Zone: Total 164 trees.
- Regulated Tree: See Tree Protection Notes. Total 10 trees.
- Tree To Be Removed: Total 33 trees.
- Tree to be boxed and relocated: See Planting Plan for planting location of boxed trees. See Tree Protection Standards. Total 40 trees.

SOURCE: WRNS Studio 2019

DUDEK

FIGURE 3-4

Existing Trees

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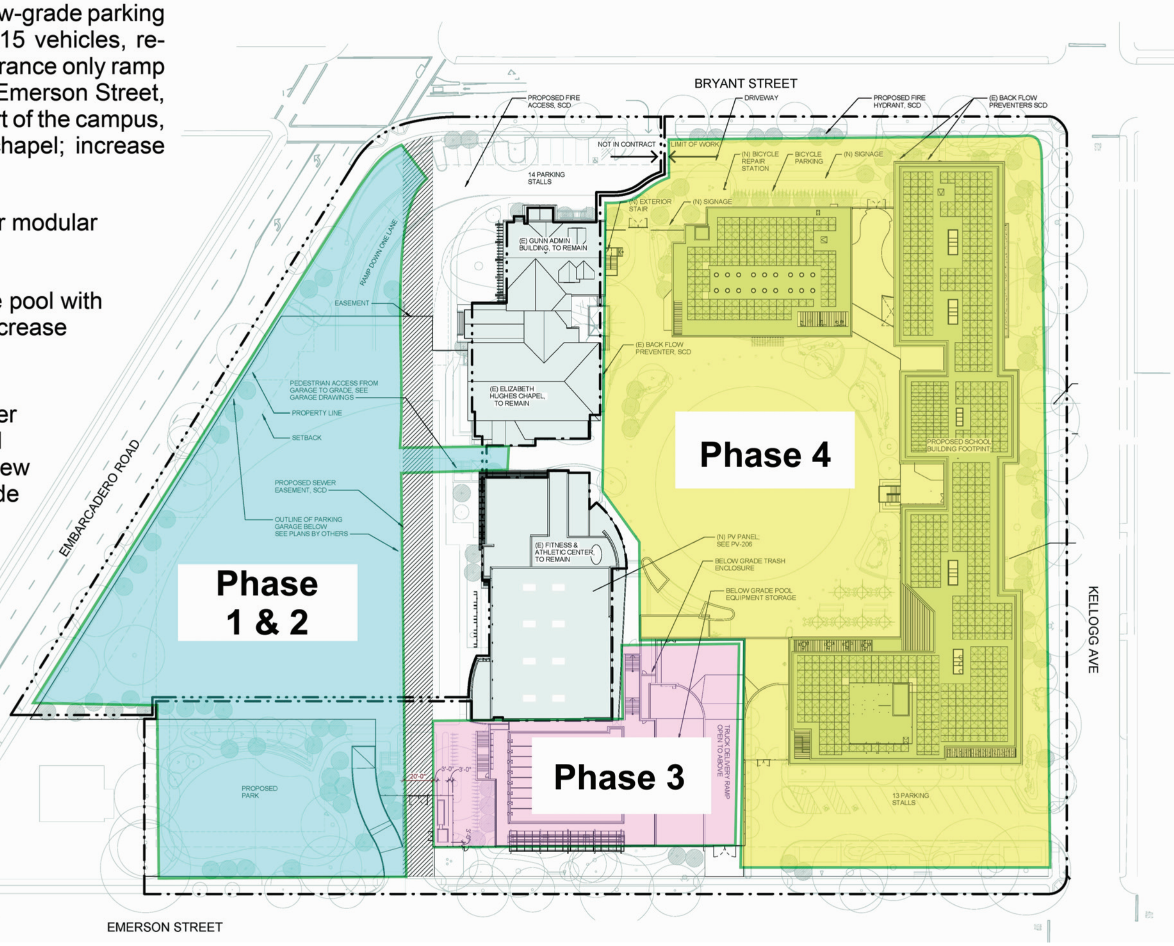
Phasing:

Phase 1: Demolish the two on-site residences and construct a below-grade parking structure under the merged parcels to accommodate 115 vehicles, re-route drop-off and pick-up through the garage with an entrance only ramp accessed from Bryant Street, an exit ramp egress onto Emerson Street, and a pedestrian tunnel from the garage to the central part of the campus, with access located between the athletic center and chapel; increase enrollment to a maximum of 490 students.

Phase 2: Establish a temporary campus by placing portable and/or modular buildings above the parking garage (on Spieker Field).

Phase 3: Demolish the Fine Arts Building; construct a below-grade pool with sound attenuation barrier adjacent to Emerson Street; increase enrollment to a maximum of 520 students.

Phase 4: Demolish the existing classroom building, Campus Center Building, the at-grade pool, pool equipment building, and maintenance building; reconstruct the Circle, construct new classroom building, construct vehicle ramp to below-grade trash enclosure and service/loading area within the basement of the new classroom building; implement the proposed Sustainability Road Map (Appendix B) including reducing the number of food service deliveries by 10%, construct Emerson Park as a publically accessible park located west of the Emerson Street exit ramp of the below grade parking garage, remove temporary campus facilities and restore Spieker Field, increase enrollment to a maximum of 540 students.



SOURCE: WRNS Studio 2019

DUDEK

FIGURE 3-5
Phasing Plan
Castilleja School Project EIR

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PROJECT DATA

NET LOT AREA	286,783 SF			
LOT COVERAGE	ALLOWED 100,374 SF (35.0%)	EXISTING 65,273 SF (22.8%)	PROPOSED 65,317 SF (22.8%)	PAMC***** 18.12.030 TABLE 1
FLOOR AREA RATIO	EXISTING 0.43	PROPOSED **0.40		
EXISTING GROSS FLOOR AREA	ABOVE GRADE SF		*122,318 SF	
	BELOW GRADE SF		43,913 SF	
	TOTAL SQUARE FOOTAGE (INCL. LOWER LEVEL)		166,231 SF	
PROPOSED GROSS FLOOR AREA	ABOVE GRADE SF		115,963 SF	
	BELOW GRADE SF		89,997 SF	
	TOTAL SQUARE FOOTAGE (INCL. LOWER LEVEL)		205,960 SF	
EXISTING VEHICLE PARKING SPACES	REQUIRED 149	EXISTING BELOW GRADE 0	EXISTING ABOVE GRADE 74	PAMC***** 18.52.040 TABLE 1
PROPOSED VEHICLE PARKING SPACES	REQUIRED 137	PROPOSED BELOW GRADE ****115	PROPOSED ABOVE GRADE 27	PAMC***** 18.52.040 TABLE 1
	TOTAL PROPOSED SPACES		**142**	
EXISTING BICYCLE PARKING SPACES	REQUIRED 88	EXISTING 108		PAMC***** 18.52.040 TABLE 1
PROPOSED BICYCLE PARKING SPACES	REQUIRED 112	PROPOSED****** 83		PAMC***** 18.52.040 TABLE 1

* INCLUDES LOCKEY ALUMNAE HOUSE AND HEAD'S HOUSE

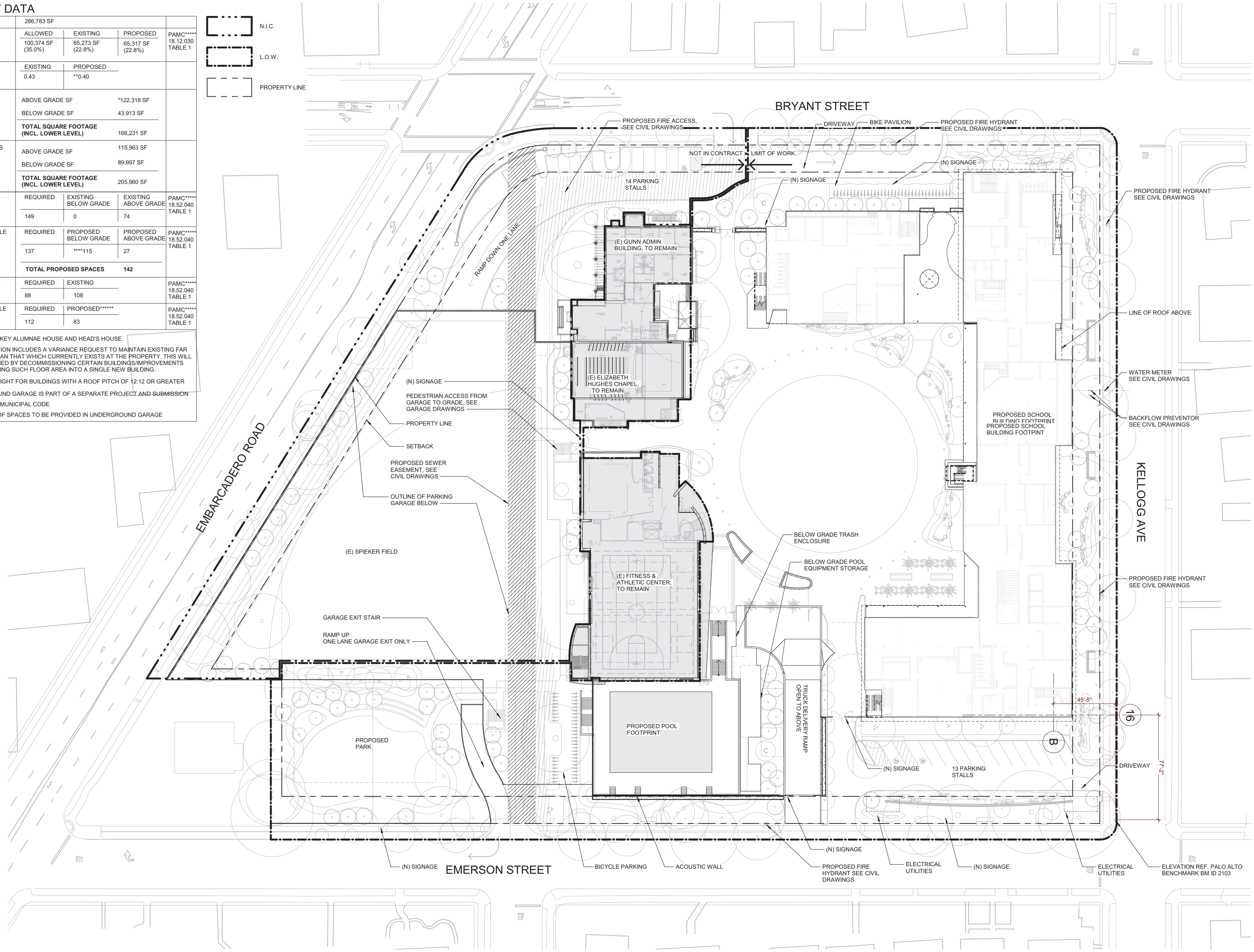
** THE APPLICATION INCLUDES A VARIANCE REQUEST TO MAINTAIN EXISTING FAR OF NO MORE THAN THAT WHICH CURRENTLY EXISTS AT THE PROPERTY. THIS WILL BE ACCOMPLISHED BY DECOMMISSIONING CERTAIN BUILDINGS/IMPROVEMENTS AND REPURPOSING SUCH FLOOR AREA INTO A SINGLE NEW BUILDING.

*** 33'-0" MAX HEIGHT FOR BUILDINGS WITH A ROOF PITCH OF 12:12 OR GREATER

**** UNDERGROUND GARAGE IS PART OF A SEPARATE PROJECT AND SUBMISSION

***** PALO ALTO MUNICIPAL CODE

****** BALANCE OF SPACES TO BE PROVIDED IN UNDERGROUND GARAGE



SOURCE: WRNS Studio 2019

DUDEK

FIGURE 3-6

Proposed Campus Plan

Castilleja School Project EIR

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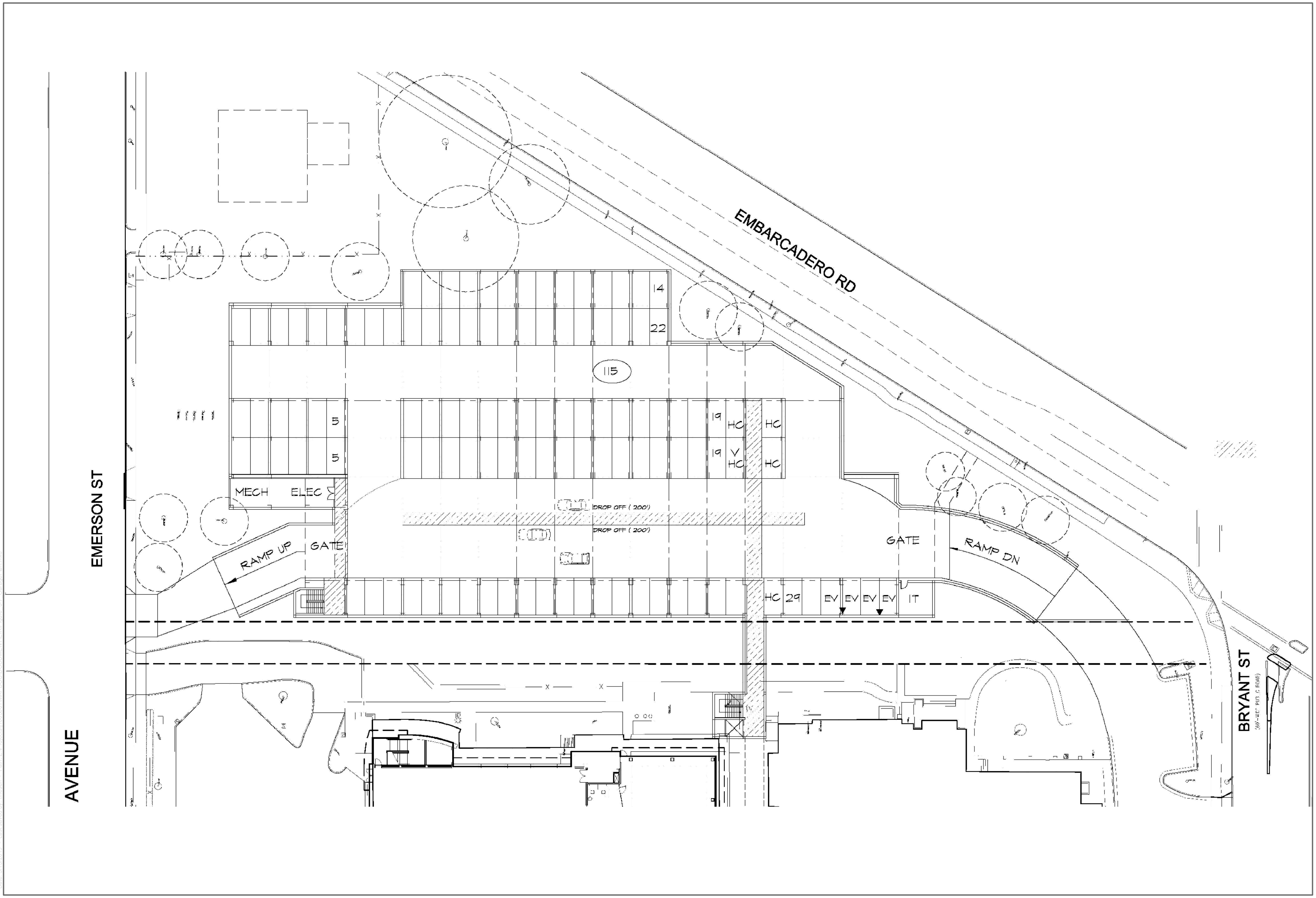

SOURCE: Steinberd Hart 2018

DUDEK

FIGURE 3-7

Garage Plan

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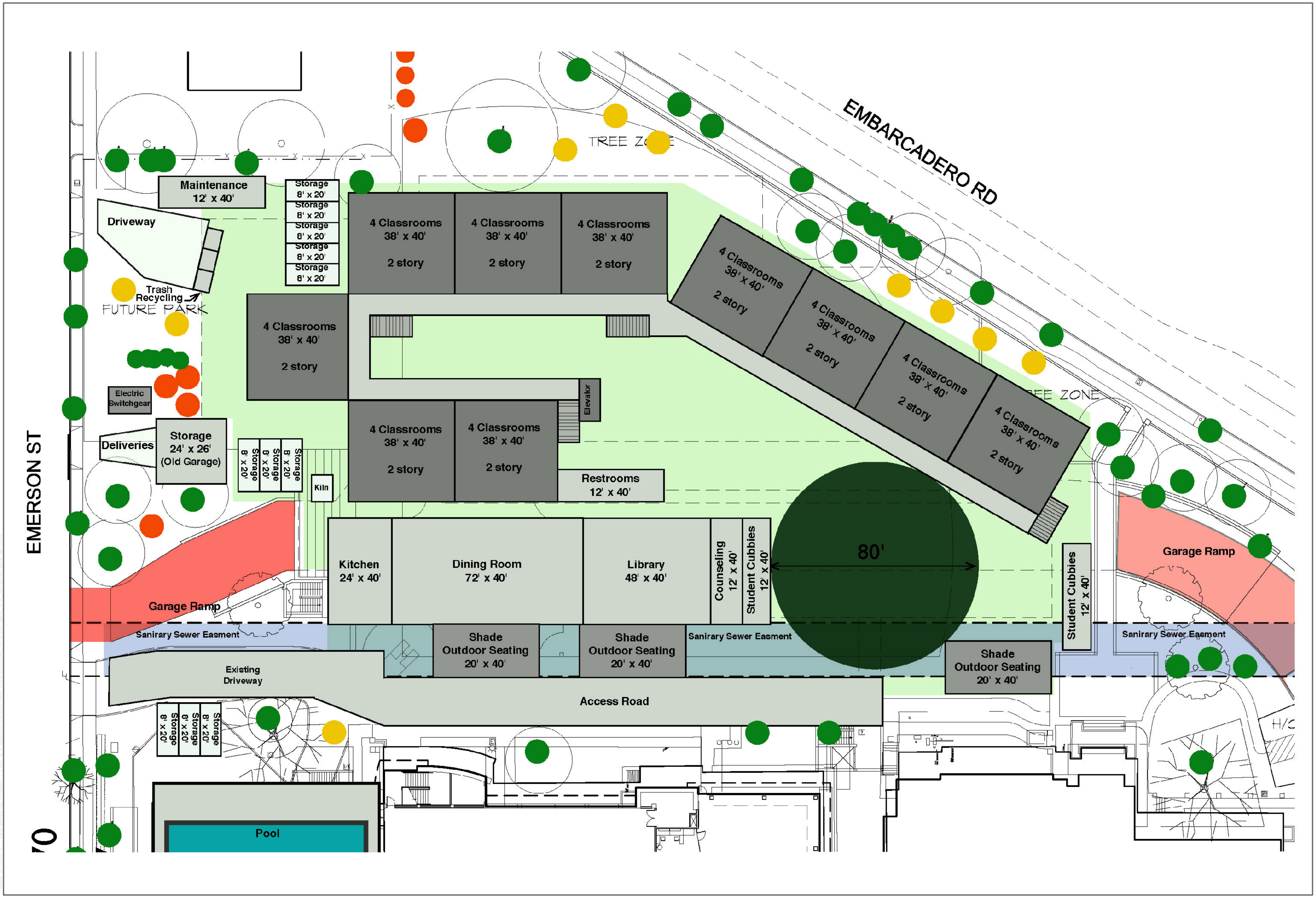

SOURCE: Steinberd Hart 2018

DUDEK

FIGURE 3-8

Temporary Campus Plan

Castilleja School Project EIR

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SOURCE: WRNS Studio 2019

DUDEK

FIGURE 3-9

New Classroom Building Floor Area Diagrams

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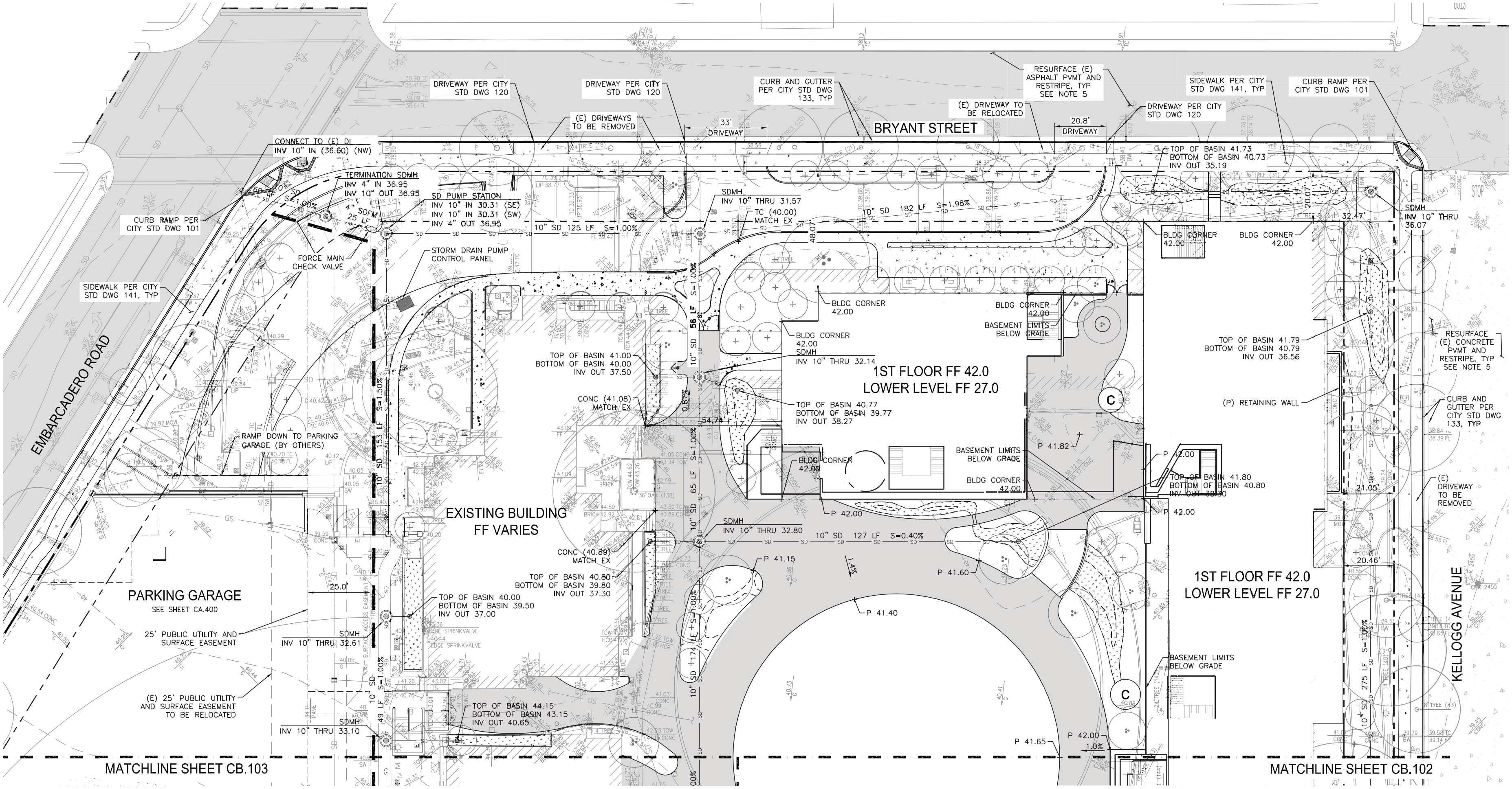

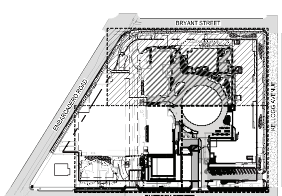

KEY MAP

NOT TO SCALE

NOTES

1. ALL GRADING SHALL COMPLY WITH APPLICABLE PERMITS, LOCAL ORDINANCES AND RECOMMENDATIONS OR THE GEOTECHNICAL REPORT.
2. CUT AND/OR FILL SLOPES SHALL NOT EXCEED SLOPE RECOMMENDED BY GEOTECHNICAL ENGINEER. (TEMPORARY SLOPE [1V: 3H]; PERMANENT SLOPE [1V: 2.5H]).
3. PROVIDE FINISHED GRADE AS SHOWN ON PLANS. MAINTAIN MIN 3% SLOPE AWAY FROM BUILDING IN SOFTSCAPE OR 1.5% AWAY FROM BUILDING IN HARDSCAPE.
4. PROVIDE MINIMUM SOIL COMPACTION OF 90% RELATIVE COMPACTION FOR FILLS BENEATH PROPOSED FLATWORK; 95% RELATIVE COMPACTION FOR FILLS BENEATH VEHICULAR PAVEMENTL AND 85% IN SOFTSCAPE OR LANDSCAPE AREA, UNLESS OTHERWISE NOTED.
5. STREETS FRONTING THE SCHOOL PROPERTY TO BE REPAVED UNLESS ACCEPTED BY THE CITY ENGINEER IN THEIR CURRENT CONDITION.

LEGEND

- ASPHALT
- PERVIOUS PAVERS
- BIORETENTION FACILITY
- STORM DRAIN
- STORM DRAIN INLET
- BIORETENTION MANHOLE
- BIORETENTION OVERFLOW INLET
- LIMIT OF WORK
- FENCELINE

NORTH 0 10' 20' 40'

SOURCE: WRNS Studio 2019

DUDEK

FIGURE 3-10

Grading and Drainage Section 1

Castilleja School Project EIR

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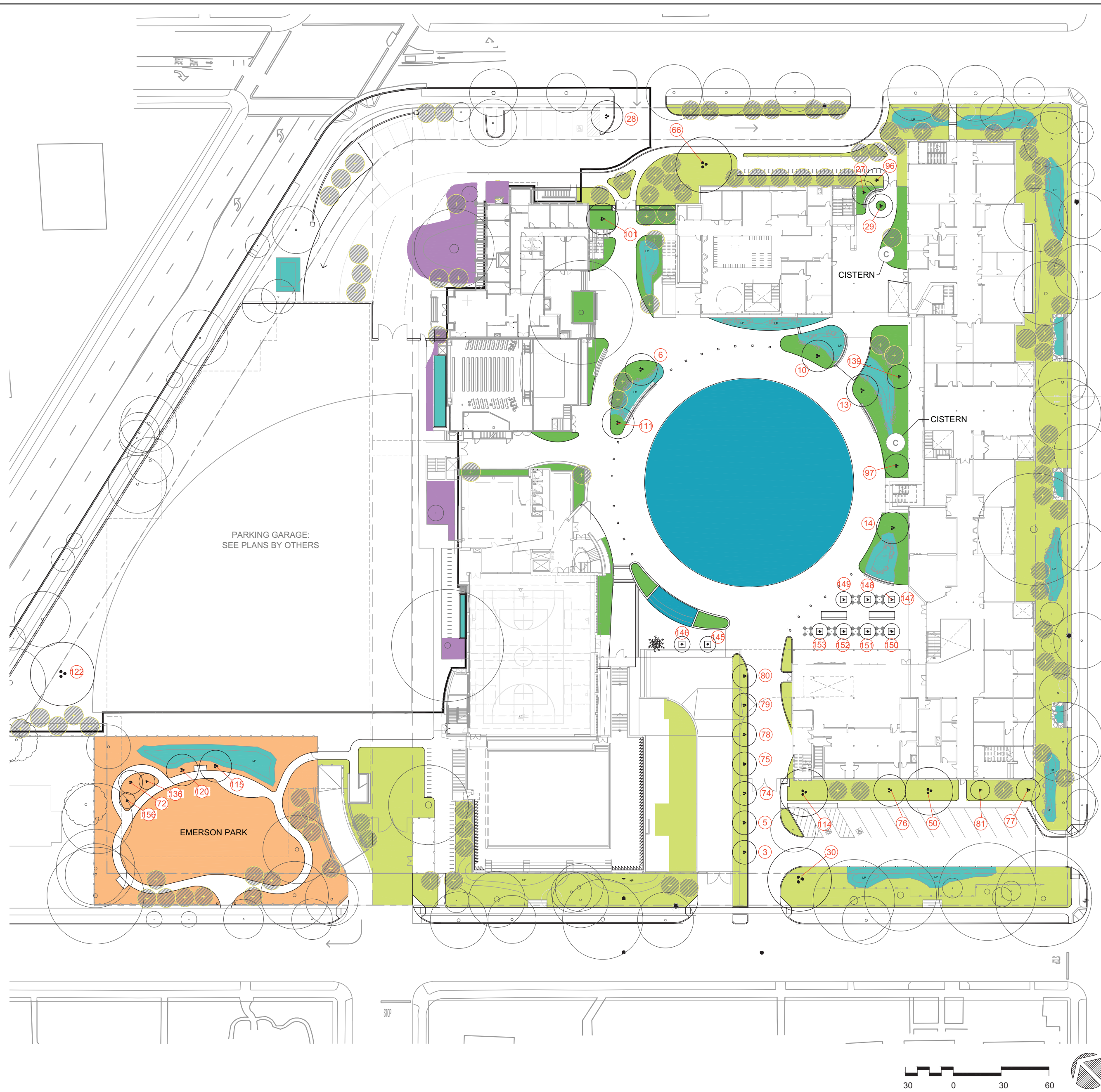

LEGEND

- Existing Planting
- Bioswale / Flowthrough planter
- Perimeter Planting
- Interior Gardens
- Green Wall
- Emerson Park
- Synthetic Turf / Geoblock
- Existing Tree
- Relocated Tree: (41 Total) See Tree Protection Plan
- Replacement Tree (103 Total)
- New Palm to Match Existing Relocated Palms

PLANT LIST

TYPE / LOCATION	BOTANICAL NAME	COMMON NAME	WUCOLS	NATIVE
BIOSWALE				
Grasses				
	Calamagrostis 'Karl Foerster'	Reed Grass	M	YES
	Carex tumulicola	Berkeley Sedge	L	YES
	Juncus patens	California Grey Rush	L	YES
	Muhlenbergia rigens	Deer Grass	L	YES
PERIMETER / EMERSON PARK				
Trees				
	Acer circinatum	Vine Maple	M	YES
	Cornus nutallii	Flowering Dogwood	M	YES
	Quercus agrifolia	Coast Live Oak	L	YES
	Sequoia sempervirens	Coast Redwood	H	YES
Shrubs				
	Myrica californica	California Wax Myrtle	M	YES
	Polystichum munitum	Western Sword Fern	M	YES
	Rhamnus californica 'Eve Case'	Coffeeberry	L	YES
	Salvia 'Celestial Blue'	Celestial Blue Salvia	L	YES
Perennials				
	Achillea millefolium	Yarrow	L	YES
	Castilleja sp.	Indian Paintbrush	L	YES
	Heuchera maxima	Island alumroot	M	YES
	Iris douglasiana	Douglas Iris	L	YES
	Penstemon heterophyllus	Blue Foothill Penstemon	L	YES
Grasses				
	Carex tumulicola	Berkeley Sedge	L	YES
	Festuca idahoensis	Idaho Fescue	VL	YES
Groundcover				
	Arctostaphylos 'Emerald Carpet'	Groundcover Manzanita	M	YES
INTERIOR GARDENS				
Trees				
	Acer circinatum	Vine Maple	M	YES
	Cornus nutallii	Flowering Dogwood	L	YES
Shrubs				
	Myrica californica	California Wax Myrtle	M	YES
	Polystichum munitum	Western Sword Fern	M	YES
	Rhamus californica 'Eve Case'	Coffeeberry	L	YES
	Ribes sanguineum	Evergreen Currant	L	YES
Perennials				
	Achillea sp.	Yarrow	L	YES
	Asclepias speciosa	Showy Milkweed	L	YES
	Castilleja sp.	Indian Paintbrush	L	YES
	Eschscholzia californica	California Poppy	L	YES
	Salvia 'Celestial Blue'	Celestial Blue Salvia	L	YES
Grasses				
	Carex tumulicola	Berkeley Sedge	L	YES
Groundcover				
	Arctostaphylos 'Emerald Carpet'	Groundcover Manzanita	M	YES
GREEN WALL				
	Assorted Perennials /Succulents			

SOURCE: WRNS Studio 2019

DUDEK

FIGURE 3-11

Landscape Plan

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CHAPTER 4
LAND USE AND PLANNING

This chapter addresses the potential land use and planning impacts associated with the proposed Castilleja School Project, which involves expansion of the current campus through merger of three existing lots, a series of building demolition and construction projects, and modification to the school's existing Conditional Use Permit (CUP) to allow increased enrollment and to define the general frequency and size of special events allowed at the campus. The analysis in this chapter considers the potential impacts of the project related to the compatibility of the proposed project with adjacent land uses, consistency of the project with applicable Palo Alto Comprehensive Plan policies, zoning requirements, and other relevant City planning and policy documents, specifically in regards to policies and standards the City has adopted for the intent of reducing physical environmental effects. This includes the consistency of the project with the City's Tree Protection and Management Ordinance.

The City received several comments addressing land use concerns in response to the Notice of Preparation. These comments identified neighbors' concerns regarding the compatibility of the school with the surrounding residential neighborhood and the ability of the project site to support the proposed increase in enrollment. The Notice of Preparation, Initial Study and comments received are provided in Appendix A.

4.1 EXISTING CONDITIONS

The proposed project entails improvements to the existing Castilleja School, an all-girls private school that has operated at its location at 1310 Bryant Street since 1910. The 6.58-acre project site consists of three parcels - Assessor's Parcel Number (APN) 124-12-34, 124-12-33, and 124-12-31. The site is located at approximately 39°13'41.3"N 121°02'33.8"W, in the Old Palo Alto neighborhood, south of the Professorville registered historic district which lies on the north side of Embarcadero Road and approximately 0.6 miles southeast of the University Ave/Downtown Palo Alto area. The site is bounded by Embarcadero Road, Bryant Street, Kellogg Avenue, and Emerson Street.

Existing Land Uses

As described in Chapter 3, Project Description, the project site is fully developed with Castilleja School facilities, including four academic buildings, an outdoor pool, a grassy area, a soccer/baseball field, a small maintenance building, and surface parking lots. Two small residential structures are also located on site; one is used as rental housing and the other, the Lockey Alumnae House, is used for school functions and events. The tree inventory provided in Appendix C identifies 174 trees within and adjacent to the site. This includes one tree that was removed from the project site in 2017 pursuant to a Tree Removal permit (tree #112, a coast redwood) and another tree that has recently been identified as dying from a fungal disease (tree #45, a blue atlas cedar) and in need of removal (Bench 2019). Removal of this tree, if authorized by the City, would not be a result of the Castilleja School Project evaluated in this EIR. As shown in in Figure 3-4, Tree Plan, the project plans anticipated retention of this tree. However, based on an arborist assessment (Bench 2019) that recommended removal of the tree, Castilleja School has submitted a separate application for a Tree Removal permit (City file number 19PLN-00206). In addition, as shown in Figure 3-4, there are 127 trees located within the project site, four trees located on private property adjacent to the site, and 42 street trees (i.e., within the public right-of-way) adjacent to the site.

Embarcadero Road is an arterial route located adjacent to the northern project site boundary. Bryant Street, adjacent to the eastern project site boundary, serves as a bicycle boulevard shared with vehicular traffic. Single-family homes within the City's R-1 zone district surround the project site on three sides and Embarcadero Road on the north-side.

Comprehensive Plan and Zoning Designations

Land use designations and zoning districts for the project area are determined by the Palo Alto Comprehensive Plan and the Palo Alto Municipal Code (PAMC), respectively. The project does not propose any changes to the zoning or land use designation on the project site.

Under the Palo Alto Comprehensive Plan, the project site and surrounding properties are designated Single-Family Residential. This designation applies to residential neighborhoods primarily characterized by detached single-family homes, typically with one dwelling unit on each lot, but churches and schools are permitted with conditional use permits. As described in the Palo Alto Comprehensive Plan, the net density in single-family areas will range from one to seven units per acre, but rises to a maximum of 14 units on parcels where second units or duplexes occur. The project site and surrounding properties to the north, east, and southeast are zoned R-1 (10,000) or R-1. Consistent with the Comprehensive Plan, schools are a conditionally permitted use within the R-1 (10,000) zone district. The maximum allowable lot size in the R-1 (10,000) zone is 19,999 square feet (approximately 0.46 acre). One block southwest of the project site, along Alma Street, the properties are zoned R-2.

Project Permits

Castilleja School first obtained a CUP in 1960 (60-UP-3) to allow construction and use of dormitories for boarding school students. Between 1960 and 1996, several additional CUPs were issued, including those for a Fine Arts Building (74-UP-4); Chapel Rehabilitation and Additions (79-UP-25); Parking Areas (91-UP-53); and a Softball Field with associated parking (92-UP-40). In 1995, Castilleja sought a CUP (95-UP-47) to convert the dormitory building into a library, classrooms, offices, and other uses, as well as to permit 385 students to enroll at the school by the year 1999. In addition, the 1995 CUP required Castilleja School to seek an amendment in 1999 if it sought to increase the student population beyond 385. In 1999, another CUP (99-UP-48) was approved to authorize remodeling the Administration Building and to establish Transportation Demand Management (TDM) requirements (Appendix B), followed by a CUP in 2000 (00-CUP-23) that established an enrollment cap of 415 students. During the 2011-2012 academic school year, the student population exceeded the 2000 CUP enrollment limitation of 415 students.

Castilleja School is requesting a CUP amendment to gradually increase enrollment to 540 students over the course of implementing the phased construction plan, as described in Section 3.4 of the Project Description. Castilleja School also requests phased Architectural Review of the proposal to demolish four buildings, construct an underground parking garage, reconstruct Speiker Field above the garage, relocate the outdoor swimming pool, relocate the central Circle, and construct new academic building, which is proposed to include the school library, staff offices, classrooms, and common space. The project also includes a request for a tentative map to merge three parcels. The Tentative Map includes a request for an exception to allow the resulting lot to exceed the maximum allowable lot size in the R-1 zone district of 19,999 square feet. The project proponent also requests two variances:

- to allow approximately 2,360 square feet of the below-grade parking garage to encroach (below-grade) into the required special setback along Embarcadero Road, as shown on Figure 3-6, Proposed Campus Plan, and Figure 3-7, Garage Plan, with individual encroachments ranging from less than one foot to 24 feet, and
- to replace existing above-ground gross floor area of the academic building with slightly less new gross floor area that would continue to exceed the maximum allowable floor area ratio for the project site.

4.2 REGULATORY FRAMEWORK

There are no federal or state land use regulations pertinent to the analysis of the project's physical environmental effects.

Local Regulations

Palo Alto Comprehensive Plan

<u>Land Use and Community Design Element</u>

Land uses in the project area are governed by the *City of Palo Alto Comprehensive Plan 2030*, adopted by the Palo Alto City Council in November 2017. The Comprehensive Plan contains the City's policies on land use and community design, transportation, housing, natural environment, business and economics, and community services. Its policies apply to both public and private properties. Its focus is on the physical form of the City.

The Land Use and Community Design Element (Chapter 2) of the Comprehensive Plan provides a "constitution" for the development of public and private property. It describes the context in which local planning decisions are made, and presents goals, policies, and programs covering a broad range of growth and development topics. The Land Use and Community Design Element also recognizes that land use decisions must be closely integrated with transportation and economic decisions. Key land use goals and policies of the Comprehensive Plan relevant to the proposed project are listed in this section. A detailed analysis of the project's consistency with these and other policies is provided in Section 4.3.

- Goal L-1: A compact and resilient city providing residents and visitors with attractive neighborhoods, work places, shopping districts, public facilities, and open spaces.
    - Policy L-1.1: Maintain and prioritize Palo Alto's varied residential neighborhoods while sustaining the vitality of its commercial areas and public facilities.
    - Policy L-1.2: Limit future urban development to currently developed lands within the urban service area. The boundary of the urban service area is otherwise known as the urban growth boundary. Retain undeveloped land west of Foothill Expressway and Junipero Serra as open space, with allowances made for very low-intensity development consistent with the open space character of the area. Retain undeveloped land northeast of Highway 101 as open space.
    - Policy L-1.3: Infill development in the urban service area should be compatible with its surroundings and the overall scale and character of the city to ensure a compact, efficient development pattern.
- Goal L-3: Safe, attractive residential neighborhoods, each with its own distinct character and within walking distance of shopping, services, schools, and/or other public gathering places.
    - Policy L-3.1: Ensure that new or remodeled structures are compatible with the neighborhood and adjacent structures.
- Goal L-6: Well-designed buildings that create coherent development patterns and enhance city streets and public spaces.
    - Policy L-6.1: Promote high-quality design and site planning that is compatible with surrounding development and public spaces.
    - Policy L-6.2: Use the Zoning Ordinance, design review process, design guidelines, and Coordinated Area Plans to ensure high quality residential and commercial design and architectural compatibility.
    - Policy L-6.7: Where possible, avoid abrupt changes in scale and density between residential and non-residential areas and between residential areas of different densities. To promote compatibility and gradual transitions between land uses,

place zoning district boundaries at mid-block locations rather than along streets wherever possible.

Natural Environment Element

Chapter 4, Natural Environment, of the Comprehensive Plan, describes the existing concerns, efforts, and programs to protect natural resources and habitat throughout the City. The project site is currently developed and does not contain important biological resources or habitat (as described in the Initial Study; see Appendix A), with the exception of trees. Therefore, goals and policies associated with protecting open space and specific habitat are not applicable to the proposed project. The City of Palo Alto Comprehensive Plan's goals and policies focusing on protecting the City's urban forest are applicable to the proposed project. Specifically, following goals, policies, and programs are relevant to trees on the project site:

- Goal N-2: A thriving urban forest that provides public health, ecological, economic, and aesthetic benefits for Palo Alto.
  - Policy N-2.1: Recognize the importance of the urban forest as a vital part of the city's natural and green infrastructure network that contribute to public health, resiliency, habitat values, appreciation of natural systems, and an attractive visual character which must be protected and enhanced.
    - Program N2.1.1: Explore ways to prevent and ameliorate damage to trees and tree roots by above and below ground infrastructure and buildings.
  - Policy N-2.9: Minimize removal of, and damage to, trees due to construction-related activities such as trenching, excavation, soil compacting, and release of toxins.
  - Policy N-2.10: Preserve and protect Regulated Trees, such as native oaks and other significant trees, on public and private property, including landscape trees approved as part of a development review process and consider strategies for expanding tree protection in Palo Alto.
    - Program N2.10.1: Continue to require replacement of trees, including street trees lost to new development.
    - Program N2.7.3: Actively pursue funding for tree planting to increase canopy cover significantly across the city, avoid a net loss of canopy at the neighborhood level and attain canopy size targets in parks, open space, parking lots and City rights-of-way.

Palo Alto Municipal Code

Zoning Ordinance

The purpose of the Palo Alto Zoning Ordinance (Title 18 of the Palo Alto Municipal Code) is to accomplish the objectives, policies, and programs of the Palo Alto Comprehensive Plan, as stated in Section 18.01.020. The Zoning Ordinance regulates all land uses and development within the City of Palo Alto by establishing development standards and allowable land uses for each zone district. Proposed land uses, buildings, structures, and land division must comply with these regulations.

R-1 zoning standards are expressed in Chapter 18.12. The R-1 single-family residential district is intended to create, preserve, and enhance areas suitable for detached dwellings with a strong presence of nature and with open area affording maximum privacy and opportunities for outdoor living and children's play. Minimum site area requirements are established to create and preserve variety among neighborhoods, to provide adequate open area, and to encourage quality design. Community uses and facilities, such as schools and churches, should be limited unless no net loss of housing would result. Private educational facilities are permitted with a Conditional Use Permit.

The special residential building site R-1 subdistricts are based on minimum lot size and are intended to modify the site development regulations of the R-1 single family residence district, where applied in combination with the R-1 district, to create and maintain single-family living areas of varying site size and development characteristics, to reflect and preserve the character of existing neighborhoods. Within the R-1 (10,000) subdistrict, new parcels are required to have a minimum of 10,000 square feet and a maximum of 19,999 square feet.

Buildings in R-1 zones are restricted to a maximum roof height of 30 feet, or 33 feet for buildings with a roof pitch of 12:12 or greater. Per Section 18.12.060, underground parking is prohibited for single-family uses. However, the existing campus is not in single-family residential use. The single family homes on the two properties proposed to be merged with the existing campus are proposed to be demolished and become part of the school campus with the requested Tentative Map with Exception. The subterranean garage proposed beneath the project site is subject to formal Architectural Review and would require approval of a Variance to allow subterranean encroachment into the Embarcadero Road special setback.

Design of parking facilities is regulated by Section 18.54 (Parking Facility Design Standards). These standards address parking facilities generally and include specific requirements related to accessible parking, bicycle parking and facility landscaping. Section 18.54.70 outlines all the dimensional requirements for both above and below ground parking facilities, including driveway ramp setbacks and stall widths.

Section 18.12.040 of the Municipal Code contains R-1 residential development standards. These include a rear yard setback of 20 feet and street side yard setback of 16 feet. Maximum site coverage for multiple story development is 35 percent, with an additional 5 percent permitted to be covered by a patio or overhang. The maximum house size is 6,000 square feet. The maximum floor area ratio (FAR) is 0.45 for the first 5,000 square feet of lot size and 0.30 for square footage of the lot size in excess of 5,000 square feet.

Excavated features (e.g., below-grade patios or sunken gardens) are permitted and should be screened to off-site views by means of landscaping and/or fencing as determined appropriate by the planning director per Section 18.12.090. Palo Alto Municipal Code section 18.12.040(b) presents Table 3, which establishes how FAR is calculated in the R-1 zone. This table indicates that within the above-grade portion of the building, the following building components are counted towards the FAR:

- Space that is equivalent to a second or third floor (i.e., with ceiling height of 17 feet or more, or with a ceiling height of 26 feet or more) is counted twice (for second floor equivalent) and three times (for third floor equivalent).
- Entry features less than 12 feet in height, if not substantially enclosed and not recessed, are counted once while entry features greater than 12 feet in height are counted twice.
- First floor exterior spaces are not counted towards FAR while second floor roofed or enclosed porches, arcades, balconies, porticos, breeze-ways are counted towards FAR.
- Any habitable space within basements is not included in the calculation of gross floor area when the finished level of the first floor is no more than 3 feet above the grade around the perimeter of the building foundation.
- Lightwells, stairwells, and similar excavated features along the perimeter of the basement shall not affect the measurement of grade for the purposes of determining gross floor area, provided that several criteria are met, including:
    - Such features are not located in the front of the building;
    - Such features shall not exceed 3 feet in width; and
    - The cumulative length of all such features does not exceed 30% of the perimeter of the basement.
        - Below-grade patios, sunken gardens, or similar excavated areas along the perimeter of the basement shall not affect the measurement of grade for the purposes of determining gross floor area, provided that all such areas combined do not exceed 2 percent of the area of the lot or 200 square feet, whichever is greater; that each such area does not exceed 200 square feet; and that each such area is separated from another by a distance of at least 10 feet. Area devoted to required stairway access shall not be included in the 200 square foot limitation.

Tree Preservation and Management Ordinance

Tree removal is regulated by Title 8 of the Palo Alto Municipal Code. Chapter 8.10 contains the City's tree preservation and management regulations. The intent of Chapter 8.10 is to promote the health, safety, welfare, and quality of life of the residents of the City through the protection of specified trees located on private property and the establishment of standards for removal, maintenance, and planting of trees. In establishing these procedures and standards, it is the City's intent to encourage the preservation of trees. The City regulates maintenance and/or removal of (1) protected trees, (2) heritage trees, (3) street trees, and (4) other trees specifically designated by the City. The Palo Alto Municipal Code defines protected trees as any coast live oak (*Quercus agrifolia*) or valley oak (*Q. lobata*) that measures 11.5 inches in diameter or more when measured 4.5 feet above natural grade, and any coast redwood (*Sequoia sempervirens*) that is 18 inches in diameter or more when measured 4.5 feet above natural grade. Heritage trees can be of any size or species and are designated as such by the City Council, based on distinctive characteristics such as being of great size, unique form, or other historical significance. Street trees include all trees growing within the street right-of-way outside of private property. Lastly, for projects on public or private property subject to a discretionary review, the City can specifically designate trees to be saved and protected. Trees that do not fall into one of the above four categories may be maintained or removed without City review or approval.

The Palo Alto Tree Technical Manual (City of Palo Alto 2001) contains regulations necessary for implementation of Chapter 8.10 of the City's Municipal Code. The Tree Technical Manual includes standards and specifications regarding protection of trees during construction, replacement of trees allowed to be removed, maintenance of protected trees, the format and content of required tree reports, and the criteria for determining whether a tree is dangerous.

The Urban Forest Master Plan (City of Palo Alto 2019), Policy 6.C., directs that all projects should "strive for no net loss/increase in canopy cover." To accomplish this, the City encourages projects to retain as many trees as reasonable, prioritize replanting on-site for those that need to be removed, and mitigate with off-site planting or in-lieu payments for the remainder to insure no net loss of canopy is achieved.

4.3 PROJECT IMPACTS

Methods of Analysis

The following assessment of land use impacts is based on a review of applicable plan, policy, and regulatory documents, as well as consultation with City of Palo Alto Planning Department staff. Information related to land uses was reviewed in light of the proposed project to evaluate the project's consistency with relevant plans and policies, and to determine land use compatibility.

The first impact discussed in this section relates to the conformance of the proposed project with all applicable Comprehensive Plan policies and other City plans as they relate to the protection of environmental resources, including those resource policies and environmental issue areas covered in other sections of this EIR. Where mitigation measures are necessary to ensure compliance with the City's policies required for the protection of environmental resources, those measures are referenced in the first impact discussion. The full text of each mitigation measure is presented in each of the sections of this EIR, and is not repeated here.

Significance Criteria

Appendix G of the CEQA Guidelines provides the criteria that were used to determine whether the proposed project would have a significant environmental impact related to land use. Potentially significant impacts associated with the proposed project have been evaluated using the following significance criteria. Would the project:

- Conflict with any applicable land use plan, policy, or regulation of an agency with jurisdiction over the project (including, but not limited to the general plan, specific plan, or zoning ordinance) adopted for the purpose of avoiding or mitigating an environmental effect?
- Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance?
- Create an incompatibility with surrounding land uses (current and planned) or physically divide an existing community?

The Land Use and Planning section of CEQA Guidelines Appendix G also identifies a significance criteria that requires consideration of whether a project would conflict with any applicable habitat conservation plan or natural community conservation plan. As identified in the NOP for this EIR and Chapter 2, Introduction, there are no habitat conservation plans or natural community conservation plans applicable to the project site and this issue is not discussed further.

Impact Analysis

IMPACT 4-1:	Conflict with land use plan, policy, or regulation of an agency with jurisdiction over the project (including, but not limited to the general plan, specific plan, or zoning ordinance) adopted for the purpose of avoiding or mitigating an environmental effect.
SIGNIFICANCE:	Significant
MITIGATION MEASURES:	Mitigation Measures 4a, 4b, 7a, 7b, and 7c (see Chapter 7, Transportation), and 8a and 8b (see Chapter 8, Noise)
SIGNIFICANCE AFTER MITIGATION:	Less than Significant

The project site is zoned for and surrounded by residential uses. The existing school use on the project site is a conditionally permitted use in the R-1 zone district and Single-Family Residential land use designation, and the school has obtained multiple CUPs between 1960 and 2000 as described in Section 4.1. The proposed project would continue existing school operations on the existing campus site but would intensify operations by increasing enrollment. The project would remove the residential structures on the two Emerson Street properties (one is not currently used as a residence) and would merge the existing three parcels into a single parcel with 286,783 square feet. This would require approval of a Tentative Map with Exception to allow the single parcel to exceed the maximum allowable lot size in the R-1 zone.

The project would demolish two onsite residential structures, the fine arts building, the existing classroom building, Campus Center building, the at-grade pool, pool equipment building, and maintenance building and construct a below-grade parking structure, below-grade pool with sound-attenuation barrier, a new academic building to include the school library and classrooms, vehicle ramp to below-grade trash enclosure and service/loading area adjacent to the fitness/athletic center. The project would slightly reduce the total amount of above-ground gross floor area relative to the existing buildings located one the existing campus parcel. As shown in Table 3-1 in Chapter 3, Project Description, within the expanded school campus the project would demolish 90,593 square feet of above-grade building space and replace it with 84,238 square feet of new above-grade construction.

The project would include construction of a privately owned 0.33-acre open space area on the site that neighbors would be permitted to use. The open space would be located on a major portion of the two Emerson Street properties that are proposed to be merged into the campus; the Emerson properties taken together are currently comprised of 18,000 square feet or 0.41-acre.

Palo Alto Comprehensive Plan Consistency

The project would be subject to the policies of the Comprehensive Plan. Table 4-1 lists the Comprehensive Plan policies applicable to the proposed project and evaluates the project's consistency with each of these policies. As shown in Table 4-1, the proposed project would be substantially consistent with applicable goals and policies of the Comprehensive Plan. For those Comprehensive Plan goals and policies that do not specifically pertain to the proposed project, the project would not impede the City's ability to meet those goals and policies.

Table 4-1
Comprehensive Plan Policy Consistency Analysis

Policy	Analysis
Land Use and Community Design	
Concentrating Development within the Urban Service Area	
Policy L-1.1: Maintain and prioritize Palo Alto's varied residential neighborhoods while sustaining the vitality of its commercial areas and public facilities.	**Consistent**. The project would both maintain and prioritize the residential neighborhood surrounding the project site as well as enhance the functionality of the Castilleja School. The project would enable the school to redevelop its facilities for increased safety, sustainability, and programmatic space to better serve its student population. The project would also include features to minimize existing school-related disruptions on the surrounding neighborhood with regard to traffic and noise, described further in Impact 4-2 below. In addition, the project would provide amenities that would benefit the community, including the landscaping, the preservation of mature trees, and construction of a 0.33-acre privately owned open space area.
Policy L-1.2: Limit future urban development to currently developed lands within the urban service area. The boundary of the urban service area is otherwise known as the urban growth boundary. Retain undeveloped land west of Foothill Expressway and Junipero Serra as open space, with allowances made for very low-intensity development consistent with the open space character of the area. Retain undeveloped land northeast of Highway 101 as open space.	**Consistent**. The project site is currently developed with school facilities and located within the City's urban growth boundary.
Policy L-1.3: Infill development in the urban service area should be compatible with its surroundings and the overall scale and character of the city to ensure a compact, efficient development pattern.	**Consistent**. As described in Chapter 3, Project Description, the project would redevelop the project site and new structures would comply with the City's building height and setbacks requirements. As described in Chapter 5, Aesthetics, the proposed design of the new Academic building is intended to have scale and character that is compatible with the surrounding neighborhood. The proposed building design is subject to the City's design review process and

Table 4-1
Comprehensive Plan Policy Consistency Analysis

Policy	Analysis
	the review and recommendations of the Architectural Review Board.
Regulating Land Use	
Policy L-1.5: Regulate land uses in Palo Alto according to the land use definition in this Element and Map L-6.	**Consistent**. As described above, school uses are conditionally permitted uses in areas designated as Single-Family Residential. No change to the land use designation of the site is proposed as part of the project.
Policy L-1.6: Encourage land uses that address the needs of the community and manage change and development to benefit the community.	**Consistent**. The project would demolish two residential structures, one of which was recently used as a rental property. The loss of this housing unit would be a loss of a current land use that is much needed in the community. However, the project would continue the existing school land use on the existing campus site and include expansion of the enrollment cap and redevelopment of school facilities to adapt its facilities for increased safety, sustainability, and programmatic space to continue to serve Palo Alto with a single-gender, non-sectarian school. Schools are also an important need within the community. Therefore, on balance, the project is consistent with this policy.
Growth Management and Monitoring	
Policy L-1.11: Hold new development to the highest development standards in order to maintain Palo Alto's livability and achieve the highest quality development with the least impacts.	**Consistent.** The project design would be subject to the City's Architectural Review process to ensure that design elements, architectural features, and building colors and materials meet with the City's design standards. Proposed building designs include a number of sustainability measures, such as façade shading from roof overhangs (under four feet deep) and solar shading screens, solar panels, high-efficiency and noise-mitigation glazing, natural lighting for all teaching spaces and spaced spaces through skylights or wall glazing, durable and sustainable exterior siding materials, locally sourced interior finishes, water-efficient plumbing fixture, graywater irrigation, and bioretention landscaping features. The project would also include construction of a 0.33-acre privately owned open space area at Emerson Street and Melville Avenue in the northwest corner of the project site that neighbors would be permitted to access.
A Sustainable Community	
Policy L-2.8: When considering infill redevelopment, work to minimize displacement of existing residents.	**Consistent**. The project site contains two existing residential structures; one has been used for the past 8 years for school functions and events and the other is used as rental housing. The project

Table 4-1
Comprehensive Plan Policy Consistency Analysis

Policy	Analysis
	would include demolition of both of these on-site residences, resulting in the displacement of one rental housing unit. The loss of these two housing units, one of which is currently being used for housing, would not displace a substantial number of residents.
Policy L-2.11: Encourage new development and redevelopment to incorporate greenery and natural features such as green rooftops, pocket parks, plazas, and rain gardens.	**Consistent**. As shown on the project's landscaping plan, the project would preserve the majority of trees around the site's perimeter and include additional landscaping with trees, shrubs, grasses, vines, and groundcover. This would include sunken gardens adjacent to buildings, bioretention areas, and a green roof above the proposed subterranean parking garage. The proposal includes retaining 97 trees, removing 35 trees and relocating 40 trees. The project would also include a 0.33-acre privately owned open space area that neighbors would be allowed to access.
Neighborhood Compatibility	
Policy L-3.1: Ensure that new or remodeled structures are compatible with the neighborhood and adjacent structures.	**Consistent**. As described in Chapter 3, one of the project objectives is to achieve better architectural compatibility with the adjacent neighborhood compared to the existing buildings on-site. Proposed design for the new Academic building is shown in the site plans in Appendix B2. The proposed building complies with the height limit established in the PAMC for the R-1 zone. This will help ensure that building scale and massing is compatible with neighboring residences. Additionally, as discussed and presented in figures in Chapter 5, Aesthetics, the proposed buildings would be slightly smaller in scale and mass than the existing buildings and building design incorporates articulation and variety in material and colors to further break up the massing. Architectural features, fencing and walls are similar to those found in residential, rather than institutional, neighborhoods such as large roof overhangs with exposed wood beams, trellised patios and outdoor covered areas, and use of exterior materials that are predominant in the neighborhood.
Design of Buildings and Public Space	
Policy L-6.1: Promote high-quality design and site planning that is compatible with surrounding development and public spaces.	**Consistent**. One of the project objectives identified in Chapter 3 is to achieve better architectural compatibility with the adjacent neighborhoods and improve site aesthetics through landscaping. Proposed building designs are shown in the site plans in Appendix B2. The

Table 4-1
Comprehensive Plan Policy Consistency Analysis

Policy	Analysis
	project would include the removal of five institutional buildings and construction of two new buildings with slightly less gross floor area than the existing campus buildings. As shown in the site plans and discussed in Chapter 5, Aesthetics, the new academic building to include the school library and classrooms includes variegated building façades to break up the bulk and mass of the building, as well as building materials that are compatible with the existing residences surrounding the site. Removing outdated buildings that are substantially lower quality than buildings built to current standards would promote high-quality design and site planning. The new building would be designed to be more consistent with the surrounding neighborhood, while meeting the current design guidelines set forth in the Palo Alto Municipal Code. The proposed below-grade parking garage would relocate circulating and parked vehicles from the neighborhood streets by routing most pick-up and drop-off traffic through the garage and by providing on-site parking to reduce the amount of on-street parking in the neighborhood. These changes would allow the school use to be more compatible with its residential neighbors. The bus drop-off and pick-up area would also be relocated internal to the site, and loading, delivery, and trash functions would be moved off City streets and onto school property, below grade, to reduce neighborhood congestion and noise.
Policy L-6.7: Where possible, avoid abrupt changes in scale and density between residential and non-residential areas and between residential areas of different densities. To promote compatibility and gradual transitions between land uses, place zoning district boundaries at mid-block locations rather than along streets wherever possible.	**Consistent**. As described above, the new building façades would be scaled to the size of neighboring residences, which would avoid abrupt changes in scale between residential and non-residential uses. The project would also increase the amount of undeveloped open space on the project site by approximately 12,257 square feet and create a privately-owned 0.33-acre open space area that neighbors would be permitted to use.
Parks and Gathering Places	
Policy L-8.1: Facilitate creation of new parkland to serve Palo Alto's residential neighborhoods, as consistent with the Parks, Trails, Open Space, and Recreation Master Plan.	**Consistent**. The project would include a new privately-owned 0.33-acre open space area that neighbors would be permitted to use.
Streets and Parking	
Policy L-9.2: Encourage development that creatively integrates parking into the project, including by locating it behind buildings or	**Consistent**. The project would reduce the amount of surface parking on the site from 74 spaces to 27 spaces, and construct an underground parking

Table 4-1
Comprehensive Plan Policy Consistency Analysis

Policy	Analysis
underground wherever possible, or by providing shared use of parking areas. Encourage other alternatives to surface parking lots that minimize the amount of land devoted to parking while still maintaining safe streets, street trees, a vibrant local economy, and sufficient parking to meet demand.	garage with 115 spaces. With most drop-off and pick-up traffic routed through the underground parking garage, and the availability of on-site parking, the parking garage would relocate vehicle circulation and parking away from the neighborhood streets such that the school use can be more compatible with its residential neighbors.
Policy L-9.3: Treat residential streets as both public ways and neighborhood amenities. Provide and maintain continuous sidewalks, healthy street trees, benches, and other amenities that promote walking and “active” transportation.	**Consistent**. The project would include bicycle parking for students consistent with the Municipal Code. The project would be consistent with all above-ground setback and landscaping requirements which would ensure a high-quality and comfortable pedestrian experience on adjacent residential streets.
Public Spaces	
Policy L-9.4: Maintain and enhance existing public gathering places and open spaces and integrate new public spaces at a variety of scales.	**Consistent**. The project would include construction of a privately-owned 0.33-acre open space area in the northwestern portion of the project site that neighbors would be permitted to use.
Policy L-9.6: Create, preserve and enhance parks and publicly accessible, shared outdoor gathering spaces within walking and biking distance of residential neighborhoods.	**Consistent**. The project would create a more welcoming environment with enhanced views and public gathering spaces. The project would increase the amount of open space on the project site by approximately 12,257 square feet, thereby enhancing public access to the project site. The project would also add a privately-owned 0.33-acre open space area at Emerson Street and Melville Avenue that neighbors would be permitted to use.
Transportation	
Sustainable Transportation	
Policy T-1.1: Take a comprehensive approach to reducing single-occupant vehicle trips by involving those who live, work and shop in Palo Alto in developing strategies that make it easier and more convenient not to drive.	**Consistent.** As part of the proposed Sustainability Plan, Castilleja School will implement additional Transportation Demand Management strategies to reduce peak hour vehicle trips (Appendix B). This includes encouraging bicycling, walking, and carpooling and providing shuttle and bus service.
Policy T-1.2: Collaborate with Palo Alto employers and business owners to develop, implement and expand comprehensive programs like the TMA to reduce single-occupant vehicle commute trips, including through incentives.	**Consistent.** As part of the proposed Sustainability Plan, Castilleja School will implement additional Transportation Demand Management strategies to reduce peak hour vehicle trips (Appendix B). This includes encouraging bicycling, walking, and carpooling and providing shuttle and bus service.

Table 4-1
Comprehensive Plan Policy Consistency Analysis

Policy	Analysis
Reducing Greenhouse Gas Emissions	
Policy T-1.3: Reduce GHG and pollutant emissions associated with transportation by reducing VMT and per-mile emissions through increasing transit options, supporting biking and walking.	**Consistent.** As part of the proposed Sustainability Plan, Castilleja School will implement additional Transportation Demand Management strategies to reduce peak hour vehicle trips (Appendix B). This includes encouraging bicycling, walking, and carpooling and providing shuttle and bus service.
Increasing Transit Use	
Policy T-1.6: Encourage innovation and expanded transit access to regional destinations, multi-modal transit stations, employment centers and commercial centers, including those within Palo Alto through the use of efficient public and/or private transit options such as rideshare services, on-demand local shuttles and other first/last mile connections.	**Consistent.** As part of the proposed Sustainability Plan, Castilleja School will expand the school's Transportation Demand Management program, including expanding shuttle and bus service (Appendix B).
Bicycling and Walking	
Policy T-1.16: Promote personal transportation vehicles an alternative to cars (e.g. bicycles, skateboards, roller blades) to get to work, school, shopping, recreational facilities and transit stops.	**Consistent.** As part of the proposed Sustainability Plan, Castilleja School will implement additional Transportation Demand Management strategies to reduce peak hour vehicle trips (Appendix B). This includes encouraging bicycling, walking, and carpooling and providing shuttle and bus service.
Policy T-1.19: Provide facilities that encourage and support bicycling and walking.	**Consistent.** The project includes bicycle parking for students in accordance with the Municipal Code.
Traffic Delay and Congestion	
Policy T-2.3: Use motor vehicle LOS at signalized intersections to evaluate the potential impact of proposed projects, including contributions to cumulative congestion. Use signal warrants and other metrics to evaluate impacts at unsignalized intersections.	**Consistent.** Chapter 7, Transportation, of this EIR provides a detailed analysis of the project's potential impacts to intersection levels of service and identifies mitigation measures to reduce adverse effects to LOS at signalized intersections.
Policy T-2.4: Consistent with the principles of Complete Streets adopted by the City, work to achieve and maintain acceptable levels of service for transit vehicles, bicyclists, pedestrians and automobiles on roads in Palo Alto, while maintaining the ability to customize to the Palo Alto context.	**Consistent.** The analysis in Chapter 7, Transportation, includes consideration of levels of service and safety for transit, bicyclists, pedestrians, and automobiles. The proposed project would have a potentially significant impact on transportation levels of service because it would make a considerable contribution to the increased delays at the Kingsley Avenue/Alma Street intersection in the cumulative scenario. Mitigation Measure 7a requires implementation of the proposed enhanced Transportation Demand Management Plan to reduce these effects. Although the impact would remain significant and unavoidable because the City cannot guarantee

Table 4-1
Comprehensive Plan Policy Consistency Analysis

Policy	Analysis
	that it would be feasible to improve the LOS to an acceptable level at this location, the project is consistent with Policy T-2.4 because the EIR identifies ways that the City could improve LOS at this location and work towards achieving an acceptable LOS.
Neighborhood Impacts	
Policy T-4.6: Require project proponents to employ the TIRE methodology to measure potential street impacts from proposed new development of all types in residential neighborhoods.	**Consistent.** Chapter 7, Transportation, includes analysis of the project's effects using the TIRE methodology.
Motor Vehicle and Bicycle Parking	
Policy T-5.1: All new development projects should manage parking demand generated by the project, without the use of onstreet parking, consistent with the established parking regulations. As demonstrated parking demand decreases over time, parking requirements for new construction should decrease.	**Consistent.** The proposed project would place most parking in a below-grade parking garage within the project site. Currently, the campus does not provide sufficient vehicle parking to meet the Municipal Code requirements. The proposed on-site parking would exceed the Municipal Code requirements. Further, it would improve the ratio of parking spaces to students, which would reduce the amount of on-street parking in the neighborhood.
Policy T-5.6: Strongly encourage the use of below-grade or structured parking, and explore mechanized parking instead of surface parking for new developments of all types while minimizing negative impacts including on groundwater and landscaping where feasible.	**Consistent.** The proposed project would place most parking in a below-grade parking garage within the project site.
Policy T-5.11: Work to protect residential areas from parking impacts of nearby businesses and uses, recognizing that fully addressing some existing intrusions may take time.	**Consistent.** The proposed project would place most parking in a below-grade parking garage within the project site and would provide on-site parking in excess of the Municipal Code requirements. The development of below-grade parking would reduce the use of on-street parking by students and parents and would therefore reduce the intrusion of campus vehicles on on-street parking in the residential neighborhood.
Policy T-5.12: To promote bicycle use, increase the number of safe, attractive and well-designed bicycle parking spaces available in the city, including spots for diverse types of bicycle and associated equipment, including bicycle trailers, prioritizing heavily travelled areas such as commercial and retail centers, employment districts, recreational/cultural facilities, multi-modal transit facilities and ride share stops for bicycle parking infrastructure.	**Consistent.** The project includes provision of on-site bicycle parking and a bicycle repair station for students and staff. As part of the Transportation Demand Management Plan (Appendix B), the project would also provide for bicycle "fix-it" days to encourage bike riding.

Table 4-1
Comprehensive Plan Policy Consistency Analysis

Policy	Analysis
Urban Forest and Understory	
Policy N-2.1: Recognize the importance of the urban forest as a vital part of the city's natural and green infrastructure network that contributes to public health, resiliency, habitat values, appreciation of natural systems and an attractive visual character which must be protected and enhanced.	**Consistent.** Impact 4-3 evaluates the project's potential to result in adverse effects to the existing trees within and adjacent to the project site and the proposed landscaping plan includes planting new trees throughout the campus. The project would retain 97 trees, removing 35 trees and relocating 40 trees. The Tree Removal Management Program is intended to ensure the protection of existing trees and the survival of new and replanted trees. Replanting established trees causes significant impact which will require long term care plus mitigation for reduction of health and longevity.
Policy N-2.4: Protect soils in both urban and natural areas as the foundation of a healthy urban forest. Recognize that healthy soils are necessary to filter air and water, sustain plants and animals and support buildings and infrastructure.	**Consistent.** Impact 4-3 evaluates the project's potential to result in adverse effects to the existing trees within and adjacent to the project site, including consideration of effects due to encroachment into the soil area necessary to support healthy trees. Specifically, the Arborist Report (Appendix C) provides recommendations regarding provision and/or protection of adequate soil area to support healthy tree growth.
Policy N-2.6: Improve the overall distribution of citywide canopy cover, so that neighborhoods in all areas of Palo Alto enjoy the benefits of a healthy urban canopy.	**Consistent.** Mitigation Measure 4b requires Castilleja School to plant trees in landscape planters along public streets in the project vicinity. This will improve the canopy cover in the neighborhood.
Policy N-2.8: Require new commercial, multi-unit and single-family housing projects to provide street trees and related irrigation systems.	**Consistent.** The project would retain most of the existing street trees around the project site perimeter and would plant additional street trees in the vicinity as required by Mitigation Measure 4b.
Policy N-2.9: Minimize removal of, and damage to, trees due to construction-related activities such as trenching, excavation, soil compacting and release of toxins.	**Consistent.** Impact 4-3 evaluates the project's potential to result in adverse effects to the existing trees within and adjacent to the project site, including consideration of effects due to encroachment into the soil area necessary to support healthy trees. The project would retain 97 trees, removing 35 trees and relocating 40 trees. Mitigation Measure 4b requires that the project applicant prepare and implement a Tree Protection, Removal, and Relocation Plan for each construction phase, subject to review and approval by the City's Urban Forester. Further, this plan must include specific measures for the protection of retained trees from adverse effects associated with construction activities.
Policy N-2.10: Preserve and protect Regulated Trees, such as native oaks and other significant	**Consistent.** Impact 4-3 evaluates the project's consistency with the City's Tree Protection and

Table 4-1
Comprehensive Plan Policy Consistency Analysis

Policy	Analysis
trees, on public and private property, including landscape trees approved as part of a development review process and consider strategies for expanding tree protection in Palo Alto.	Management ordinance. The project would retain 97 trees, removing 35 trees and relocating 40 trees. The Tree Protection, Removal, and Relocation Plan required under Mitigation Measure 4b, which is subject to review and approval by the City's Urban Forester, must include specific measures for the protection of retained trees from adverse effects associated with construction activities.
Noise	
Policy N-6.7: While a proposed project is in the development review process, the noise impact of the project on existing residential land uses, public open spaces and public conservation land should be evaluated in terms of the increase in existing noise levels for the potential for adverse community impact, regardless of existing background noise levels. If an area is below the applicable maximum noise guideline, an increase in noise up to the maximum should not necessarily be allowed.	**Consistent.** Chapter 8, Noise, of this EIR provides a detailed analysis of the potential noise impacts associated with the project. The proposed project could create a substantial increase in ambient noise levels for some neighbors during construction and associated with the use of amplified sound equipment at the proposed pool. However, implementation of Mitigation Measures 8a and 8b which require use of noise management measures during construction and modeling that demonstrates the sound system at the pool would be designed and installed such that noise levels remain in compliance with the City's standards, would ensure that the proposed project would be compliant with Policy N-6.7.
Policy N-6.8: The City may require measures to reduce noise impacts of new development on adjacent properties through appropriate means including, but not limited to, the following: • Orient buildings to shield noise sensitive outdoor spaces from sources of noise. • Construct noise walls when other methods to reduce noise are not practical and when these walls will not shift similar noise impacts to another adjacent property. • Screen and control noise sources such as parking lots, outdoor activities and mechanical equipment, including HVAC equipment. • Increase setbacks to serve as a buffer between noise sources and adjacent dwellings. • Whenever possible, retain fences, walls or landscaping that serve as noise buffers while considering design, safety and other impacts. • Use soundproofing materials, noise reduction construction techniques, and/or acoustically rated windows/doors.	**Consistent.** Chapter 8, Noise, of this EIR identifies the anticipated noise levels associated with special events and truck activity and finds that impacts would remain less than significant. The proposed project would relocate truck activity to a below-grade loading and trash enclosure area.

Table 4-1
Comprehensive Plan Policy Consistency Analysis

Policy	Analysis
• Include auxiliary power sources at loading docks to minimize truck engine idling. • Control hours of operation, including deliveries and trash pickup, to minimize noise impacts.	
Policy N-6.11: Continue to prioritize construction noise limits around sensitive receptors, including through limiting construction hours and individual and cumulative noise from construction equipment.	**Consistent.** Chapter 8, Noise, of this EIR identifies the general noise levels associated with construction and includes Mitigation Measure 8b requiring Castilleja School to submit detailed construction equipment and noise management plans for each construction phase.
Energy	
Policy N-7.4: Maximize the conservation and efficient use of energy in new and existing residences and other buildings in Palo Alto.	**Consistent.** As part of the proposed Sustainability Plan, Castilleja School will work towards achieving "zero net energy" use by using renewable energy generated onsite to meet the majority of energy demand. This may include photovoltaics, solar water heating, and/or wastewater heat recovery.
Policy N-7.5: Encourage energy efficient lighting that protects dark skies and promotes energy conservation by minimizing light and glare from development while ensuring public health and safety.	**Consistent.** As part of the proposed Sustainability Plan, Castilleja School will work towards achieving "zero net energy" use by using renewable energy generated onsite to meet the majority of energy demand. This may include photovoltaics, solar water heating, and/or wastewater heat recovery.
Policy N-7.6: Support the maximum economic use of solar electric (photovoltaic) and solar thermal energy, both as renewable supply resources for the Electric Utility Portfolio and as alternative forms of local power generation.	**Consistent.** As part of the proposed Sustainability Plan, Castilleja School will work towards achieving "zero net energy" use by using renewable energy generated onsite to meet the majority of energy demand. This may include photovoltaics, solar water heating, and/or wastewater heat recovery.
Climate Change and Climate Adaptation	
Policy N-8.1: Take action to achieve target reductions in greenhouse gas emission levels from City operations and the community activity of 80 percent below 1990 levels by 2030.	**Consistent.** The project would replace four buildings with new construction that is more energy efficient and water efficient than the existing structures which would help reduce greenhouse gas emissions. The project also includes implementation of a Sustainability Plan that would further reduce Castilleja School's contribution to greenhouse gas emissions.
Natural Hazards	
Policy S-2.5: Minimize exposure of people and structures to geologic hazards, including slope stability, subsidence and expansive soils, and to seismic hazards including groundshaking, fault rupture, liquefaction and landslides.	**Consistent.** The geotechnical report for the proposed project demonstrates that the geologic and soil conditions at the site are suitable to support the proposed improvements.

Palo Alto Zoning Ordinance Consistency

As described in item (a) of PAMC Section 18.12.010, the R-1 single-family residential district is intended to create, preserve, and enhance areas suitable for detached dwellings with a strong presence of nature and with open area affording maximum privacy and opportunities for outdoor living and children's play. The R-1 district also seeks to create and preserve variety among neighborhoods, to provide adequate open area, and to encourage quality design. Private schools and community facilities are an allowed use in the R-1 zone, subject to issuance of a CUP.

The project would include creation of a publically-accessible private open space area that neighbors would be permitted to access. This would allow for passive outdoor activities. The proposed building design is intended to be compatible with the neighborhood through the use of appropriate setbacks, horizontal articulation in the building façade, and use of building materials and colors that are reflective of the materials and colors present throughout the neighborhood. Thus, the project would be consistent with the stated purpose of the R-1 district. However, the purpose section also states, "Community uses and facilities, such as churches and schools, should be limited unless no net loss of housing would result." The project would lead to the loss of one residential structure currently used as a residence, and the loss of a second residential structure that is not currently in residential use. Thus, there would be a net loss of one housing unit. However, the project is the redevelopment of an existing school site, not the establishment of a new school or community facility in a residential area that could cause the loss of a significant number of housing units. The use of the term "should" in the Municipal Code indicates that the City Council may use discretion in determining whether the net loss of a single housing unit would impede the city's ability to provide sufficient housing opportunities.

Project consistency with the Zoning Ordinance is evaluated in Table 4-2. The project site contains some existing features that do not comply with the Zoning Ordinance, including maximum lot size, maximum FAR, and maximum building height. Existing exceedances in development standards would not indicate potential for the project to have an environmental effect, unless the project exacerbated the existing violations. As shown in Table 4-2, the proposed building designs would bring the maximum building height on the site into compliance with the Zoning Ordinance. As shown on Figures 4-1 and 4-2, Building Elevations, the library roofline would be at a height of 28 feet; roof mounted photovoltaic panels would increase the height to 30 feet. Most other site characteristics would comply with the remaining development standards, including setbacks, site coverage, and vehicle and bicycle parking. However, the project includes a request for further exceedance of maximum lot size via a Tentative Map with Exception process, and removal and replacement of existing non-complying gross floor area.

Table 4-2
Zoning Ordinance Policy Consistency Analysis

Development Standard	R-1(10,000) Zoning	Existing Property	Proposed Project
Minimum – Maximum Lot Size	10,000 – 19,999 square feet	286,783 square feet (project site)- includes 268,762 sq ft existing campus parcel plus lot area of two Castilleja-owned parcels (10,500 sq ft and 7,500 sq ft)	286,783 square feet (three parcels merged)
Maximum Floor Area Ratio	0.45 first 5,000 square feet of lot size; 0.30 square footage in excess of 5,000 square feet	Allowable: 1310 Bryant Street, 0.30; 1263 Emerson Street, 0.37; 1235 Emerson Street, 0.40. Total 0.31 Existing: 0.43	Allowable: 0.30 Proposed: 0.41
Maximum Building Height	30 feet standard; 33 feet for buildings with a roof pitch of 12:12 or greater	34 feet 6 inches	30 feet
Minimum Setbacks			
Emerson	20 feet	20 feet	20 feet
Kellogg	20 feet	27 feet 9 inches	20 feet
Bryant	20 feet	22 feet	20 feet
Embarcadero	24 feet	108 feet 6 inches	Above grade: 108 feet 6 inches (no change above grade) Below grade: 0 feet, variance requested
Maximum site coverage, multiple-story development	35% (100,374 square feet)	23% (65,263 square feet)	29% (83,043 square feet)
Vehicle Parking	2 spaces per middle grade teaching station, 4 spaces per upper grade teaching station	74	142
Bicycle Parking	1 space for every 5 students	95	140

Source: City of Palo Alto 2018; Appendix B

Palo Alto Municipal Code section 18.12.040 defines the maximum allowable gross floor area as a Floor Area Ratio (FAR) of 0.45 for the first 5,000 square feet of lot size and 0.30 for the portion of the lot in excess of 5,000 square feet. With a total project site area of 286,783 square feet, the maximum allowable FAR within the site would be 0.3026, which corresponds to a gross floor area of 86,784.9 square feet. As shown in Table 4-2, the current FAR within the project site is 0.43, which exceeds the allowable FAR established for the R-1 zone. A project site FAR of 0.41 is proposed.

Palo Alto Municipal Code Section 18.12.040(b) presents Table 3, which establishes how FAR is calculated for the R-1 zone. This table indicates that within the above-grade portion of the building, the following building components are counted towards the FAR:

- Space that is equivalent to a second or third floor (i.e., with ceiling height of 17 feet or more, or with a ceiling height of 26 feet or more) is counted twice (for second floor equivalent) and three times (for third floor equivalent);
- Entry features less than 12 feet in height, if not substantially enclosed and not recessed, are counted once while entry features greater than 12 feet in height are counted twice;
- First floor exterior spaces are not counted towards FAR while second floor roofed or enclosed porches, arcades, balconies, porticos, breeze-ways are counted towards FAR;
- Any habitable space within basements is not included in the calculation of gross floor area when the finished level of the first floor is no more than three feet above the grade around the perimeter of the building foundation;
- Lightwells, stairwells, and similar excavated features along the perimeter of the basement shall not affect the measurement of grade for the purposes of determining gross floor area, provided that several criteria are met, including:
    - (A) such features are not located in the front of the building;
    - (B) such features shall not exceed 3 feet in width;
    - (C) the cumulative length of all such features does not exceed 30% of the perimeter of the basement;
- Below-grade patios, sunken gardens, or similar excavated areas along the perimeter of the basement shall not affect the measurement of grade for the purposes of determining gross floor area, provided that all such areas combined do not exceed 2% of the area of the lot or 200 square feet, whichever is greater; that each such area does not exceed 200 square feet; and that each such area is separated from another by a distance of at least 10 feet. Area devoted to required stairway access shall not be included in the 200 square foot limitation.

Based on application of these standards to the proposed building plans for the new academic building to include the school library and classrooms (Appendix B2), the new buildings would include 84,124 above-grade square feet. This is inclusive of any second-floor and/or third-floor equivalent spaces, entry features, second-floor covered or enclosed porches, breeze-ways, etc. Further the below-grade level incorporates patios and lightwells consistent with the provisions of Section 18.12.090, specifically that:

- the finished level of the first floor is no more than three feet above the grade around the perimeter of the building foundation,
- individual lightwells and stairwells do not exceed 3 feet in width and the total length of lightwells and stairwells do not exceed 30% of the perimeter of the basement, and
- below-grade patios, sunken gardens, or similar excavated areas along the perimeter of the basement combined do not exceed 2% of the lot size, and individual features are no more

than 200 square feet and are separated from other such areas by a distance of at least 10 feet.

The project would include demolishing seven existing buildings with a total floor area of 90,593 square feet and constructing a single new academic building to include the school library and classrooms with a total floor area of 84,124 square feet. While this would still exceed the allowable FAR permitted in the R-1 zone, it would be slightly less gross floor area than existing conditions and, therefore, would not represent a new environmental impact. Castilleja School has requested a variance from the City to allow the school to maintain its existing above-grade FAR. This variance would not allow an increase in the project site's FAR compared to existing conditions and thus would not create any new conflicts with the development standards or any associated adverse physical environmental effects. The proposed project would also include a variance for below-grade setback encroachments to accommodate the underground parking garage. Approval of this variance would not alter the existing or planned land uses in the vicinity and would not create any adverse physical environmental effects. Thus the project would result in **less-than-significant** impacts with regard to conflicts with zoning designations or land use policies.

IMPACT 4-2:	Create land use incompatibility or physically divide an established community
SIGNIFICANCE:	Potentially Significant
MITIGATION MEASURES:	Mitigation Measures 4a, 7a, 7b, and 7c (see Chapter 7, Transportation), and 8a and 8b (see Chapter 8, Noise)
SIGNIFICANCE AFTER MITIGATION:	Significant and Unavoidable

Castilleja School requests that the City amend the school's CUP to allow for an increase in the student enrollment cap, approve a Tentative Map with Exceptions to merge the three parcels that comprise the project site, and approve the proposed campus site plan, which anticipates redevelopment of portions of the site. This would result in an expansion of school facilities on an existing school site which has operated at this location since 1910. The proposed project does not include features (e.g., highways, railways, etc.) that would physically divide an established community, nor would the project introduce a new land use into the project area.

Schools are a conditionally permitted use in the R-1 zoning district and Single-Family Residential land use designation; therefore, school uses are considered generally compatible with these residential uses. However, the scale and massing of educational facilities can be incompatible with residential communities, and school-related activities and events have the potential to cause neighborhood disruptions related to traffic and noise.

The proposed project would result in less than significant impacts to aesthetics and visual resources. It would reduce the number of structures onsite and increase the amount of open space. The majority of the increase in building area would occur below grade and there would be no increase in the gross floor area (above ground building space). The project would improve the visual character of the site and its compatibility with the surrounding residential neighborhood compared to the existing conditions by reducing the amount of at-grade parking, both on-street and off-street, relocating bus loading and unloading to the below-grade parking garage, and creating a private open space area in the northwestern corner of the project site. The proposed building plans use materials, colors, and details that are compatible with the existing structures on the site such that the overall campus would have a unified and coherent design. The project design includes pedestrian scale fencing and gates to provide several paths of ingress and egress for students, staff and visitors, including convenient bicycle parking. The project also incorporates elements that meet the City's sustainability goals, such as rooftop photovoltaics, energy efficiency, and water-use efficiency.

The current CUP defines a maximum student enrollment cap of 415 students, allows for five major functions annually for all students and parents (back to school night, gator gathering, major fundraising/dinner dance, founder's day lunch, graduation), and an undetermined number of events of 50 to 100 persons. The CUP requires that an annual list of special events for 50 to 100 people be published on the school's website publication and be distributed to neighbors (Palo Alto 2000). There were 438 students enrolled in the 2016-2017 school year and 434 students enrolled in the 2017-2018 school year. While the school has published lists of special events, neighbors of the project site have indicated that the frequency and size of events causes conflicts with the residential characteristics of the surrounding neighborhood due to the traffic and noise generated by these events.

As shown in the proposed Special Events Description in Appendix B, Castilleja is seeking to continue the five major events annually for all students and parents (two weeknight events - Gator Gathering and Founder's Day, two weekend events Back to School and Graduation, and one weekday events - Opening Day). The Special Events Description also enumerates the timing, sizes, and types of additional events that would be held in a single academic year. The Special Events Description notes that the list provided is representative of the general schedule of events, but that the actual types and sizes of events in each year may vary. Neighbors of the project site have experienced disturbance and annoyance from special events at Castilleja School in the past. If the project substantially increased the number and/or size of special events held at the site, the resulting disturbance to neighbors could result in a **significant** land use incompatibility. However, as shown in the Project Narrative in Appendix B, Castilleja has proposed several restrictions on special events. Mitigation Measure 4a requires the City to include the special events restrictions summarized below as Conditions of Approval for the CUP amendment to ensure that the project does not result in an increase in the effect of special events related to land use compatibility between the school and the residential neighbors and the impact would be reduced to **less than significant**:

1. No school events would occur on campus on Sundays.
2. Athletic competitions would occur only on weekdays and would be complete by 8 pm.

3. There would be a maximum of 90 events with more than 50 guests each year. An illustrative example of the annual special events is provided in the Special Events Description (Appendix B) and summarized in Table 4-3. As shown, a typical year would include 45 events of 50 to 100 people (10 weekends, 21 weekdays and 14 weeknights) and 40 events of over 100 people (1 weekday, 27 weeknights, 12 weekends).
4. Parking during special events would occur on Spieker Field; all parking for events with fewer than 50 guests would occur within the Castilleja campus. Additional parking areas would be needed for larger events.
5. No events would be held on campus that do not directly relate to Castilleja.

Table 4-3
Special Events

Time of Week	Typical Event	Typical Number of Events Per Year	
		50-100 guests	*100+ guests*
Weekday	Middle school swim meet	1	-
	Parent meeting/reception	6	-
	Admissions event	4	-
	Arts showcase, arts performance	3	-
	Alumnae reception	1	-
	Upper school swim meet	2	-
	Academic showcase	2	-
	Class day	1	-
	8th grade promotion	1	-
	Grandparents event	-	1
Weeknight	Dances and socials	3	6
	Academic showcase	2	2
	Parent meeting/reception	5	4
	Global program	2	3
	Arts performance	1	4
	Alumnae gathering	1	1
	Service learning showcase	-	2
	Admissions and donor events	-	4
	Athletics showcase	-	1
Weekend	Parent meeting/reception	5	1
	Arts performance	4	6
	Alumnae gathering	1	-
	Admissions event	-	4
	Donor event	-	1
	Total	***45***	***40***

Source: Appendix B

As shown on the project plans (Appendix B), the project would include several features to reduce existing neighborhood disruptions associated with operation of the school. Vehicle access to the site would be concentrated near Embarcadero Road to reduce the volume of school related traffic on local neighborhood streets. Existing drop-off and pick-up areas along Kellogg Avenue and Emerson Street would be removed. As discussed in Impact 7-4 in Chapter 7, Transportation, and the Transportation Impact Study in Appendix E the below-grade garage would include a dual drop-off/pick-up lane that could accommodate 16 vehicles at one time, which is sufficient to ensure that lengthy queues do not build up during drop-off and pick-up. As part of their routine communications with students and families, Castilleja School would instruct them to use the garage for drop-off and pick-up rather than using the curb along Kellogg Avenue and Emerson Street. The parking garage would allow the majority of the drop-off and pick-up to occur within the project site, and would not create vehicle queues onto public streets. However, it would concentrate school related traffic on Embarcadero Road, Bryant Street, and Emerson Street. The TIRE Index analysis presented in Impact 7-1 in Chapter 7 demonstrates that the proposed requirement for all traffic exiting the garage to turn right would create a substantial increase in traffic volumes on the segment of Emerson Street between Melville Avenue and Embarcadero Road and thus would have a **significant** impact related to land use compatibility. The Traffic Impacts Analysis (TIA) for the proposed project (Appendix E) evaluated a mitigation measure that would allow traffic exiting the garage to turn left or proceed straight onto Melville Avenue. The TIA concluded that this would exacerbate impacts by exposing more roadway segments to significant increases in daily traffic volumes. Thus it is not feasible to substantially reduce or avoid the significant land use compatibility impact associated with the increase in daily traffic volume on one residential street segment. This impact remains **significant and unavoidable**.

Castilleja School would implement an expanded Transportation Demand Management Plan to reduce traffic to the project site and ensure that there is no increase in the number of peak hour traffic trips. This would reduce the project's contribution to increased congestion and traffic volumes on neighborhood streets. The proposed TDM plan and a memorandum demonstrating that the TDM plan would meet the monitoring and enforcement provisions of PAMC Section 18.52.050(d) are provided in Appendix B. Monitoring and enforcement provisions include submitting bi-annual peak trip audits, implementing additional TDM measures when/if there are more than 440 trips in the AM or PM peak hour, and reducing enrollment in future years if peak hour trips remain above 440.

Truck delivery and garbage pick-up facilities would also be relocated below grade, accessed via a ramp from Kellogg Avenue. This would reduce the amount of time that large trucks would be present on the neighborhood streets and generally reduce neighbor's noise exposure from truck activity. As discussed in Chapter 8, Noise, noise levels at the two residences nearest the proposed below-grade truck loading zone would increase while noise levels at the other five locations studied would decrease.

As further discussed in Chapter 8, Noise, the City's Noise Ordinance (Palo Alto Municipal Code Chapter 9.10) specifies that noise emanating from any residential property shall not exceed 6 dB above the local ambient noise level at any point outside of the property plane. Section 9.10.060 contains a general daytime exception for any noise source which does not exceed 70 dBA at a distance of 25 feet between the hours of 8:00 AM and 8:00 PM Monday through Friday, 9:00 AM and 8:00 PM on Saturday, and 10:00 AM and 6:00 PM on Sunday and holidays. Some school events would occur as late as 10:00 PM and thus could occur outside of the general daytime exception period. There are several locations where noise from special events could exceed the Municipal Code standards; thus the project would have a **significant** impact associated with creating or exacerbating a land use incompatibility. However, as shown in Chapter 8, with implementation of Mitigation Measures 8a and 8b, noise generated during special events would not exceed the Municipal Code or Comprehensive Plan noise standards. Thus the impact would be reduced to **less than significant.**

In summary, the proposed Castilleja School Project would have a **significant** impact associated with the potential to exacerbate existing land use conflicts between the school and its residential neighborhood by increasing the disturbance to neighbors associated with special events, increasing traffic volumes in the project vicinity, and generating noise levels that could exceed the Municipal Code standards. Implementation of Mitigation Measure 4a would reduce the project's significant land use compatibility impacts related to special events and implementation of Mitigation Measures 8a and 8b would reduce the project's significant land use compatibility impacts associated with noise. Implementation of Mitigation Measure 7a would reduce the project's significant land use compatibility impacts associated with increased traffic volumes on residential streets but would not be sufficient to reduce the impact to a less than significant level. Thus, the project's impacts associated with land use incompatibility would remain **significant and unavoidable.**

IMPACT 4-3:	Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance.
SIGNIFICANCE:	Significant
MITIGATION MEASURES:	Mitigation Measure 4b
SIGNIFICANCE AFTER MITIGATION:	Less than Significant

As described previously in Section 4.1 and shown in Figure 3-4, Tree Plan, there are 127 trees located within the project site, four trees are located on private property adjacent to the site, and 42 street trees (i.e., within the public right-of-way) adjacent to the site. The proposed project would require the removal of 35 trees, four of which are street trees and five of which are protected trees under the Municipal Code. Table 4-4 identifies each tree and the health of the tree as determined by the Arborist Inventory and Report (Appendix C), and the impact of the proposed project on each. Note that the information in Table 4-4 reflects the July 1, 2019 plan set provided in Appendix B2. The tree impacts anticipated under the current project plans vary slightly from the older tree inventory and impact tables available for review at the City's webpage for this project (such as the inventories dated September 2017 and February 2018).

Table 4-4
Impact to Onsite Trees

Tree #	Species	Regulated? Y/N	Health	Size (diameter inches)	Impact
1	Coast Redwood (*Sequoia sempervirens)*	Y	Excellent	73	No impact, retain tree in place
2	Arbutus Marina (*Arbutus marina*)	N	Excellent	3	No impact, retain tree in place
3	Arbutus Marina (*Arbutus marina*)	N	Excellent	5	Relocate
4	Dogwood (*Cornus species*)	N	Poor	1	Remove
5	Arbutus Marina (*Arbutus marina*)	N	Excellent	4	Relocate
6	Coast Live Oak *(Quercus agrifolia)*	Y	Good	17	Relocate
7	Aristocrat Pear *(Pyrus calleryana)*	N	Fair-Good	10	No impact, retain tree in place
8	Aristocrat Pear *(Pyrus calleryana)*	N	Fair-Good	9	No impact, retain tree in place
9	Aristocrat Pear *(Pyrus calleryana)*	N	Fair-Good	8	Remove
10	Coast Live Oak *(Quercus agrifolia)*	N	Excellent	11	Relocate
11	English Hawthorne *(Crataegus laevigata)*	N	Excellent	10	No impact, retain tree in place
12	Southern Magnolia *(Magnolia grandiflora)*	N	Fair	12	No impact, retain tree in place
13	Coast Live Oak *(Quercus agrifolia)*	Y	Excellent	16	Relocate
14	Coast Live Oak *(Quercus agrifolia)*	N	Excellent	7	Relocate
15	Flowering Cherry (*Prunus serrulata)*	N	Excellent	8	No impact, retain tree in place
16	Coast Live Oak *(Quercus agrifolia)*	Y	Fair-Good	17	No impact, retain tree in place
17	American Sweet Gum (*Liquidambar styraciflua*)	Y	Poor	25	No impact, retain tree in place
18	American Sweet Gum (*Liquidambar styraciflua*)	Y	Very Poor	21	No impact, retain tree in place

Table 4-4
Impact to Onsite Trees

Tree #	Species	Regulated? Y/N	Health	Size (diameter inches)	Impact
19	American Sweet Gum (*Liquidambar styraciflua*)	Y	Very Poor	13	Remove
20	American Sweet Gum (*Liquidambar styraciflua*)	Y	Fair-Poor	16	No impact, retain tree in place
21	American Sweet Gum (*Liquidambar styraciflua*)	Y	Fair-Poor	18	No impact, retain tree in place
22	American Sweet Gum (*Liquidambar styraciflua*)	Y	Fair-Poor	15	No impact, retain tree in place
23	American Sweet Gum (*Liquidambar styraciflua*)	Y	Fair	21	Remove
24	American Sweet Gum (*Liquidambar styraciflua*)	Y	Fair-Poor	19	No impact, retain tree in place
25	American Sweet Gum (*Liquidambar styraciflua*)	Y	Very Poor	20	No impact, retain tree in place
26	Red Maple (*Acer rubrum)*	Y	Good	6	No impact, retain tree in place
27	Japanese Maple (*Acer palmatum)*	N	Good	Multi	Relocate
28	Flowering Cherry (*Prunus serrulata)*	N	Good	8	Relocate
29	Japanese Maple (*Acer palmatum)*	N	Good	Multi	Relocate
30	Trident Maple *(Acer buegerlanum)*	N	Excellent	11	Relocate
31	Copper Beech *(Fagus sylvatica 'Atropunicea)*	N	Excellent	7	No impact, retain tree in place
32	Copper Beech *(Fagus sylvatica 'Atropunicea)*	N	Good	6	No impact, retain tree in place
33	Japanese Privet (*Ligustrum japonicum*)	N	Good	13	No impact, retain tree in place
34	Red Maple (*Acer rubrum)*	Y	Very Poor	6	No impact, retain tree in place
35	Red Maple (*Acer rubrum)*	Y	Fair-Poor	5	No impact, retain tree in place

Table 4-4
Impact to Onsite Trees

Tree #	Species	Regulated? Y/N	Health	Size (diameter inches)	Impact
36	Southern Magnolia *(Magnolia grandiflora)*	Y	Very Poor	12	No impact, retain tree in place
37	Southern Magnolia *(Magnolia grandiflora)*	Y	Fair	15	No impact, retain tree in place
38	Coast Live Oak *(Quercus agrifolia)*	Y	Good	15	No impact, retain tree in place
39	Coast Live Oak *(Quercus agrifolia)*	Y	Good	18	No impact, retain tree in place
40	Coast Live Oak *(Quercus agrifolia)*	Y	Fair	23	No impact, retain tree in place
41	Coast Live Oak *(Quercus agrifolia)*	Y	Excellent	17	No impact, retain tree in place
42	Southern Magnolia *(Magnolia grandiflora)*	Y	Fair	7	No impact, retain tree in place
43	Southern Magnolia *(Magnolia grandiflora)*	Y	Fair	18	No impact, retain tree in place
44	Southern Magnolia *(Magnolia grandiflora)*	Y	Fair-Good	14	No impact, retain tree in place
45	Blue Atlas Cedar (*Cedrus atlantica 'Glauca'*)	N	Very Poor	57	No impact under Castilleja School Project; separate Architectural Review application submittal for removal of this tree due to disease
46	Lemon (*Citrus spp.*)	N	Fair	5	No impact, retain tree in place
47	Copper Beech (*Fagus sylvatica 'Atropunicea'*)	N	Fair	4	No impact, retain tree in place
48	Southern Magnolia *(Magnolia grandiflora)*	Y	Fair	12	No impact, retain tree in place
49	Loquat (*Eriobotrya japonica*)	N	Excellent	11	No impact, retain tree in place
50	Chinese Pistache (*Pistacia chinensis*)	N	Excellent	10	Relocate
51	European Hackberry (*Celtis austrails*)	Y	Good	6	No impact, retain tree in place
52	European Hackberry (*Celtis austrails*)	Y	Good	7	No impact, retain tree in place
53	European Hackberry (*Celtis austrails*)	Y	Good	5	Remove
54	Coast Live Oak *(Quercus agrifolia)*	Y	Fair	14	No impact, retain tree in place

Table 4-4
Impact to Onsite Trees

Tree #	Species	Regulated? Y/N	Health	Size (diameter inches)	Impact
55	Coast Live Oak *(Quercus agrifolia)*	Y	Fair	16	No impact, retain tree in place
56	Coast Live Oak *(Quercus agrifolia)*	Y	Good	34	No impact, retain tree in place
57	Tawhiwhi (*Pittosporum tenuifolium*)	N	Very Poor	3	No impact, retain tree in place
58	Tawhiwhi (*Pittosporum tenuifolium*)	N	Fair	3	No impact, retain tree in place
59	Tawhiwhi (*Pittosporum tenuifolium*)	N	Good	5	No impact, retain tree in place
60	Coast Redwood (*Sequoia sempervirens*)	N	Fair-Good	5	No impact, retain tree in place
61	Blackwood Acacia (*Acacia melanoxylon*)	N	Fair-Poor	15	No impact, retain tree in place
62	Coast Redwood (*Sequoia sempervirens)*	N	Fair	6	No impact, retain tree in place
63	Coast Redwood (*Sequoia sempervirens)*	Y	Excellent	52	No impact, retain tree in place
64	Coast Live Oak *(Quercus agrifolia)*	Y	Fair	23	No impact, retain tree in place
65	Chinese Elm (*Ulmus parvifolia*)	Y	Good	19	No impact, retain tree in place
66	Chinese Pistache (Pistacia Chinensis)	Y	Fair	14	Relocate
67	Chinese Elm (*Ulmus parvifolia*)	Y	Good	21	Remove
68	Chinese Elm (*Ulmus parvifolia*)	Y	Good	16	No impact, retain tree in place
69	Chinese Elm (*Ulmus parvifolia*)	Y	Fair-Good	20	No impact, retain tree in place
70	Chinese Elm (*Ulmus parvifolia*)	Y	Fair-Good	17	No impact, retain tree in place
71	Chinese Elm (*Ulmus parvifolia*)	Y	Fair-Good	18	No impact, retain tree in place
72	Chinese Pistache (*Pistacia Chinensis*)	N	Excellent	5	Relocate
73	Arbutus Marina (*Arbutus marina*)	N	Good	8	No impact, retain tree in place

Table 4-4
Impact to Onsite Trees

Tree #	Species	Regulated? Y/N	Health	Size (diameter inches)	Impact
74	Arbutus Marina (*Arbutus marina*)	N	Good	8	Relocate
75	Arbutus Marina (*Arbutus marina*)	N	Good	8	Relocate
76	Chinese Pistache (*Pistacia chinensis*)	N	Excellent	6	Relocate
77	Chinese Pistache (*Pistacia chinensis*)	N	Excellent	7	Relocate
78	Arbutus Marina (*Arbutus marina*)	N	Fair-Good	5	Relocate
79	Arbutus Marina (*Arbutus marina*)	N	Fair-Good	4	Relocate
80	Arbutus Marina (*Arbutus marina*)	N	Fair-Good	5	Relocate
81	Chinese Pistache (*Pistacia chinensis*)	N	Excellent	5	Relocate
82	Blackwood Acacia (*Acacia melanoxylon*)	N	Fair	12	Remove
83	Blackwood Acacia (*Acacia melanoxylon*)	N	Fair-Good	12	Remove
84	Coast Live Oak *(Quercus agrifolia)*	Y	Good	28	No impact, retain tree in place
85	Coast Live Oak *(Quercus agrifolia)*	Y	Good	15	No impact, retain tree in place
86	California Bay Laurel (*Umbellularia californica*)	N	Fair-Good	7	No impact, retain tree in place
87	Coast Live Oak *(Quercus agrifolia)*	Y	Good	23”	No impact, retain tree in place
88	English Hawthorne (*Crataegus laevigata*)	N	Good	3	No impact, retain tree in place
89	Coast Live Oak *(Quercus agrifolia)*	Y	Good	50”	No impact, retain tree in place
90	Grecian Laurel (*Laurus nobilis*)	N	Fair	2	Remove
91	Hawthorne species (*Crataegus species*)	N	Fair	4	Remove
92	Hawthorne species (*Crataegus species*)	N	Fair	3	Remove
93	Hawthorne species (*Crataegus species*)	N	Fair	3	Remove

Table 4-4
Impact to Onsite Trees

Tree #	Species	Regulated? Y/N	Health	Size (diameter inches)	Impact
94	Hawthorne species (*Crataegus species*)	N	Fair	3	Remove
95	Hawthorne species (*Crataegus species*)	N	Fair	3	Remove
96	Hawthorne species (*Crataegus species*)	N	Fair	3	Relocate
97	Japanese Maple (*Acer palmatum)*	N	Good	Multi	Relocate
98	Coast Live Oak (Quercus agrifolia)	Y	Excellent	22	No impact, retain tree in place
99	Coast Live Oak *(Quercus agrifolia)*	Y	Good	21	No impact, retain tree in place
100	Coast Live Oak *(Quercus agrifolia)*	Y	Good	16	No impact, retain tree in place
101	English Hawthorne *(Crataegus laevigata)*	N	Excellent	6	Relocate
102	Coast Live Oak *(Quercus agrifolia)*	Y	Fair-Good	39	Remove
103	Chinese Pistache (*Pistacia chinensis*)	Y	Good	8	No impact, retain tree in place
104	Chinese Pistache (*Pistacia chinensis*)	Y	Good	9	No impact, retain tree in place
105	Tawhiwhi (*Pittosporum tenuifolium*)	N	Good	9	Remove
106	Tawhiwhi (*Pittosporum tenuifolium*)	N	Good	3	Remove
107	Tawhiwhi (*Pittosporum tenuifolium*)	N	Good	6	Remove
108	Tawhiwhi (*Pittosporum tenuifolium*)	N	Good	5	Remove
109	Tawhiwhi (*Pittosporum tenuifolium*)	N	Good	6	Remove
110	Tawhiwhi (*Pittosporum tenuifolium*)	N	Good	8	Remove
111	Coast Live Oak *(Quercus agrifolia)*	Y	Good	22	Relocate
112	Coast Redwood (*Sequoia sempervirens)*	Y	-	-	Removed in 2017
113	Coast Live Oak *(Quercus agrifolia)*	Y	Good	32	No impact, retain tree in place

Table 4-4
Impact to Onsite Trees

Tree #	Species	Regulated? Y/N	Health	Size (diameter inches)	Impact
114	Chinese Pistache (*Pistacia chinensis*)	N	Good	13	Relocate
115	Coast Redwood (*Sequoia sempervirens)*	N	Fair-Good	14	Relocate
116	Coast Redwood (*Sequoia sempervirens)*	N	Fair-Good	15	Remove
117	Coast Redwood (*Sequoia sempervirens)*	N	Fair-Good	14	Remove
118	Coast Redwood (*Sequoia sempervirens)*	Y	Fair-Good	18	Remove
119	Coast Redwood (*Sequoia sempervirens)*	Y	Fair-Good	18	Remove
120	Coast Redwood (*Sequoia sempervirens)*	Y	Fair-Good	24	Relocate
121	Coast Live Oak *(Quercus agrifolia)*	Y	Good	27	No impact, retain tree in place
122	Coast Live Oak *(Quercus agrifolia)*	Y	Excellent	24	No impact, retain tree in place
123	Deodar Cedar (*Cedrus deodara*)	N	Good	19	No impact, retain tree in place
124	Deodar Cedar (*Cedrus deodara*)	N	Excellent	18	No impact, retain tree in place
125	European Hackberry (*Celtis austrails*)	N	Good	5	No impact, retain tree in place
126	Coast Live Oak *(Quercus agrifolia)*	Y	Fair-Good	18	No impact, retain tree in place
127	European Hackberry (*Celtis austrails*)	Y	Fair-Good	6	No impact, retain tree in place
128	European Hackberry (*Celtis austrails*)	Y	Fair-Good	3	No impact, retain tree in place
129	European Hackberry (*Celtis austrails*)	Y	Fair-Good	8	No impact, retain tree in place
130	European Hackberry (*Celtis austrails*)	Y	Dead	7	Remove
131	Coast Live Oak *(Quercus agrifolia)*	Y	Good	10	No impact, retain tree in place

Table 4-4
Impact to Onsite Trees

Tree #	Species	Regulated? Y/N	Health	Size (diameter inches)	Impact
132	Coast Live Oak *(Quercus agrifolia)*	Y	Good	15	No impact, retain tree in place
133	Coast Live Oak *(Quercus agrifolia)*	Y	Good	24	No impact, retain tree in place
134	English Hawthorne *(Crataegus laevigata)*	Y	Fair	4	No impact, retain tree in place
135	European Hackberry (*Celtis austrails*)	Y	Fair-Good	11	No impact, retain tree in place
136	Eastern Redbud (*Cercis canadensis*)	N	Excellent	3	Relocate
137	Eastern Redbud (*Cercis canadensis*)	N	Excellent	3	No impact, retain tree in place
138	Coast Live Oak *(Quercus agrifolia)*	Y	Excellent	27	No impact, retain tree in place
139	Japanese Maple (*Acer palmatum)*	N	Good	6	Relocate
140	Coast Live Oak *(Quercus agrifolia)*	Y	Fair-Poor	36	Remove
141	Italian Stone Pine (*Pinus pinea*)	N	Excellent	27	Remove
142	Fern Pine (*Afrocarpus gracilior*)	N	Excellent	23	Remove
143	Southern Magnolia *(Magnolia grandiflora)*	N	Fair	18	Remove
144	Shiny Xylosma (*Xylosma congestum*)	N	Excellent	15	Remove
145	Queen Palm (*Syagrus romanzoffiana*)	N	Excellent	10	Relocate
146	Queen Palm (*Syagrus romanzoffiana*)	N	Excellent	9	Relocate
147	Queen Palm (*Syagrus romanzoffiana*)	N	Excellent	9	Relocate
148	Queen Palm (*Syagrus romanzoffiana*)	N	Excellent	8	Relocate
149	Queen Palm (*Syagrus romanzoffiana*)	N	Excellent	8	Relocate
150	Queen Palm (*Syagrus romanzoffiana*)	N	Excellent	10	Relocate
151	Queen Palm (*Syagrus romanzoffiana*)	N	Excellent	9	Relocate

Table 4-4
Impact to Onsite Trees

Tree #	Species	Regulated? Y/N	Health	Size (diameter inches)	Impact
152	Queen Palm (*Syagrus romanzoffiana*)	N	Excellent	8	Relocate
153	Queen Palm (*Syagrus romanzoffiana*)	N	Excellent	8	Relocate
154	Japanese Maple (*Acer palmatum)*	N	Fair	5	Remove
155	Coast Live Oak *(Quercus agrifolia)*	Y	Fair	27	Remove
156	European Olive (*Olea europea*)	N	Excellent	3	Relocate
157	Coast Live Oak *(Quercus agrifolia)*	Y	Excellent	17	No impact, retain tree in place
158	Wild Plum (*Prunus cerasifera*)	N	Fair	4	Remove
159	Coast Live Oak *(Quercus agrifolia)*	Y	Good	23	No impact, retain tree in place
160	Coast Live Oak *(Quercus agrifolia)*	Y	Good	31	No impact, retain tree in place
161	Coast Live Oak *(Quercus agrifolia)*	Y	Good	11	No impact, retain tree in place
162	Coast Live Oak *(Quercus agrifolia)*	Y	Good	27	No impact, retain tree in place
163	Maidenhair Tree (*Ginkgo biloba*)	Y	Fair-Good	4	No impact, retain tree in place
164	Maidenhair Tree (*Ginkgo biloba*)	Y	Fair-Good	4	No impact, retain tree in place
165	Coast Live Oak *(Quercus agrifolia)*	Y	Good	26	No impact, retain tree in place
166	Coast Redwood (*Sequoia sempervirens)*	N	Fair-Good	9	No impact, retain tree in place
167	Valley Oak (*Quercus lobala*)	Y	Fair-Good	12	No impact, retain tree in place
168	Coast Live Oak *(Quercus agrifolia)*	Y	Excellent	24	No impact, retain tree in place
169	Tawhiwhi (*Pittosporum tenuifolium*)	N	Fair	3	No impact, retain tree in place
170	Tawhiwhi (*Pittosporum tenuifolium*)	N	Fair	3	No impact, retain tree in place
171	Tawhiwhi (*Pittosporum tenuifolium*)	N	Fair	4	No impact, retain tree in place

Table 4-4
Impact to Onsite Trees

Tree #	Species	Regulated? Y/N	Health	Size (diameter inches)	Impact
172	Tawhiwhi (*Pittosporum tenuifolium*)	N	Dead	3	Remove
173	Tawhiwhi (*Pittosporum tenuifolium*)	N	Good	6	No impact, retain tree in place
174	Tawhiwhi (*Pittosporum tenuifolium*)	N	Good	5	No impact, retain tree in place

Note: Regulated trees include oak trees with a minimum trunk diameter of 11.5 inches, redwood trees with a minimum trunk diameter of 18 inches, and street trees.
Source: Appendix C

As shown in Table 4-4, some of the trees proposed for removal or relocation are regulated under the City's Tree Protection and Maintenance Ordinance. Thus the project would have a **significant** impact associated with adverse effects to trees and potential inconsistency with the City's tree ordinance.

As regulated trees, a permit would be required for the removal of the street trees and protected trees (oaks and redwoods with the required minimum trunk diameter), and replacement of the tree would be required. In total, the project proposes to remove four street trees, three coast live oak trees (#102, 140, 155), and two coast redwoods (#118 and 119). As noted in Table 4-4, tree #112 (a redwood) was removed in 2017 following the City's approval of a tree removal permit. Another tree (tree #45, Blue Atlas Cedar) was recently determined to have a fungus damaging the tree from the inside out causing severe structural damage (Bench 2019); a report evaluating the tree has led the applicant to seek a tree removal permit with submittal of a separate Architectural Review application in June 2019. Removal of this tree, if approved by the City, would not be an impact of the Castilleja School Project evaluated in this EIR. As shown in the building plans in Appendix B, the proposed project design includes retention of this tree.

Should any additional oak or redwood trees proposed for removal increase in size such that they are protected trees by the time of their proposed removal, the applicant would be required to obtain permits for the removal of those trees from the City. This will be confirmed at the time of the issuance of the building permits by the City, as required Mitigation Measure 4b.

Up to 40 trees would be relocated in 2021 or 2022. Five of the trees to be relocated have trunk diameters and species that qualify as ordinance-protected trees: three coast live oak trees (#6, #13, and #111) and one coast redwood (#120). Additionally one street tree would be relocated. The project would be required to obtain a permit to relocate these protected trees and the street tree. Because relocated trees reduces the size of their root ball and can lead to shortened lifespans, Mitigation Measure 4b requires additional new trees to be planted to compensate for the decrease in health of the relocated trees. The project also proposes to remove 26 trees that are not regulated by the Municipal Code. A total of 97 trees would remain in place.

The proposed landscaping plan shown in Figure 3-11, the proposed Tree Plan shown in Figure 3-4, and the proposed building plans in Appendix B provide details on the locations and species of new trees and methods for tree relocation, including preparation, replanting, and maintenance after transplant. However, specific locations for replanting of each tree identified as needing to be relocated have not been identified. Mitigation Measure 4b requires Castilleja School to provide a Tree Protection and Preservation, Removal, and Relocation Plan for each construction phase. This plan must identify the species, size, and condition of all trees within 50 feet of the area that would be affected by the construction phase, identify each tree that would be affected by the construction phase, document specific tree protection measures for the trees to be retained, present a plan for planting new trees to replace trees that are removed and to ensure there is no net loss of tree canopy in the project area, identify details of the methodology for relocating trees and a plan for planting additional trees to compensate for adverse health effects to the relocated trees. All planting must be consistent with the City's Tree Technical Manual. The City's Tree Protection and Management Ordinance requires replacement trees to be of sufficient canopy size at initial planting to equal or exceed the diameter of the removed tree at 10 years of growth. Therefore, to offset the loss of mature trees, planting at replacement ratios consistent with the Tree Technical Manual would occur on or adjacent to the project site. With implementation of Mitigation Measure 4b, the proposed project would comply with Section 8.10 of the Palo Alto Municipal Code by obtaining tree removal permits, preparing and implementing a Tree Protection and Preservation Plan for each construction phase, replacing trees that are removed during construction, and planting additional trees to compensate for adverse effects from tree relocation. The project would not conflict with the City's tree regulations and the impact would be reduced to **less than significant**.

IMPACT 4-4:	Substantially contribute to cumulative land use impacts.
SIGNIFICANCE:	No Impact
MITIGATION MEASURES:	None required
SIGNIFICANCE AFTER MITIGATION:	No Impact

The "Building Eye" tool on the City's website, https://paloalto.buildingeye.com/planning, shows that there are several recently-approved and pending projects in the vicinity of Castilleja School. The majority of these involve modifications to existing single-family homes or demolition and replacement of single-family homes. In July 2015, the City granted approval of a final parcel map for two residential condo units to replace an existing single-family dwelling unit in the RM-15 zoning district, located at 103 Melville Avenue. The projects in the cumulative scenario are not expected to alter the land uses in the project vicinity. They would not create land use incompatibilities. Thus there is no significant cumulative land use impact to which the project could contribute.

4.4 MITIGATION MEASURES

Mitigation Measure 4a The Castilleja School Conditional Use Permit shall include the following restrictions for special events held at the project site:

1. No special events may occur on campus on Sundays.
2. Athletic competitions may occur only on weekdays and shall be complete by 8 pm.
3. There shall be a maximum of 90 events with more than 50 guests each year.
4. Parking during special events shall occur on Spieker Field; all parking for events with fewer than 50 guests shall occur within the Castilleja campus.
5. For events with between 50 and 80 guests, Castilleja shall prepare a parking plan identifying the amount of on-street parking available around the project site's frontage on Kellogg Avenue and Emerson Street, additional on-street parking opportunities in the neighborhood, and nearby park and ride parking lots that guests could use to facilitate ride sharing.
6. For events with more than 80 guests, Castilleja shall identify one or more satellite parking locations and provide shuttle service for guests using those locations. Further, Castilleja shall retain traffic monitors to help direct event traffic to appropriate parking locations.
7. No events may be held on campus that do not directly relate to Castilleja.

Mitigation Measure 4b Prior to issuance of demolition, grading, and/or building permits for each construction phase, Castilleja School shall submit to the City Arborist a Tree Protection, Removal, and Relocation Plan. This shall include an inventory of the species, size, and condition of all trees within 50 feet of the construction area. For the trees to be retained in place, the Tree Protection, Removal, and Relocation Plan must identify specific tree protection measures to be in place during construction, consistent with Section 8.10 of the Palo Alto Municipal Code. For all trees to be removed, the Tree Protection, Removal, and Relocation Plan must identify their species and size and identify specific locations where new tree planting would occur to replace the removed trees. For trees that are protected under the Municipal Code, replacement planting must include trees of the same species as any regulated tree to be removed, and must include sufficient new trees to replace the removed trees on an inch-for-inch basis. For trees that are not protected under the Municipal Code, replacement planting must be sufficient to provide no net loss of tree canopy after 10 years. For trees to be relocated, the Tree Protection, Removal, and Relocation Plan must identify the specific methods for tree location for each individual tree, including the location where the tree would be replanted and when that replanting would occur. For all trees to be removed and to be relocated, replacement planting must comply with the replanting ratios in Table 3-1, Tree Canopy Replacement Standard of the Palo Alto Tree Technical Manual, based on the size of the tree at the time of removal or relocation. For relocated trees, the relocated tree shall be included as one of the required replacement trees. For example, if the Tree Canopy Replacement Standard would require planting three trees, the applicant would replant the relocated tree and two new trees. Any trees relocated or replaced shall be monitored for a period of five years after planting/replanting to ensure they have successfully established. Should any trees not survive, they shall be replaced and monitored for a period of five years.

4.5 REFERENCES CITED

Bench, Michael. 2019. *Arborist Assessment for Tree #45.* June 11, 2019.

City of Palo Alto. 2001. *Tree Technical Manual*. https://www.cityofpaloalto.org/civicax/filebank/documents/6436.

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City of Palo Alto. 2019. *Urban Forest Master Plan.* https://www.cityofpaloalto.org/civicax/filebank/documents/36187.

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SOURCE: WRNS Studio 2019

DUDEK

FIGURE 4-1

Building Elevations

Castilleja School Project EIR

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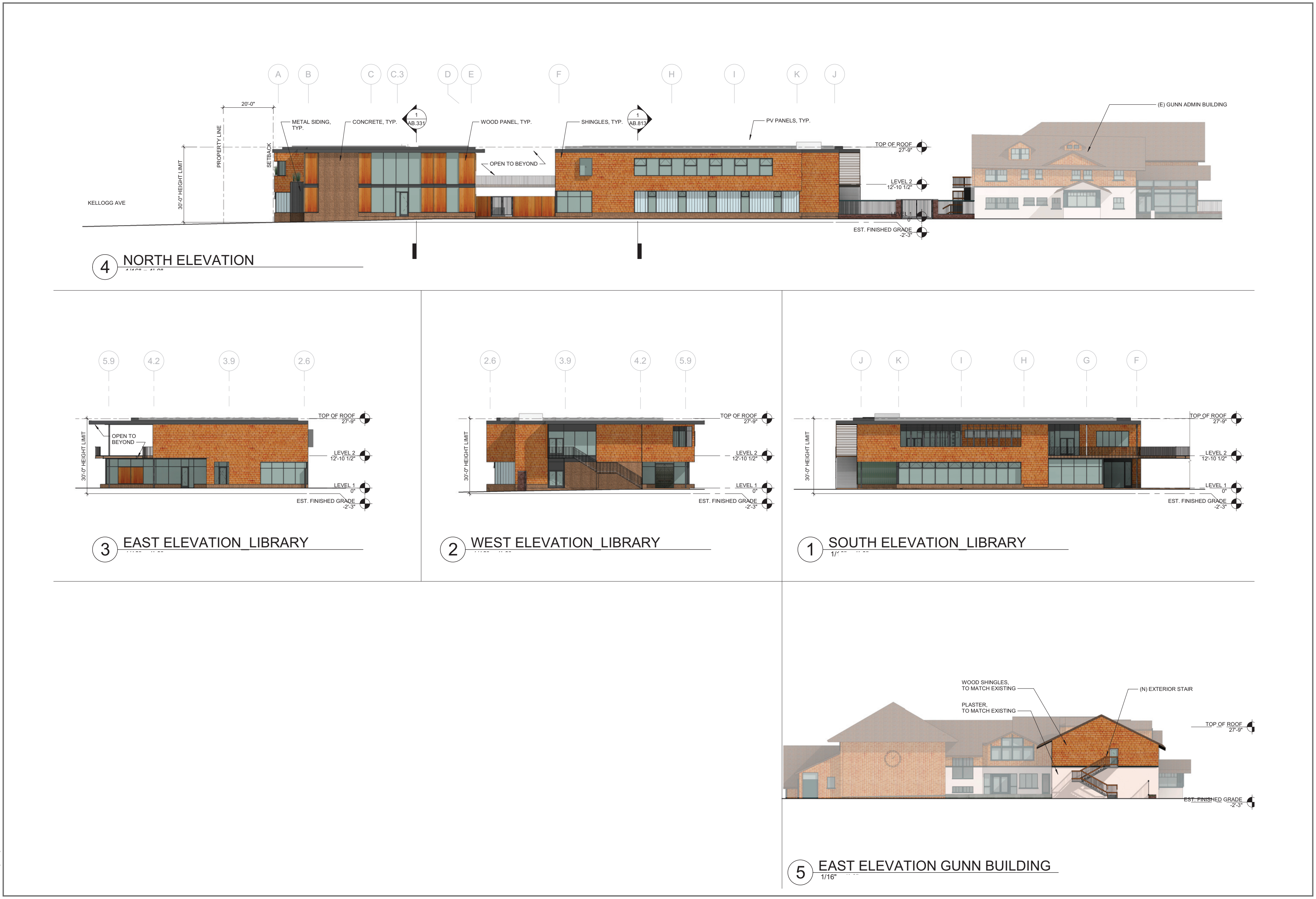

SOURCE: WRNS Studio 2019

DUDEK

FIGURE 4-2

Building Elevations

Castilleja School Project EIR

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CHAPTER 5
AESTHETICS

The following analysis identifies changes in the visual environment experienced by existing off-site viewers with exposure to the Castilleja School project (proposed project). In addition, the analysis discusses the potential impacts associated with implementation of the proposed project relative to visual compatibility with existing development and consistency with the City of Palo Alto (City) Comprehensive Plan goals and policies related to aesthetics and design.

The City received several comments addressing aesthetics in response to the Notice of Preparation for this Environmental Impact Report (EIR). These comments identified neighbors' concerns regarding the compatibility of the proposed buildings with the surrounding residential neighborhood, particularly in relation to building scale, massing and height, proposed setbacks, tree loss, and the appearance of the garage. The Notice of Preparation, Initial Study and comments received are provided in Appendix A.

5.1 EXISTING CONDITIONS

Regional Setting

The 6.58-acre project site is located in the City of Palo Alto in Santa Clara County. Palo Alto is located in the northern part of Santa Clara County, in the portion of the Bay Area known as the Mid-Peninsula. The City shares a boundary with San Mateo County and six cities. It sits between the Santa Cruz Mountains and the San Francisco Bay.

The City of Palo Alto lies in the San Francisco Bay Area, which is part of the Coast Ranges geomorphic province. The regional structure is dominated by the northwest-trending Santa Cruz Mountains to the southwest and the Diablo Range across the bay to the northeast. The Santa Cruz Mountains consist of two entirely different, incompatible core complexes, lying side by side and separated from each other by large faults.

While there are no officially designated scenic highways within the City of Palo Alto, the 2030 Comprehensive Plan identifies several scenic routes including Embarcadero Road, Oregon Expressway, and El Camino Real. The Comprehensive Plan also recognizes the aesthetic qualities provided by forested hills, marshland, salt ponds, sloughs, creeks and riparian corridors in and adjacent to the City and notes that the community values several distinctive qualities of the City, including its historic buildings, pedestrian scale, high-quality architecture, and beautiful streets and parks. Maintaining the physical qualities of the City is an overarching consideration, incorporated in all parts of the Comprehensive Plan.

Palo Alto comprises 16,627 acres, or about 26 square miles. The City began as a university town in 1894 to serve the newly established Stanford University. The City grew to many times its original size over the next century as land to the south and east was annexed.

The City contains at least 35 identifiable neighborhoods. Because the City's neighborhoods were developed over more than a century's time, each has a distinct character. Each neighborhood demonstrates the architectural styles, building materials, scale, and street patterns that were typical at the time of its development.

Visual Conditions in the Project Vicinity

The proposed project is located in a single-family residential neighborhood on the south side of Embarcadero Road. The Professorville Historic District is located north of the project site, on the opposite side of Embarcadero Road. While the neighborhood surrounding the project site is not a designated historic district, many of the homes in the vicinity date to the early 1900s. Consistent with the description in the Palo Alto Comprehensive Plan of neighborhoods built prior to the mid-1940s, this area has a traditional pattern of development with relatively narrow streets in a grid arrangement, curbside parking, vertical curbs, and street trees between the curb and sidewalk. Homes are oriented to the street and parking is often located to the rear of the lot (Palo Alto 2017). As shown in Figure 3-2, Site and Vicinity, in Chapter 3, Project Description, the area around Castilleja School is heavily vegetated and has a moderately dense tree canopy. Figure 5-1, Neighborhood Context Photographs, provides representative images of the neighborhood surrounding the project site.

As described in Chapter 3, Project Description, the project site is fully developed with Castilleja School facilities, including four academic buildings, an outdoor pool, a grassy area, a soccer/baseball field, a small maintenance building, and surface parking lots. Two small residential structures are also located on the project site; one is used as rental housing and the other, the Lockey Alumnae House, is used for school functions and events. A total of 121 trees are located on the site, four trees are located adjacent to the site on private property, and 42 street trees are located immediately adjacent to the site within the public right-of-way. Figures 5-2 and 5-3, Project Site Photographs, provide images that are representative of views of the Castilleja School campus from the adjacent streets.

Scenic Roadways

Embarcadero Road runs along the northern boundary of the project site. The Palo Alto Comprehensive Plan identifies Embarcadero Road as a scenic roadway. It runs from Harbor Road to El Camino Real and provides secondary access to Stanford University. Embarcadero Road is lined with trees, homes, parks, and schools, and westbound drivers on portions of this roadway can enjoys views of the Santa Cruz Mountains.

5.2 REGULATORY FRAMEWORK

Federal and State Regulations

There are no federal or state regulations pertaining to aesthetics that are applicable to the evaluation of the aesthetic impacts of the proposed project.

Local Regulations

Palo Alto Comprehensive Plan

Land uses in the project area are governed by the City of Palo Alto Comprehensive Plan. The Palo Alto Comprehensive Plan contains the City's official policies on land use and community design, transportation, housing, natural environment, business and economics, and community services. Its policies apply to both public and private properties. Its focus is on the physical form of the City. The Land Use and Community Design Element of the Comprehensive Plan provides establishes goals, policies and programs that promote a high-degree of aesthetic quality in all new land development projects within the City. Goals and policies that are applicable to the analysis of the proposed project's aesthetic impacts include:

- Goal L-3: Safe, attractive residential neighborhoods, each with its own distinct character and within walking distance of shopping, services, schools, and/or other public gathering places
    - Policy L-3.1 Ensure that new or remodeled structures are compatible with the neighborhood and adjacent structures.
- Goal L-6: Well-designed buildings that create coherent development patterns and enhance city streets and public spaces
    - Policy L-6.1 Promote high-quality design and site planning that is compatible with surrounding development and public spaces.
    - Policy L-6.2: Use the Zoning Ordinance, design review process, design guidelines and Coordinated Area Plans to ensure high quality residential and commercial design and architectural compatibility.
    - Policy L-6.6: Design buildings to complement streets and public spaces; to promote personal safety, public health and wellbeing; and to enhance a sense of community safety.

- Goal L-9: Attractive, inviting public spaces and streets that enhance the image and character of the city
  - Policy L-9.2: Encourage development that creatively integrates parking into the project, including by locating it behind buildings or underground wherever possible, or by providing for shared use of parking areas. Encourage other alternatives to surface parking lots that minimize the amount of land devoted to parking while still maintaining safe streets, street trees, a vibrant local economy and sufficient parking to meet demand.
  - Policy L-9.3 Treat residential streets as both public ways and neighborhood amenities. Provide and maintain continuous sidewalks, healthy street trees, benches and other amenities that promote walking and "active" transportation.
  - Policy L-9.6 Create, preserve and enhance parks and publicly accessible, shared outdoor gathering spaces within walking and biking distance of residential neighborhoods.

Architectural Review Board

The Palo Alto Architectural Review Board (ARB) is established under Chapter 2.21 of the Palo Alto Municipal Code. The ARB is responsible for design review of all new construction as well as changes and additions to commercial, industrial and multiple-family projects. The ARB was created to promote high aesthetic quality in land use development projects to ensure new projects are visually compatible with neighboring land uses. Palo Alto Municipal Code Section 18.76.020 states "The purpose of architectural review is to:

1. Promote orderly and harmonious development in the city;
2. Enhance the desirability of residence or investment in the city;
3. Encourage the attainment of the most desirable use of land and improvements;
4. Enhance the desirability of living conditions upon the immediate site or in adjacent areas; and
5. Promote visual environments which are of high aesthetic quality and variety and which, at the same time, are considerate of each other."

The ARB provides recommendations on projects to the Director of Planning and to the City Council for their final approval. The Comprehensive Plan notes that the ARB plays an important role in maintaining the City's overall design standards and recognizes that "Palo Alto has many buildings of outstanding architectural merit representing a variety of styles and periods. The best examples of these buildings are constructed with quality materials, show evidence of craftsmanship, fit with their surroundings, and help make neighborhoods comfortable and appealing" (Palo Alto 2017).

City of Palo Alto Municipal Code

Title 8, Trees and Vegetation

Regulations regarding street trees, shrubs and plants, weed abatement, and tree preservation and management are outlined in Title 8 of the Palo Alto Municipal Code. Chapter 8.04 establishes that a permit is required in order to remove or plant street trees, shrubs or plants, which are defined as those that are in the public right-of-way, parks or public places in the City. A permit is also required to "excavate any ditch or tunnel; or place concrete or other pavement within a distance of ten feet of the center of the trunk of any street tree." Chapter 8.10, the City's Tree Preservation and Management Ordinance, provides measures to maintain and protect both public and private trees to promote health, safety, welfare, and quality of life. This chapter defines Protected Trees to include coast live oak and valley oak trees that are at least 11.5 inches in diameter, redwood trees that are at least 18 inches in diameter (measured 54 inches above natural grade), and any tree designated by the City Council as a heritage tree.

Title 18, Zoning

The Palo Alto Zoning Ordinance (Title 18 of the Municipal Code) outlines the regulations for development in specific areas of the City and includes provisions regarding the visual qualities of the built environments. As noted in Comprehensive Plan Policy L-6.2, the Zoning Ordinance is a key tool for the City to regulate building and site design. It defines specific development standards, such as building height and setbacks, for each zone district. It also establishes the City's design review process, and sets forth the following requirements for all development in the City:

- Interior and exterior light sources must be shielded to prevent visibility from off-site and lighting in outdoor areas must be of low intensity and operated on a timer.
- Buildings should avoid use of reflective surfaces that can create glare.
- Architectural features and landscaping should be used to reduce apparent building mass and bulk.
- Trash and storage areas, mechanical equipment, and loading docks should be screened.

The development standards for the R-1 (10,000) zone as established in Chapter 18.12. of the Zoning Ordinance include the following:

- **Setbacks:** a contextual standard for front yard setbacks, 20-foot minimum for rear yard setbacks, 8-foot minimum interior side yard setback, and 16-foot minimum street side yard setback.
- **Maximum building height:** 30 feet for standard roofs, 33 feet for buildings with a roof pitch of 12:12 or greater.
- **Maximum site coverage:** 35 percent for multiple-story development, with an additional five percent permitted to be covered by a patio or overhang.
- **Maximum Floor Area Ratio (FAR):** 0.45 for the first 5,000 square feet of lot size and 0.30 for the square footage of the lot in excess of 5,000 square feet.
- **Maximum house size:** 6,000 square feet

The Zoning Ordinance includes detailed specifications about how the gross floor area is determined for specific types of building features, such as garages and entry features. It also defines features that are excluded from the gross floor area, such as first floor porches meeting certain limitations and basements that comply with the patio and light-well requirements described in Section 18.12.090.

<u>Chapter 18.23.030. Lighting</u>

Chapter 18.23.030 of the Municipal Code establishes performance criteria related to lighting and glare impacts for Multiple Family, Commercial, and Manufacturing and Industrial Districts to minimize the visual impacts of lighting on, abutting, or nearby residential sites and from adjacent roadways. For example, Chapter 18.23.030 requires that exterior lighting in parking areas, pathways and common open space shall be designed to achieve the following: (1) provide for safe and secure access on the site, (2) achieve maximum energy efficiency, and (3) reduce impacts or visual intrusions on abutting or nearby properties from spillover and architectural lighting that projects upward. Other requirements include that where a light source is visible from outside the property boundaries, such lighting shall not exceed 0.5 foot-candle as measured at the abutting residential property line, and that interior lighting shall be designed to minimize nighttime glow visible from and/or intruding into nearby properties and shall be shielded to eliminate glare and light spillover beyond the perimeter property line of the development.

<u>Chapter 18.40.130. Landscaping</u>

Chapter 18.40.130 of the Municipal Code establishes landscaping regulations and performance criteria for all development within the city with the intent of encouraging creative and sustainable landscape design that enhances structures, open space areas, streetscapes and parking areas. Important goals supported by the landscaping regulations include preserving native plant species,

providing shade, and achieving landscape designs that can contribute to economic vitality and public health as well as enhance the character of Palo Alto.

5.3 PROJECT IMPACTS

Methods of Analysis

This Draft EIR evaluates whether the project would result in a “substantial adverse effect” to existing scenic resources and the visual character of the site and surrounding area.

A description of the project site and the surrounding area was prepared based on site visits and review of aerial photographs. This EIR relies upon the City’s Comprehensive Plan and Municipal Code to determine what visual elements have been deemed valuable by the community. The impact analysis focuses on the manner in which development could alter the visual elements or features defined as important visual resources that exist in or near the project site and the whether the project would alter the visual character of the project site.

Significance Criteria

Based on Appendix G of the CEQA Guidelines and on requirements in the Palo Alto Municipal Code related to shadowing public spaces, the proposed project would have a significant aesthetic impact if it would:

- Substantially degrade the existing visual character or quality of the site and its surroundings;
- Create a new source of substantial light or glare which would adversely affect day or nighttime views in the area ("glare" is defined in this EIR as the reflection of harsh bright light sufficient to cause physical discomfort or loss in visual performance and visibility); or
- Substantially shadow public open space (other than public streets and adjacent sidewalks) between 9:00 AM and 3:00 PM from September 21 to March 21.

CEQA Guidelines Appendix G also includes significance criteria related to scenic vistas and scenic resources that are visible from state scenic highways. The project site does not contain any scenic vistas and is not a feature within any scenic vistas. Therefore, development of the project would have no effect on any scenic vistas. In addition, there are no scenic highways in the vicinity of the project site and development of the project would have no effect related to damage to scenic resources visible from a state scenic highway. Therefore, these issues are not addressed in this EIR.

Impact Analysis

IMPACT 5-1	Would the project substantially degrade the existing visual character or quality of the site and its surroundings
SIGNIFICANCE:	Less than Significant
MITIGATION MEASURES:	None required
SIGNIFICANCE AFTER MITIGATION:	Less than Significant

The project site is relatively flat and is developed with approximately 166,231 square feet of building space. This includes approximately 122,318 square feet of gross floor area as defined in the Palo Alto Municipal Code Chapter 18.10 (which is the amount of above-grade building space onsite, as discussed in more detail in Section 4.2 and Impact 4-1, in Chapter 4, Land Use and Planning) and 43,913 square feet of below-grade building space. As shown in Figure 3-3, Existing Site Plan, in Chapter 3, Project Description, the majority of the existing buildings and improvements are located along the perimeter of the project site. These include the Campus Center building and the Gunn Administration building along Bryant Street; the Classroom building along both Bryant Street and Kellogg Avenue; the maintenance building and Leonard Ely Fine Arts Center along Emerson Street south of Melville Avenue, and the rental house and Lockey Alumnae house located on Emerson Street north of Melville Avenue. Additionally, Spieker Field, which is the school's soccer and baseball field, is located along Embarcadero Road, with the Elizabeth Hughes Chapel Theater building visible from the road southeast of the field. Other improvements within the campus include the Fitness and Athletic Center, an outdoor pool, and a large grassy circle generally in the center of the campus (the Circle).

There are surface parking lots containing a total of 74 parking stalls located along Bryant Street, at the corner of Kellogg Avenue and Emerson Street, and on Emerson Street at the terminus of Melville Avenue. There are 121 trees located on the site, four trees located adjacent to the site on private property, and 42 street trees are located within the immediate vicinity of the site within public right-of-way (Appendix C).

The proposed project would allow Castilleja School to increase enrollment at the campus by 125 students compared to the existing CUP enrollment cap and undertake a phased plan to demolish seven structures within the project site and construct a below-grade parking garage, a new outdoor pool, and a new academic building (to include the library, classrooms, staff offices, and common space). The project would not alter the existing land use designation or the zoning at the project site; although the two single-family residential structures in the western corner of the site would be demolished to accommodate the expanded campus.

Construction Period Effects

During demolition and construction activities, there would be a noticeable change in the visual conditions within and adjacent to the project site due to the presence of heavy equipment and trucks, and the temporary views of exposed earth and buildings being demolished and constructed. These activities would result in temporary change in visual character, which is considered a **less than significant** impact.

Changes in Campus-Wide Visual Character

Site Coverage and Building Intensity

The buildings proposed for demolition are the Leonard Ely Fine Arts Center building, maintenance building, pool equipment building, Campus Center, Classroom building, the Lockey Alumnae House, and the rental house. Combined, these buildings include 90,593 square feet of gross floor area (above ground building space). Under the proposed phased development plan, Castilleja School would construct a new academic building that consists of 84,124 square feet of the above-grade gross floor area, along with approximately 46,768 square feet of below-grade building space. With implementation of the proposed phased development plan, the total amount of open space on the project site is anticipated to increase by approximately 12,257 square feet. The total amount of proposed site coverage is 73,416 square feet, whereas the allowable site coverage for the project site is 100,374 square feet (based on the Municipal Code standard for a maximum of 35 percent coverage in the R-1 zone).

Parking

The parking garage is proposed to consist of approximately 50,500 square feet of below grade building space with 115 parking spaces and a dual-lane pick-up/drop-off area. The existing at-grade parking lots along Bryant Street and at the corner of Kellogg Avenue and Emerson Street would be reconfigured. The third parking lot would be demolished and the site redeveloped to support the below-grade pool. The project would reduce the number of surface parking spots by 47, leaving a total of 27 above ground off-street parking spaces to supplement the 115 spaces in the garage for a total of 142 on-site parking spaces, where the Municipal Code requires only 104 parking spaces for the 32 proposed teaching stations. With construction of the parking garage, students and families would be instructed to use the garage for pick-up and drop-off and daily parking. This would reduce the amount of on-street and off-street at-grade parking, which would improve the visual character of the project site and surrounding area.

Changes in Visual Character from Key Viewpoints

The following analysis determines whether the project would result in a substantial adverse change in visual conditions by considering the proposed building design, materials, scale, and massing in relation to the existing conditions at the project site and the adjacent streets. The analysis is based on the site plans provided in Appendix B, which present detailed architectural, landscaping, and lighting plans for the proposed below-grade parking garage, swimming pool, Academic building, and open space area in the northwestern portion of the project site. Key elements of the building plans are included in the EIR in figures presented in Chapter 3, Project Description, as well as the following:

- Figures 4-1 and 4-2, Building Elevations, which identifies the proposed scale, massing, fenestration, materials, and colors for the proposed Academic building;
- Figure 5-4, Fence and Wall Types and Locations, which provides a plan view of the proposed campus modifications, and indicates the location of each of the four different types of gates and fences proposed to be used within the project site; and
- Figure 5-5, Fence and Wall Designs, which provides the design details that would be used for each wall and fence type.

Views from Embarcadero Road

Current views of the project site from Embarcadero Road consist of a low brick wall topped with a steel fence consisting of vertical posts and chain link. Spieker Field is visible behind the fence. There are 11 street trees along this frontage and five trees growing along the northern edge of Spieker Field that provide substantial tree canopy in the foreground of this viewshed. All of these trees, the brick wall, and the steel fence are proposed to be retained in place. Several of the trees near the midpoint of the project site frontage on Embarcadero Road are deciduous, thus the tree canopy is not present in winter and passers-by on Embarcadero Road have a clear view of the Elizabeth Hughes Chapel and the existing Fitness and Athletic center during the winter season. Near Bryant Street, there are six additional trees growing between the existing parking lot and Embarcadero Road, all of which are proposed to be retained in place. These trees provide screening of the parking area and activities within this portion of the campus from Embarcadero Road.

Views from Embarcadero Road would be substantially altered during construction of the below-grade parking lot, which would be placed below Spieker Field and during the period in which the temporary campus buildings are onsite. As shown in Figure 3-8, Temporary Campus Plan, the temporary campus buildings would be placed on Spieker Field, with two rows of classroom buildings generally parallel to Embarcadero Road and placed approximately 20 feet from the property boundary. However, at the completion of all construction and restoration of Spieker Field, the views from Embarcadero Road would not change substantially from the existing condition. Thus the project would result in a **less than significant** change in the visual characteristics of the project site as viewed from Embarcadero Road.

Views from Bryant Street

Current views of the project site from Bryant Street include a small parking lot near Embarcadero Road, the Gunn Administration Building, and the Classroom building. A looped driveway that provides space for student drop-off and pick-up extends along a portion of the site's Bryant Street frontage. Under the proposed project, the parking lot would be reduced to provide a single row of parking along Bryant Street and a driveway ramp into the below-grade parking garage. As shown on Figure 3-11, Landscaping Plan, and Figure 5-5, there are several trees within and adjacent to the parking lot; one of these would be relocated and the rest would be retained in place. There are also ten street trees along the project site's Bryant Street frontage. Two of these would be relocated and the rest would be retained in place. No changes to the Gunn Administration Building would be made.

The Classroom building would be demolished and replaced. As shown in Figure 3-6, Proposed Campus Plan, the proposed Academic building would be constructed with one wing oriented parallel to Bryant Street, one wing parallel to Kellogg Avenue, and an extension off the westerly end of that wing oriented parallel to Emerson Street. As shown in Figures 4-1 and 4-2, Building Elevations, the building frontage on Bryant Street would consist of two primary façades, each 30 feet in height, connected by a solid wood fence with a pedestrian gate. The northerly of the two building façades would be sided with wood shingles while the southerly façade would be sided with wood panels. The northerly façade would be set back from Bryant Street by approximately 50 feet while the southerly façade would be set back 20 feet. As shown in Figure 3-11, the area within the 20-foot setback between the looped driveway and Kellogg Street would be landscaped with a bio-retention swale and perimeter planting.

As shown in Figure 5-4, the fence connection the two façades would be Fence Type 4, a row of bicycle parking would be placed in front of the northerly façade, a section of Fence Type 3 would be constructed between the bicycle parking and Bryant Street, and Fence Type 1 would be constructed between the northerly façade and the existing Gunn Administration Building. As shown in Figure 5-5, Fence Type 4 would be six feet tall and Fence Type 3 would be four feet tall. Both would have a steel frame and be faced with 1x4 cedar boards. Figure 4-2 shows that this section of Fence Type 4 would have all of the 1x4 cedar board oriented with the wide side facing the street, to provide a solid fence. The Fence Type 3 used in front of the bicycle parking would have sections where the 1x4 cedar boards would be oriented with the narrow side facing the street and a four-inch gap between boards, and other sections where the wide side would be facing the street and there would be minimal gaps between boards (refer to the Plan view of the Fence Type 3 details on Figure 5-4). Fence Type 1 would consist of a 1-foot, six-inch tall brick wall topped with a four-inch layer of concrete to match the existing hardscape in this area. This would be topped with a four-foot tall steel fence painted to match the existing steel fencing at the administration building.

The project would replace the existing Classroom building with a new building that would be similar in size, scale, and massing to the existing building. The new building would be approximately 4 feet shorter than the existing building, and the massing as viewed from Bryant Street would be slightly reduced because of the open section between the northerly and southerly building façades and the separation that would be created between the northerly building façade and the Administration building. This would improve visibility of the Administration building, which is a historic resource, as discussed in Chapter 6, Cultural Resources. Landscaping and fencing would be similar to existing landscaping and fencing within the project site and would be compatible with the residential nature of the surrounding neighborhood. Thus the project would result in a **less than significant** change in the visual characteristics of the project site as viewed from Bryant Street.

Views from Kellogg Avenue

Current views of the project site from Kellogg Avenue include the southern façades of the existing classroom building and campus center building, and the small at-grade parking lot at the corner of Kellogg Avenue and Emerson Street. There are two driveways accessing this parking lot off of Kellogg Avenue. A looped driveway that provides space for bus loading and unloading extends through the middle of the site's Kellogg Avenue frontage.

Under the proposed project, the existing classroom building and campus center building would be demolished and replaced with the new Academic building. The looped driveway would be eliminated and the existing parking lot would be reconfigured and shifted towards Emerson Street such that there would be only one driveway accessing the lot from Kellogg Avenue. The existing classroom building extends approximately 140 feet along Kellogg Avenue from its intersection with Bryant Street. There is a 30-foot wide separation between the classroom building and the campus center building, with a solid wood fence and gate connecting the two buildings at ground level. The campus center building extends another 195 feet along Kellogg Avenue towards Emerson Street.

The proposed Academic building would extend for approximately 400 feet along Kellogg Avenue from its intersection with Bryant Street and would have a maximum height of 30 feet. As shown in Figure 4-2, Building Elevations, the building frontage on Kellogg Street would have long sections sided with wood panels and storefront windows separated by solid concrete vertical bands. One section near the middle of this façade would be sided with wood shingles and narrower windows on the upper story and a windowed wall on the ground-level. The breaks in the vertical features and materials coincide with horizontal articulation in the building, as shown on Figure 3-6, Proposed

Campus Plan, and Figure 5-4. With this horizontal articulation, the building setbacks from Kellogg Avenue would range from 20 to 45 feet.

As shown on Figures 3-4 and 5-5, there are 11 street trees along this frontage. The street tree closest to Emerson Street would be relocated while the rest would be retained in place. There are also 13 trees between the public right of way and the southern façades of the two existing buildings. The looped driveway along Kellogg Avenue would be demolished; the sidewalk would be repaved and this area would be landscaped. The horizontal articulation of the Academic building façade would allow for retention of the landscape trees in this area. The building design anticipated retention of tree #45, which is a blue atlas cedar with a trunk that is 57 inches in diameter at breast height. However, Castilleja School recently received a report regarding tree #45, which found the tree to be diseased and dying from the inside to outside. The report concluded that the tree is structurally unsound and recommended immediate removal (Bench 2019). Castilleja School has submitted a separate Architectural Review application for a tree removal permit to the City, as required by the City's codes. Because the building design anticipated retention of this tree, and the proposed project evaluated in this EIR does not require removal of the tree and does not contribute to the existing disease affecting the tree, the potential removal of this tree is not considered an impact of the proposed project. One of the 13 trees would be relocated and the remaining 11 trees would be retained in place.

The project would replace the existing Classroom and Campus Center buildings with a new building that would be similar in size, scale, and massing to the existing buildings. The new building would be approximately four feet shorter than the existing building but would be approximately 35 feet longer and would not maintain the existing break in the massing that occurs between the Classroom and Campus Center buildings, which is shown in Photo 5 on Figure 5-2, Project Site Photographs. The horizontal articulation and patterning of the building materials on the southern façade of the new Academic building would help to break up the massing. All bus loading and unloading would occur within the parking garage. This would remove bus activity from this predominantly residential street, which would improve the visual character in terms of its compatibility with the neighboring residences. Landscaping would be similar to existing landscaping within the project site and would be compatible with the residential nature of the surrounding neighborhood. Thus the project would result in a **less than significant** change in the visual characteristics of the project site as viewed from Kellogg Avenue.

As discussed previously, if the City approves removal of the blue atlas cedar due to its diseased and dying condition would affect site aesthetics but would not be considered an impact of the proposed project evaluated in this EIR. Further, if removal of this tree is approved under the separate Architectural Review application, the project would accommodate replacement of the tree in the same location.

Views from Emerson Street

Current views of the project site from Emerson Street consist of a wooden fence and several closely spaced trees near Kellogg Avenue, vehicles parked within the on-site parking lots on either side of the Leonard Ely Fine Arts Center, views of the front of Lockey Alumnae House that are partially screened with tree canopy and unscreened views of the Lockey house, and views of wooden fencing and the garage of the rental house located north of the alumnae house.

The proposed project would not substantially change views of the site from Emerson Street near its intersection with Kellogg Avenue. The street trees and onsite trees in this area would be retained in place (Figure 5-5). Fencing and additional plantings would be added to the existing landscaped area. As shown on Figure 5-4, fencing in this area would include Fence Type 3 and Fence Type 4. As shown in Figure 5-5, and described previously, Fence Type 3 would be four feet tall, have a steel frame, and 1x4 cedar boards with sections that have varied board orientation and spacing. Figure 5-4 also shows that Fence Type 4 would have the same steel framing and varied sections of 1x4-inch reclaimed cedar boards but would be six feet in height. A 20-foot wide landscape zone would be created around this fence. As shown on Figure 3-11, Landscaping Plan, vegetation used in this area would include a variety of shrubs and flowering plants from the project's "Perimeter Planting" plant list. A small parking lot would be constructed behind the wooden fence such that some parked cars would still be visible from Emerson Street, but the views would be filtered by the proposed fencing and landscaping.

The Leonard Ely Fine Arts Center would be demolished and the below-grade swimming pool would be constructed within the existing footprint for the Fine Arts Center and the parking lot to the north. A bicycle parking area would be established on the north side of the pool area wall. There are five street trees along the Emerson Street frontage in the area proposed for the new swimming pool. Four of these would be retained in place while one would be relocated (Figure 5-5). In addition there are seven trees located between the sidewalk and the Fine Arts Center and adjacent parking lot. All of these would be retained within the 20-foot setback from Emerson Street (Figure 5-5).

Currently there is no fence or wall along this portion of Emerson Street. With construction of the new swimming pool in this area, a sound wall would be constructed along Emerson Street adjacent to the proposed swimming pool. This would shield views of the pool area, but would create a large wall face along the Emerson Street sidewalk, which would change the aesthetics of the pedestrian experience along this sidewalk. Figure 5-4 shows that Wall Type 1 would be constructed along the Emerson Street frontage and between the proposed bicycle parking and pool. Figure 5-5 shows that the sound wall would be six feet in height, with a kicker at the top. The kicker would be three feet high but angled in towards the pool, thus reducing the perceived massing of the sound wall to that of a standard 6-foot high wall. Horizontal wood slats would be mounted on the side of the sound wall that faces Emerson Street. Additionally, a 20-foot wide landscape zone would be created between the sound wall and the sidewalk and planted with shrubs and flowering plants from the project's "Perimeter Planting" plant list, as shown on Figure 3-11. A two-foot tall brick planter, approximately three feet in depth, would be installed adjacent to the sound wall.

The parking garage driveway would be located north of the bicycle parking area, and the private open space area would be established at the northern end of the site's Emerson Street frontage. Both of the residential structures in this portion of the project site would be demolished. The parking garage would not be visible from any viewpoints surrounding the project site; only the entrance and exit ramps and associated walls and fencing would be visible. As shown on Figure 5-4, the proposed gate at the parking garage exit ramp would be placed at the below-grade end of the ramp, immediately at the exit to the garage structure, thus it would not be visible from Emerson Street. The view from Emerson Street would be of driveway sloping downward to the garage and of the fencing along each side of the driveway. As shown on Figure 5-4, the fencing on the northwestern side of the driveway would be Fence Type 2 while Fence Type 4 would be used along the southeastern side of the driveway and in front of the bicycle parking proposed to be adjacent to the pool. As shown on Figure 5-5, Fence Type 2 would consist of steel framing with posts spaced a maximum of five feet apart and 1x4-inch reclaimed cedar boards oriented with the narrow side facing the street and spaced four inches apart, and with a height of three feet-six inches. Fence Type 4 would be six feet in height with steel framing and 1x4-inch reclaimed cedar boards. As described previously, in some sections, there would be a four-inch gap between the 1x4 boards oriented with the narrow side facing the street and in other sections the 1x4 boards would be oriented with the wide side facing the street, providing a more solid fence design. There are 22 trees interior to the project site that contribute to the tree canopy in the area surrounding the two residential structures onsite. All of the trees would be removed or relocated to accommodate construction of the parking garage. However, most of the trees closer to the street would be retained.

Figure 5-4 indicates that perimeter treatment for the 0.33-acre open space area between Emerson Street and Speiker Field would include Fence Type 2 along Emerson Street and the parking garage exit ramp, and Fence Type 5 between the open space and the adjacent private residential property. Because Fence Type 2 orients all of the cedar boards with the narrow side facing the street, viewers along Emerson Street would be able to see into the open space area. As shown on Figure 5-5, Fence Type 5 is six feet tall and consists of horizontal 1x4 reclaimed cedar boards with ½-inch spacing mounted on 2x6 tube steel posts spaced a maximum of eight feet on center. This provides a generally solid fence typical of residential privacy fencing. The Emerson Street frontage would experience a greater degree of change from the existing conditions than the other three frontages. The two existing residential structures would be demolished, and 26 trees that are visible from this frontage would be removed. New fencing and landscaping would be added, including the creation of the 0.33-acre open space area. Considered as a whole, these changes would not substantially alter the visual character of the project site or the surrounding area. The Emerson Street frontage would continue to present the character of a school campus for middle and upper grades, particularly in the southern portion of this frontage. The project would demolish two residential structures that do not currently contribute to the institutional nature of the project site, but do contribute to the residential homes development pattern at this end of Emerson. These structures would be replaced with the driveway egress from the parking garage and associated fencing, and with the private open space area. Views of portions of the parking garage structure and driveway would be filtered by fencing and landscaping. While replacement of one residential structure with a parking garage egress driveway could be seen as an adverse visual change if viewed in isolation, the addition of fencing and landscaping to the frontage would soften the views of the driveway and the replacement of a second residential structure with a landscaped open space area is considered a beneficial visual change. Further, as noted above, the project would remove much of the on-street and off-street vehicle parking from view, which is also a beneficial visual change. Considering all of these factors, the project would not have a substantial adverse effect on the visual character of the project site viewed from Emerson Street.

<u>Conclusion</u>

In summary, the proposed project would reduce the number of structures onsite and increase the amount of open space. Although it would increase the total square feet of building area dedicated to the school use by 40,114 square feet, all but approximately 6,000 square feet of this increase (represented by the demolition of the two residential buildings) would be located below grade and there would be no increase in the gross floor area (above ground building space). The project would improve the visual character of the site and its compatibility with the surrounding residential neighborhood compared to the existing conditions by reducing the amount of at-grade parking, both on-street and off-street, relocating bus loading and unloading to the below-grade parking garage, and creating a private open space area in the northwestern corner of the project site. The proposed building plans use materials, colors, and details that are compatible with the existing structures on the site such that the overall campus would have a unified and coherent design. The project design includes pedestrian scale fencing and gates to provide several paths of ingress and egress for students, staff and visitors, including convenient bicycle parking.

The scale, massing, and character of proposed buildings, fencing, walls, and landscaping are compatible with the surrounding neighborhood. As discussed in Impact 4-1 in Chapter 4, Land Use and Planning, the proposed building would comply with the 30-foot maximum building height limit in the R-1 zone. Complying with the height limit will help ensure that building scale and massing is compatible with neighboring residences which consist of primarily two-story buildings. Wall and fencing details include elements typical for residential properties, such as 1x4-inch cedar boards and a band of circle detail at the top of iron fencing. The project would result in a greater amount of open space within the project site and a reduction in the total amount of above ground building space. Building massing would be similar to the existing conditions and incorporates horizontal articulation to visually reduce the massing. Proposed landscaping incorporates retention of existing trees where feasible, planting of replacement trees and additional landscaping throughout the campus. The plants included in the landscaping plan are typical of residential landscapes in the vicinity and meet the City's requirements for low-water usage. The project also incorporates elements that meet the City's sustainability goals, such as rooftop photovoltaics, energy efficiency, and water-use efficiency. Therefore the impacts of the proposed project on the visual character and quality of the project site and surrounding area would be **less than significant**.

IMPACT 5-2	Would the project substantially shadow public open space (other than public streets and adjacent sidewalks)?
SIGNIFICANCE:	No Impact
MITIGATION MEASURES:	None required
SIGNIFICANCE AFTER MITIGATION:	No Impact

There are no public spaces immediately adjacent to the project site other than the public roadways that form the site boundaries. The nearest public space is the Elizabeth Gamble Garden approximately two blocks to the east and would not be affected by the proposed project. Generally, in the northern hemisphere, shadows are cast to the north. Embarcadero Road is located along the project site's northern boundary. Shadowing of Embarcadero Road would not be considered a significant impact. Thus the project would have no impact associated with shadowing public open spaces.

For informational purposes it is noted that some temporary shadowing of Embarcadero Road could occur during the proposed Master Plan implementation phases 3 and 4, when Spieker Field would be used as the temporary classroom building location. Buildings within the temporary campus would be a maximum of 28 feet tall and would be placed onsite generally as shown in Figure 3-8, Temporary Campus Plan, in Chapter 3. These buildings could cast some shadows on Embarcadero Road. After construction of the new Academic building in the final phase of the proposed Master Plan implementation, the temporary campus buildings would be removed and any shadowing of the road associated with those buildings would no longer occur.

IMPACT 5-3	Would the project create a new source of substantial light or glare which would adversely affect day or nighttime views in the area?
SIGNIFICANCE:	Potentially Significant
MITIGATION MEASURES:	Mitigation Measure 5a
SIGNIFICANCE AFTER MITIGATION:	Less than Significant

Lighting is necessary to provide proper site visibility, guide movement at and around a project site, provide security, emphasize signs, and enhance architectural and landscape features. Site lighting design considerations include mounting heights, light color, and shielding to focus lighting and to avoid glare. Construction undertaken in implementation of the proposed Master Plan could result in increased light and glare affecting surrounding properties and affecting safety on adjacent roadways through the addition of building lights, parking lot lights, car headlights, and any reflective building materials, including windows. Outdoor lighting sources create the greatest potential for light and glare impacts on adjacent properties. Removal of vegetation and trees, which can act as a natural shield, would also increase the potential for outdoor lighting to shine on adjacent property.

Direct glare is caused by a light source such as a light fixture or the sun. Sources of glare can also be surfaces that, after being illuminated by direct lighting or other indirect sources, have measurable luminance and, in turn, become light sources themselves. Potential sources of light and glare at nighttime would be lights and structural building features made of glass, metallic, painted surfaces, and vehicles accessing the site. Light would be emitted from the proposed buildings and surface parking lots during non-daylight hours. Light would also be emitted from the pool when it is used for swim meets and water polo games during non-daylight hours. Lights, aside from security lighting would be rarely used at the project site at nighttime would be directed downward and would not directly illuminate adjacent residential areas. The Municipal Code requires that lighting be installed such that no light source within the project site generates a light level greater than 0.5 foot-candle (the amount of light generated by 1 candle at a distance of 1 foot) on any off-site residential property.

In the daytime, glare sources would come from building materials and vehicles accessing the site. In phase 1 (subterranean garage), the proposed materials are primarily concrete, with metal railings for pedestrian stairways and bridges; the temporary campus buildings that would be installed on the site under phase 2 use stucco and limited window glass; construction of the below grade pool and sound wall in phase 3 would use concrete, wood, stone and metal; and the new academic building constructed under phase 4 would use wood, steel, brick, metal panels, and windows. The potential for windows to result in glare would be minimized with roof overhangs, tree retention and planting, and fencing that would reduce direct solar exposure on windows and reduce the potential for light reflecting off windows to create glare for drivers on adjacent streets. The project does not propose use of highly reflective surfaces, such as mirrored glass, black glass, or metal building materials. The project would not result in glare from new project light sources and therefore would not adversely affect nighttime views or daytime safety.

The building plans in Appendix B2 include lighting plans and (see sheets LT.003 and LT.100 through LT.104). These plans show that lighting fixtures would include bollards and ground-level fixtures along walkways and near building entrances, building-mounted lighting around building perimeters and at entrances, ground-level lighting in bicycle parking areas, and wall mounted lighting on steps and planter walls. Upward-directed spot lighting would be used only to highlight specimen trees. Light levels at the project site perimeter would be 0.5 footcandle or less, thus the project would not create substantial light spillover to adjacent public right-of-way or private property.

Detailed construction plans have not yet been submitted for future Master Plan implementation phases. It is not possible to verify at this time that the design, materials, and light levels of each future improvement would meet the City's development standards; therefore, this is considered a **potentially significant** impact. Mitigation Measure 5a requires Castilleja School to submit building materials and a lighting plan to the City for approval prior to construction. This would allow the City to determine whether the proposed lighting plans are compliant with the development standards in the Zoning Ordinance. The potential for light and glare impacts would remain **less than significant** with compliance with the City's Municipal Code, as stipulated in Mitigation Measure 5a.

IMPACT 5-4	Substantially contribute to cumulative impacts to the visual character of the region.
SIGNIFICANCE:	No Impact
MITIGATION MEASURES:	None required
SIGNIFICANCE AFTER MITIGATION:	No Impact

As discussed in Section 4.1, there are several recently approved or pending projects in the vicinity. The majority of these, located on single-family residential parcels, consist of modifications to or demolition and replacement of the existing dwelling units. The projects in the cumulative scenario are not expected to alter the visual character of the neighborhood around the project site. Thus there is no significant cumulative aesthetic impact to which the project could contribute.

5.4 MITIGATION MEASURES

Mitigation Measure 5a Prior to issuance of building permits for each construction phase, Castilleja School shall submit a lighting plan that identifies the specific light fixtures to be used and their proposed locations. The lighting plan shall also identify the expected light levels within the property and at the property boundaries.

5.5 REFERENCES CITED

Bench, Michael. 2019. *Arborist Assessment for Tree #45.* June 11, 2019.

Palo Alto, City of. 2017. *Our Palo Alto 2030: City of Palo Alto Comprehensive Plan 2030.* https://www.cityofpaloalto.org/civicax/filebank/documents/62915.

Palo Alto, City of. 2018. *Palo Alto Municipal Code.* http://www.amlegal.com/codes/client/palo-alto_ca/.

Photo 1: Houses on NE side of Bryant Street

Photo 2: Houses on NE side of Bryant Street

Photo 3: Houses on SE side of Kellogg Avenue

Photo 4: Houses on SE side of Kellogg Avenue

Photo 5: Adjacent residence on Emerson Street

FIGURE 5-1

Neighborhood Context Photographs

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Photo 1: Buildings facing Bryant Street

Photo 2: Buildings facing Bryant Street

Photo 3: View at corner of Bryant Street and Kellogg Avenue

Photo 4: Buildings facing Kellogg Avenue

Photo 5: Buildings facing Kellogg Avenue

Photo 6: View from Melville Avenue

FIGURE 5-2

Project Site Photographs

Castilleja School Project EIR

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Photo 1: Emerson Street view of Lockey House

Photo 2: View of 1235 Emerson Street

Photo 3: View from Embarcadero Road

Photo 4: View from Embarcadero Road

Photo 5: View at corner of Bryant Street and Embarcadero Road

FIGURE 5-3

Project Site Photographs

Castilleja School Project EIR

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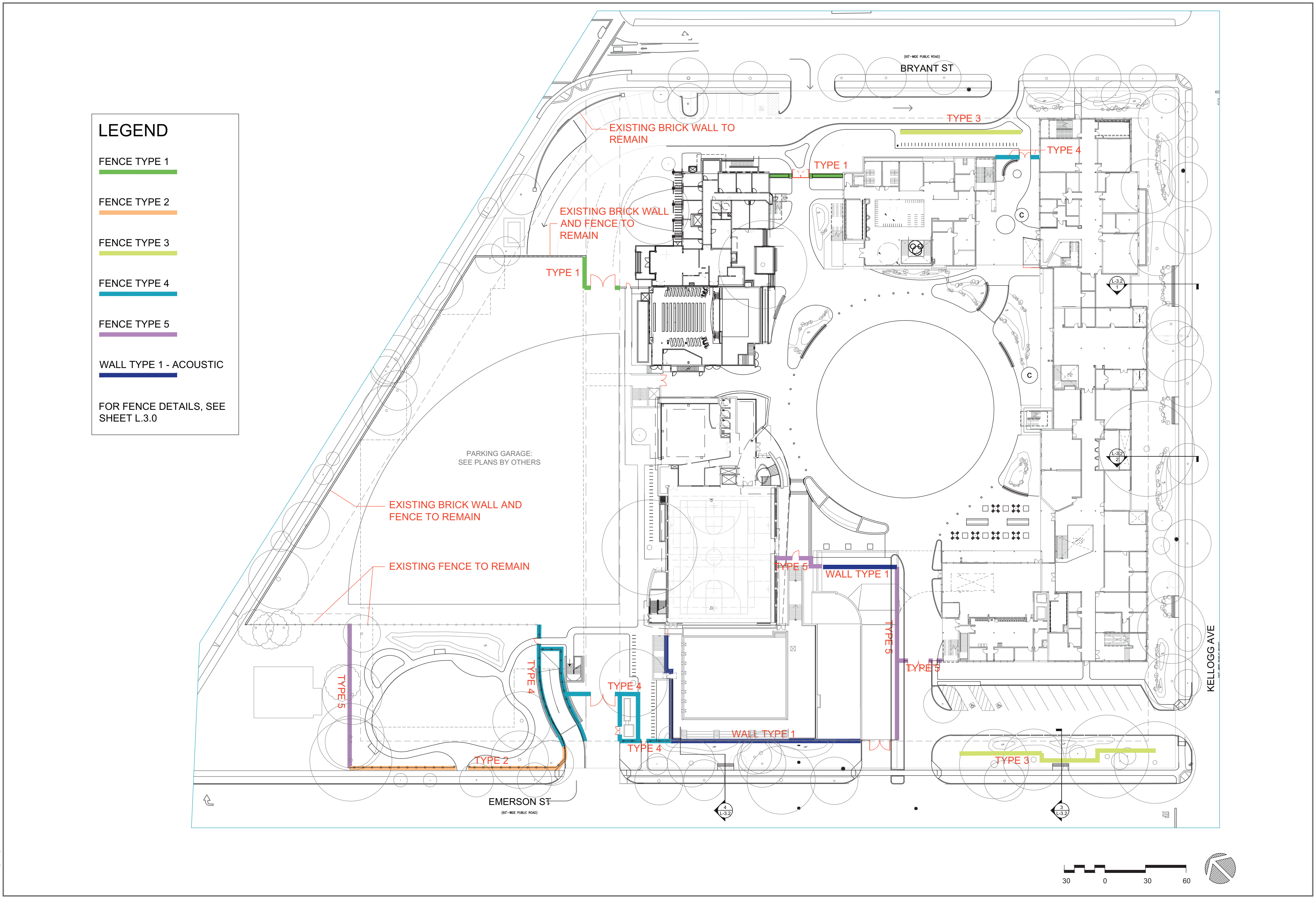

SOURCE: WRNS Studio 2019

DUDEK

FIGURE 5-4

Fence and Wall Type and Location

Castilleja School Project EIR

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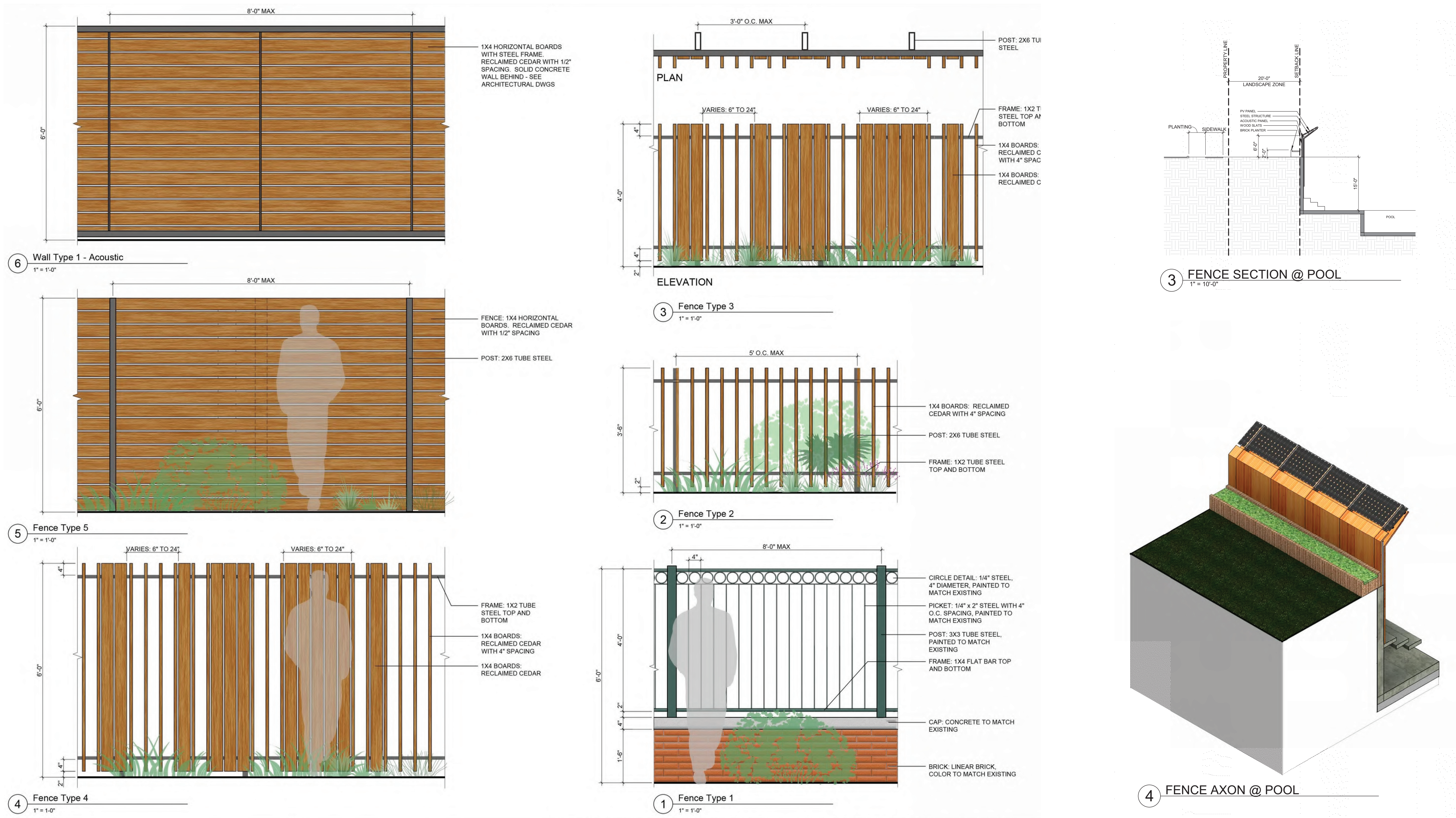

SOURCE: WRNS Studio 2019

DUDEK

FIGURE 5-4

Fence and Wall Design

Castilleja School Project EIR

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CHAPTER 6
CULTURAL RESOURCES

This section describes the potential for prehistoric and historical resources to be impacted as a result of development of the project, identifies associated regulatory requirements, evaluates potential impacts, and identifies mitigation measures related to implementation of the proposed project. Prehistoric resources include sites and artifacts associated with the indigenous, non-Euro-American population, generally prior to contact with people of the European descent. Historical resources consist of structures, features, artifacts, and sites that date from Euro-American settlement of the region. Information in this chapter is taken from the Palo Alto Comprehensive Plan (Palo Alto 2017), the Palo Alto Comprehensive Plan EIR (Palo Alto 2016), and the Cultural Resources Study prepared for the project (Appendix D).

The comments received in response to the Notice of Preparation for this Environmental Impact Report (EIR) included requests for consideration of whether the Lockey House is a historic resource and the degree to which the project could adversely affect historic resources. The Notice of Preparation, Initial Study and comments received are provided in Appendix A.

6.1 EXISTING CONDITIONS

Pre-History and History Background

Early Human Settlement (Pre-A.D. 1750)

It is believed that the Ohlone peoples settled in the Palo Alto area around 1500 B.C., after migrating from the area that is now eastern Contra Costa County and displacing the groups that had previously settled in the area. The Ohlone people continued settlement of the area until the arrival of Spanish settlers. The Ohlone people, also referred to as the Costanoan people, were a conglomerate of several different tribes defined by a common language, which was a part of the Utian language family. The Ohlone were hunter-gathers, relying on plants, seeds, berries, roots, birds and seafood. They developed bows, tobacco pipes, intensive acorn use, and complicated exchange systems. They settled from the San Francisco Bay to Carmel. The individual tribes were defined by territory and consisted of villages and camps influenced by the surrounding environment. The Ohlone were politically patrilineal and the chief was in charge of directing hunting, fishing, and gathering expeditions along with hosting visitors and ceremonial activities (Palo Alto 2016). The population declined sharply after the arrival of the Spanish, the causes of which included slavery, violence, starvation, disease and reduced birth rates. After the secularization of the missions, many went to work as rancho laborers (Appendix D). A number of archaeological surveys have been conducted within the City in association with specific projects, but there may still be undiscovered archaeological resources in many parts of the City. Such resources are most likely to occur near the original locations of streams and springs and northeast of El Camino Real near old tidelands (Palo Alto 2016).

Historic Period

European settlement in the region began as early as 1769 with the arrival of Don Gaspar de Portola and his men establishing camp near the San Francisquito Creek under "El Palo Alto," the tall tree. Colonization of the San Francisco Peninsula by the Spanish occurred through a pattern of establishing missions and converting Native Americans to Catholicism; establishing fortified structures called presidios; and establishing towns known as pueblos and stock-grazing operations called rancheros that supplied necessary goods to the settlements and also provided goods for export.

Spanish Period (1769-1822)

The Spanish missionization of Alta California was initiated in San Diego in 1796 and lasted until 1823. During this period, a total of 21 missions were constructed including five in the region: San Francisco de Asis (1776), Santa Clara de Asis (1776), San Jose de Guadalupe (1797 in Alameda County), San Rafael Arcangle (1817 in Marin County), and San Francisco Solano (1823 in Sonoma County). The missions were connected by a trail that became known as El Camino Real, which continues to serve as a major transportation corridor located approximately 0.5-mile west of Castilleja School. In the San Francisco peninsula, Spanish missionization began with the arrival of Franciscan monks led by Padre Palou and establishment of Mission Dolores and the Presidio of San Francisco in 1776. The Franciscans considered locating another mission in the area that is now Palo Alto, though they ultimately selected the Mission Santa Clara location. Once the mission establishment fell through, Don Rafael Soto from San Jose requested permission to establish a rancho in the area. His rancho was named Rancho Rinconada del Arroyo de San Francisquito and spanned 2,229 acres from "El Palo Alto to the bay and from south of the present Stanford Stadium to the current Bayshore Freeway" (Appendix D).

American Period (Post 1848)

European settlement in the region continued to expand, influenced by the gold rush and railroad development. The community of Mayfield began with construction of a roadhouse along the route between San Francisco and San Jose in 1853. The township of Mayfield was established in 1855, centered around the California Avenue/El Camino Real intersection in southern Palo Alto. Mayfield was typical of most small farm towns, with the exception of having many saloons that served the hundreds of men who operated small sawmills in the hills west of the town. The sawmills were run to harvest Douglas Fir and Redwood trees for lumber for the growing city of San Francisco to the north (Palo Alto 2019). The town also saw significant growth after French financier Jean Baptiste Paulin Caperon, better known as Peter Coutts, purchased land in Mayfield and four other parcels around three sides of today's College Terrace in 1875. This addition comprised more than a thousand acres extending from present-day Page Mill Road to Serra Street and from El Camino Real to the foothills (Appendix D). College Terrace, which also became part of Mayfield, was developed starting in 1887 when Alexander Gordon began subdividing his land and developing streets that were named after eastern universities, with the goal of selling his lots to Stanford faculty members (Appendix D).

A key contributor to the establishment of the community of Palo Alto was the influx of wealthy residents from San Francisco following construction of the Menlo Gate in 1854, which was a huge wooden gate with arches on either side. It was erected by two Irishmen who had purchased 1,700 acres of the Rancho de las Pulgas to mark the driveway to their two homes from the El Camino Real, naming it after their old home in Ireland. When the railroad was extended from San Francisco to Mayfield in 1863, the station was named for the gates. The railroad offered faster travel for wealthy San Francisco barons to reach their country homes; "a round-trip ticket from Menlo Park to San Francisco cost $2.50 and a one-way ride took 80 minutes, compared to the stagecoach, which took four hours from Redwood City to San Francisco" (Menlo Park 2017). This contributed to the larger-scale development that began in the area in the 1860s and 1870s. While the San Franciscans established large estates around Menlo Park, the ranchos continued to thrive (Appendix D).

Both Palo Alto and Mayfield continued to grow; but the establishment of Stanford University and its association with Palo Alto led to the decline of Mayfield. Leland Stanford, President of the Southern Pacific Railroad and one of the "Big Four" of the Central Pacific Railroad, started buying land in 1876 around the area that would become Palo Alto. Leland Stanford Sr. and his wife founded Stanford University in 1891, naming the university in honor of their son Leland Jr., who died of typhoid fever at age 15 in 1884. By the early 1890s, the first settlers arrived, buying homes on University, Emerson, and Webster Streets, and Lytton Avenue. Commercial development quickly followed along University Street, Lytton and Hamilton Avenues, and near the town's train depot (Appendix D). In 1894, Palo Alto was officially incorporated and began the process of developing and operating its own utilities, including water, gas, an electric power plant, and a sewage system and treatment plant (Palo Alto 2017). Although Mayfield incorporated as a city in 1903, in 1925, it was unincorporated and the area then annexed to the City of Palo Alto (Palo Alto 2016).

The Professorville Historic District is adjacent to the northwestern side of the project site. The district is significant for its important historical associations and high architectural value and represents one of the earliest residential areas in Palo Alto, housing the first generation of professors at the fledgling Stanford University. By the early twentieth century, the interurban railroad played an important role in connecting Palo Alto and Mayfield with San Jose. Streetcars began operating in 1910, making the daily commute for students and faculty of Stanford University much more convenient. Apartments and boarding houses began springing up along the streetcar routes to support students and shop workers. As the City's population continued to grow, more high-end housing began to spring up throughout the City; while low-end rental housing was also introduced through the construction of more affordable bungalow courts (Appendix D). During World War II, many single-family homes were subdivided into apartments to meet the demand for housing during this period of limited construction. After the war, new subdivisions boomed and entire neighborhoods sprang up throughout the City. By the 1950s, the City had transformed from a college town to a leader in technology, and there was a drastic increase in research, light industrial, and office space (Palo Alto 2017).

Castilleja School History

While the Castilleja School is currently located in a residential neighborhood, the school predated most of the residential neighborhood and has expanded over the years to accommodate increased enrollment at the school. As reported in the Cultural Resources Study prepared for the proposed project (Appendix D), in the late 1800s, the education of women was often considered inferior to college preparatory education for men; however, progressive women's education pioneers sought to change this perspective and began to establish schools focused on preparing women for higher education. The desire to provide college preparatory classes to women spurred Stanford alumna Mary Ishbel Lockey (1872–1939) to found the Castilleja School in 1907 as an all-girls school. Familiar with the Palo Alto area from her time at Stanford, Lockey capitalized on the increased population growth and moderate weather and chose Palo Alto as the location for her school. "Castilleja," the chosen name for the school, comes from the botanical name for a native flower to Santa Clara County, the Indian paintbrush.

The original school (Castilleja Hall) was founded in 1907 at 1121 Bryant Street. This building has been determined eligible as a contributor to the National Register of Historic Places (NRHP)-listed Professorville Historic District (Appendix D). Lockey then purchased 4.5 acres of land located a short distance south, and outside of the Professorville neighborhood. Much of the surrounding area consisted of open space and orchards, with sparse residential development. The new site offered the opportunity to design a complete campus and increase enrollment; it also provided an unobstructed view of the surrounding meadows, all the way to the foothills (Appendix D). In August 1910, the school relocated to 1310 Bryant Street, into four new structures; a three-story dormitory, a recitation building, a domestic science building and a gymnasium. In the 1920's, Castilleja added the pool and chapel, a science lab, the Orchard House, and an auditorium. The Western Journal of Education reported that 230 students were enrolled at Castilleja School in 1921. Enrollment declined during the Great Depression and World War II. Following World War II, the City reported that enrollment for the school was only 235, which was only a 5-student increase from 1921. In 1942–1943, the enrollment numbers for the school were at 91, and by 1947, enrollment was at 235. In 1958, the school made a decision to drop the lower grades from the educational platform and only taught grades seven through twelve, until the early 1990s when the school added grade six to their curriculum. In 1999, the City reported that enrollment for the school was at 385 students, with 90 staff members (Appendix D).

Project Site Cultural Resources Investigation

Dudek's architectural historians and archeologists conducted a Cultural Resources Study for the project site. As described in this section, the research and analysis effort included database searches, review of past cultural resources studies and other data sources, review of building plans and permits, and a site survey. During the survey, all buildings and structures on campus that were constructed over 45 years ago were photographed, researched, and evaluated in consideration of criteria and integrity requirements established by the California Register of Historic Resources (CRHR) and the City, and in consideration of potential impacts to historical resources under CEQA. The survey entailed walking all portions of the campus and documenting each building with notes and photographs, specifically noting character-defining features, spatial relationships, and any observed alterations.

Archaeological Resources Record Search

As part of the cultural resources investigation, Dudek archaeologists requested a California Historical Resources Information System records search from the Northwest Information Center, which houses cultural resources records for Santa Clara County to identify any known archaeological resources within the project site and vicinity. The records search also included a review of the NRHP, the CRHR, the California Inventory of Historic Resources, the Office of Historic Preservation Historic Properties Directory, the Archaeological Determinations of Eligibility list, and other ethnographic resources. Records indicate that 43 cultural resource investigations have been conducted within 1 mile of the project site. Of these, three studies have overlapped a portion of the project site (S 033061, S-041536, and S-029573). There are no known archaeological resources within or adjacent to the project site.

Description of Survey Resources

The proposed project site includes 6.58 acres on three parcels - Assessor's Parcel Numbers (APN) 124-12-34, 124-12-33, and 124-12-31. The site is located in the Old Palo Alto neighborhood, and approximately 0.6 miles southeast of the University Ave/Downtown Palo Alto area. The site is bounded by Embarcadero Road, Bryant Street, Kellogg Avenue, and Emerson Street. The site is located south of the Professorville Historic District which lies on the north side of Embarcadero Road.

Table 6-1 provides a description of all buildings and structures surveyed as part of the Cultural Resources Study, which was prepared by architectural historians who meet the Secretary of the Interior's Professional Qualification Standards for architectural history, including a photograph of the building, current building name, historic building name (if applicable), year built (if known), a general physical description of the building, and any alterations identified through either building development research or during the cultural resources survey.

Table 6-1
Castilleja School Buildings and Structures Surveyed

Building Name, Address, and Parcel	Year Built	Architect	Description	Identified and Observed Alterations
Gunn Family Administration Center 1310 Bryant Street (APN 124-12-034) 	1910	Roy Heald (architect) and Gustav Laumeister (builder)	This building is currently listed as a Category 3 building on the City's Historic Buildings Inventory. The 2-story building is irregular in plan and now oriented to face Embarcadero Road. The building sits on a poured concrete foundation. The ground floor is clad in pebble-dash stucco, and the second story is clad in wood shingles. The roof is sheathed in wood shingles. The building was originally designed in the Craftsman style and features overhanging eaves, wood shingle detailing, paired Craftsman style windows, wooden column supports, and dormers. The building is the only remaining original building to the 1910 founding of the school and was designed by prominent local architect Roy Heald and constructed by Gustav Laumeister.	2000: complete reconfiguration of the interior, reconfiguration of the entrance, replacement of all windows, replacement of shingles, replacement of stucco, removal of building from the foundation for basement addition, original porch was enclosed, roof replaced, trellis/arbor addition, and connection of building to Chapel and Rhoades Hall.
Circle Feature 1310 Bryant Street (APN 124-12-034) 	1910	Unknown	The use of greenspace in the original and later designs was important to Lockey and the early students. The circle feature appears on early maps of the campus and has remained a significant element in the overall design of the campus. While much of the campus developed and built up from the original plans, the use of greenspace remains a key component with the circle feature.	The circle feature is largely unchanged with the exception of the grass being replaced by synthetic turf.

Table 6-1
Castilleja School Buildings and Structures Surveyed

Building Name, Address, and Parcel	Year Built	Architect	Description	Identified and Observed Alterations
Lockey House, 1263 Emerson Street (APN 124-12-033) 	1912	Unknown	This 2-story, wood frame house that is roughly L in-plan has been significantly altered from its original appearance. The building sits on a poured concrete foundation and is clad in stucco. It features a complex hipped roof sheathed in composition shingles, and exposed rafter tails. The façade of the building is oriented to face the Castilleja School campus to the southeast, which is now the main elevation of the house. The main elevation features a poured concrete stoop that is offset to the west and accessed by brick steps under a triangular pediment. The six-panel wooden entry door is flanked by fixed wood windows, each of which features four panes. The remainder of the façade features a large four-over-one window flanked by two, two-over-one windows. The second floor windows are all three-over-one. There was an addition made to the north elevation of the building for a kitchen expansion.	1990s: Enclosure of the original entry way and addition of porch that is oriented toward campus, interior reconfiguration for use as Alumni house. Dates unknown: garage construction and kitchen addition.

Table 6-1
Castilleja School Buildings and Structures Surveyed

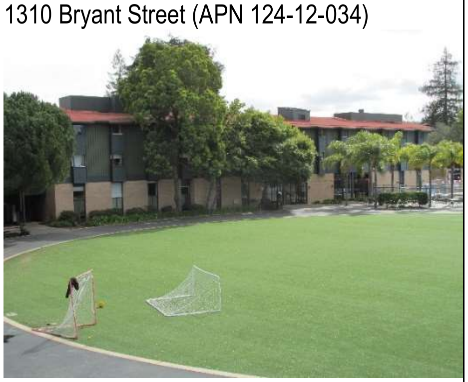
Building Name, Address, and Parcel	Year Built	Architect	Description	Identified and Observed Alterations
Elizabeth Hughes Chapel Theater 1310 Bryant Street (APN 124-12-034) 	1926	Birge Clark	This building is currently listed as a Category 3 building on the City's Historic Buildings Inventory. The 2-story Chapel was designed by Birge Clark in 1926. The building was originally designed as a standalone building, but was connected to the Administration building in 2000. Constructed in the Craftsman style, the building retains many visual elements of the style including overhanging eaves, side gabled roof sheathed in wood shingles, wood shingle cladding, and paired Craftsman style windows. However, the building was extensively renovated in 1980 and again in 2000 and has lost much of its exterior and interior integrity and configuration.	1980: Replacement and expansion of the stage area, replacement of the ceiling, and expansion of the building to the west with the addition of the step down style windows. 2000: Removal of the building from its foundation for basement construction, connection to the Administration building, replacement of the balcony and reconfiguration of the entrance from Bryant Street.
Arrillaga Family Campus Center 1310 Bryant Street (APN 124-12-034) 	1960–1962	Paul Huston	The 3-story building was poured in place concrete construction with a complex roofline that is roughly rectangular in plan. The building is oriented with entry from Kellogg Street to the southeast and the campus circle to the northwest.	1997: interior reconfiguration of second and third floors to replace the original dormitory space, reconfiguration of the first floor for the library, reconfiguration of north elevation for library entrance, additional safety bars installed on outdoor staircase railings, and the addition of elevator. 2010: Building was reroofed with spray foam.

Table 6-1
Castilleja School Buildings and Structures Surveyed

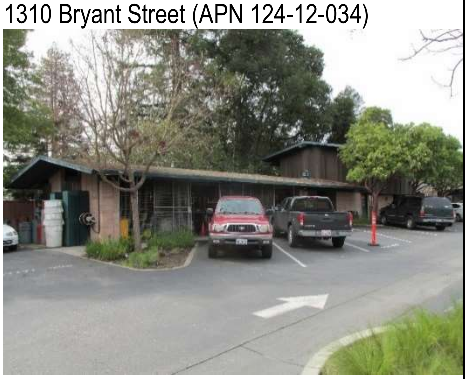
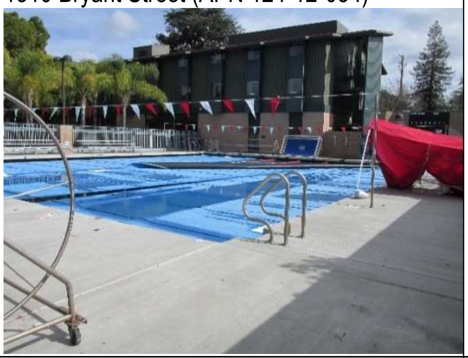
Building Name, Address, and Parcel	Year Built	Architect	Description	Identified and Observed Alterations
Rhoades Hall/Middle School Classrooms 1310 Bryant Street (APN 124-12-034) 	1965–1967	William Daseking	The 1967 2-story poured-in-place concrete school building was a phased construction project that is irregular in plan. The building is clad in brick veneer under the first-story windows, then clad in stucco that is accented by vertical concrete slat elements all set under a spray foam roof. The building is oriented with its main entry point facing Bryant Street. The main point of entry is recessed and accessed by a columned flat roof porch leading to an elaborately carved set of double doors slightly offset in a 2-story glass and metal wall panel. Fenestration is regular and all original metal windows are intact. The building also features one of the two sunken gardens on campus, which is located to the west of the building.	1998: second floor reconfigured from dormitory space to classrooms and offices, connection to Administration building and campus center building. 2010: building reroofed with a spray foam roof that is in keeping with the color and look of the original roof material.
Maintenance 1310 Bryant Street (APN 124-12-034) 	1960	Paul Huston	The 2-story maintenance building was constructed in 1960. It is irregular in plan with a rear carport under a spray foam gabled roof with overhanging eaves and exposed rafter tails. Fenestration is irregular and a variety of metal windows is featured on all elevations. The building is clad in concrete block on the first story and vertical wood siding on the second story.	1980: The building was reroofed. Circa 1990: Sliding cage doors were added to the carport section of the building.

Table 6-1
Castilleja School Buildings and Structures Surveyed

Building Name, Address, and Parcel	Year Built	Architect	Description	Identified and Observed Alterations
1235 Emerson Street (APN 124-12-031) 	1979	Unknown	The 2-story house is L-shaped in plan, clad in wood shingles with a gabled roof sheathed in composition shingles constructed circa 1980. The house is accessed by Emerson Street by a poured-concrete walkway. The house is surrounded by a wooden fence with a small entry door near the garage that provides access to a sizable yard with mature trees. The house has an irregular fenestration and all windows appear to be either fixed or double-hung vinyl windows. The main façade features a recessed entry point with multiple-pane French style doors.	No significant changes were observed.
Leonard Ely Fine Arts Center 1310 Bryant Street (APN 124-12-034) 	1980	William Daseking	The circa 1980 2-story building is rectangular in plan and is oriented to the northeast. The building is clad with concrete block and features a flat roof. The main (east) elevation of the building features a recessed entry point that is offset to the north of the façade. The main elevation also features a wooden pergola that is supported with concrete columns with a poured concrete walkway. The building also features one of the two sunken gardens on campus, which is located to the east of building.	2010: Reroof of building with spray foam Date unknown: Addition of the lockers, reroof of the building, addition of door to building facing Emerson and replacement of rotted wood on the exterior trellis system.

Table 6-1
Castilleja School Buildings and Structures Surveyed

Building Name, Address, and Parcel	Year Built	Architect	Description	Identified and Observed Alterations
Swimming Pool 1310 Bryant Street (APN 124-12-034) 	2001	Unknown	The current swimming pool, the third pool built at the same location, was installed in 2001.	There have been no significant changes to the pool since its installation in 2001.
Pool Storage Building 1310 Bryant Street (APN 124-12-034) 	2001	Unknown	The small, 1-story, flat-roofed, brick-veneer pool storage building is used for chemical and pool equipment storage.	There are no known alterations.
Joan Z. Lonergan Fitness and Athletic Center 1310 Bryant Street (APN 124-12-034) 	2008	Kornberg and Associates	The 2-story gymnasium is roughly rectangular in plan with a flat roof and is clad in stucco and wood shingles. The building is accessed by a glass entryway offset to the east	There are no known alterations.

Source: Appendix D

Previously Recorded Resources

The Northwest Information Center records identified 29 resources within the 1-mile search radius. The closest resources are 1215 Emerson Street (a single family residence adjacent to the northwest corner of the project area found eligible for the NRHP as an individual property through survey evaluation); a historic utility pole approximately 100 feet to the south of the project area (P-43-0002809, not eligible for the NRHP) and the Professorville Historic District (P-43-000551, NRHP Listed District), located adjacent to the project area, on the north side of Embarcadero Road. Refer to the Cultural Resources Study in Appendix D for information regarding additional resources known to occur within one mile of the Castilleja School project site.

6.2 REGULATORY FRAMEWORK

Cultural resources are defined as buildings, sites, structures, or objects, each of which may have historical, architectural, archaeological, cultural, and/or scientific importance. Several laws and regulations at the federal and state level govern archaeological and historic resources deemed to have scientific, historic, or cultural value. The pertinent regulatory framework, as it applies to the proposed project, is summarized in the following text.

Federal Regulations

National Historic Preservation Act

The National Historic Preservation Act of 1966 established the National Register of Historic Places (NRHP) as the official federal list of cultural resources that have been nominated by state offices for their historical significance at the local, state, or national level. Properties listed in the NRHP, or determined eligible for listing, must meet certain criteria for historical significance and possess integrity of form, location, and setting. Under Section 106 of the act and its implementing regulations, federal agencies are required to consider the effects of their actions, or those they fund or permit, on properties that may be eligible for listing or that are listed in the NRHP. The regulations in 36 CFR 60.4 describe the criteria to evaluate cultural resources for inclusion in the NRHP. Properties may be listed in the NRHP if they possess integrity of location, design, setting, materials, workmanship, feeling, and association, and they:

A. Are associated with events that have made a significant contribution to the broad patterns of our history;
B. Are associated with the lives of persons significant in our past;
C. Embody the distinctive characteristics of a type, period, or method of construction, or represent the work of a master, or possess high artistic values, or represent a significant and distinguishable entity whose components may lack individual distinction; or
D. Have yielded, or may be likely to yield, information important in prehistory or history.

These factors are known as Criteria A, B, C, and D.

In addition, the resource must be at least 50 years old, except in exceptional circumstances. Eligible properties must meet at least one of the criteria and exhibit integrity, which is measured by the degree to which the resource retains its historical properties and conveys its historical character, the degree to which the original fabric has been retained, and the reversibility of the changes to the property. Archaeological sites are evaluated under Criterion D, which concerns the potential to yield information important in prehistory or history.

The residential building at 1263 Emerson Street (Lockey house) was determined potentially eligible in 1998 for listing on the CRHR, but was not found to be eligible for listing in the NRHP. Further analysis, conducted by Dudek's architectural historian in 2017 on behalf of the City of Palo Alto (Appendix D), determined the Lockey house was ineligible for CRHR because the home no longer retains integrity of its original design. The residence at 1215 Emerson Street, which is immediately adjacent to the project site, was found in 1998 to be eligible for the NRHP (and therefore also eligible for the CRHR).

State Regulations

California Register of Historical Resources

California Public Resources Code, Section 5024.1, authorizes the establishment of the CRHR. Any identified cultural resources must therefore be evaluated against the CRHR criteria. In order to be determined eligible for listing in the CRHR, a property must be significant at the local, state, or national level under one or more of the four significance criteria, modeled on the NRHP. In order to be determined eligible for listing in the CRHR, a property must be significant at the national, state, or local level under one or more of the following four criteria:

1. It is associated with events or patterns of events that have made a significant contribution to the broad patterns of the history and cultural heritage of California and the United States.
2. It is associated with the lives of persons important to the nation or to California's past.
3. It embodies the distinctive characteristics of a type, period, region, or method of construction, or represents the work of an important creative individual, or possesses high artistic values.
4. It has yielded, or may be likely to yield, information important to the prehistory or history of the state and the nation.

In addition to meeting one or more of the above criteria, a significant property must also retain integrity. Properties eligible for listing in the CRHR must retain enough of their historic character to convey the reason(s) for their significance. Integrity is judged in relation to location, design, setting, materials, workmanship, feeling, and association.

California Public Resources Code

Sections 5097–5097.6 of the California Public Resources Code indicate that the unauthorized disturbance or removal of archaeological, historical, or paleontological resources located on public lands is a misdemeanor. It prohibits the knowing destruction of objects of antiquity without a permit on public lands, and it provides for criminal sanctions. This section was amended in 1987 to require consultation with the Native American Heritage Commission (NAHC) whenever Native American graves are found. Violations for taking or possessing remains or artifacts are felonies.

California Public Resources Code Section 5097.5 states that "a person shall not knowingly and willfully excavate upon, or remove, destroy, injure, or deface, any historic or prehistoric ruins, burial grounds, archaeological or vertebrate paleontological site, including fossilized footprints, inscriptions made by human agency, rock art, or any other archaeological, paleontological or historical feature, situated on public lands, except with the express permission of the public agency having jurisdiction over the lands."

California Health and Safety Code Section 7050.5

California law protects Native American burials, skeletal remains, and associated grave goods, regardless of their antiquity, and provides for the sensitive treatment and disposition of those remains. The California Health and Safety Code, Section 7050.5, requires that if human remains are discovered in any place other than a dedicated cemetery, no further disturbance or excavation of the site or nearby area reasonably suspected to contain human remains shall occur until the county coroner has examined the remains (Section 7050.5b). If the coroner determines or has reason to believe the remains are those of a Native American, the coroner must contact the NAHC within 24 hours (Section 7050.5c). The NAHC will notify the most likely descendant. With the permission of the landowner, the most likely descendant may inspect the site of discovery. The inspection must be completed within 24 hours of notification of the most likely descendant by the NAHC. The most likely descendant may recommend means of treating or disposing of, with appropriate dignity, the human remains and items associated with Native Americans.

California Environmental Quality Act

Under CEQA (California Public Resources Code, Section 21000 et seq.), public agencies must consider the effects of their actions on both historical resources and unique archaeological resources. Pursuant to CEQA Section 21084.1, a "project that may cause a substantial adverse change in the significance of an historical resource is a project that may have a significant effect on the environment." Section 21083.2 requires agencies to determine whether proposed projects would have effects on "unique archaeological resources."

"Historical resource" has a precise, specialized meaning as defined in the CEQA statute (see California Public Resources Code, Section 21084.1, and 14 CCR 15064.5(a) and 15064.5(b)). The term embraces any resource listed in or determined to be eligible for listing in the CRHR. The CRHR includes resources listed in or formally determined eligible for listing in the NRHP, as well as some California State Landmarks and Points of Historical Interest.

Properties of local significance that have been designated under a local preservation ordinance (local landmarks or landmark districts) or that have been identified in a local historical resources inventory may be eligible for listing in the CRHR and are presumed to be "historical resources" for purposes of CEQA unless a preponderance of evidence indicates otherwise (California Public Resources Code, Section 5024.1, and 14 CCR 4850). Unless a resource listed in a survey has been demolished or has lost substantial integrity, or there is a preponderance of evidence indicating that it is otherwise not eligible for listing, a lead agency should consider the resource potentially eligible for the CRHR.

In addition to assessing whether historical resources potentially impacted by a proposed project are listed or have been identified in a survey process, lead agencies have a responsibility to evaluate them against the CRHR criteria as discussed previously, prior to making a finding as to a proposed project's impacts to historical resources (California Public Resources Code, Section 21084.1, and 14 CCR 15064.5(a)(3)). The fact that a resource is not listed or determined to be eligible for listing does not preclude a lead agency from determining that it may be a historical resource (California Public Resources Code, Section 21084.1, and 14 CCR 15064.5(a)(4)).

CEQA also distinguishes between two classes of archaeological resources: archaeological sites that meet the definition of a historical resource, as described previously, and unique archaeological resources. Under CEQA, an archaeological resource is considered "unique" if it:

- Contains information needed to answer important scientific research questions and there is a demonstrable public interest in that information;
- Has a special and particular quality such as being the oldest of its type or the best available example of its type; or
- Is directly associated with a scientifically recognized important prehistoric or historic event or person (California Public Resources Code, Section 21083.2(g)).

CEQA states that if a proposed project would result in an impact that might cause a substantial adverse change in the significance of a historical resource, then an EIR must be prepared and mitigation measures and alternatives must be considered. A "substantial adverse change" in the significance of a historical resource means physical demolition, destruction, relocation, or alteration of the resource or its immediate surroundings such that the significance of a historical resource would be materially impaired (14 CCR 15064.5(b)(1)).

The CEQA Guidelines (Section 15064.5(c)) also provide specific guidance on the treatment of archaeological resources, depending on whether they meet the definition of a historical resource or a unique archaeological resource. If the site meets the definition of a unique archaeological resource, it must be treated in accordance with the provisions of California Public Resources Code, Section 21083.2.

CEQA Guidelines, Section 15064.5(e), requires that excavation activities be stopped whenever human remains are uncovered and that the county coroner be called in to assess the remains. If the county coroner determines that the remains are those of Native Americans, the NAHC must be contacted within 24 hours. At that time, the lead agency must consult with the appropriate Native Americans, if any, as identified in a timely manner by the NAHC. Section 15064.5 of the CEQA Guidelines directs the lead agency (or applicant), under certain circumstances, to develop an agreement with the Native Americans for the treatment and disposition of the remains.

Senate Bill 297

SB 297 addresses the disposition of Native American burials in archaeological sites and protects such remains from disturbance, vandalism, or inadvertent destruction; establishes procedures to be implemented if Native American skeletal remains are discovered during construction; and establishes the NAHC to resolve disputes regarding the disposition of such remains. The provisions of SB 297 have been incorporated into Section 15064.5(e) of the CEQA Guidelines.

Assembly Bill 52

Assembly Bill (AB) 52 requires consultation with Native American tribes traditionally and culturally affiliated with the geographic area in which a project requiring CEQA review is proposed if those tribes have requested to be informed of such proposed projects. The intention of such consultation is to avoid adverse impacts to tribal cultural resources. This law is in addition to existing legislature protecting archaeological resources associated with California Native American tribes. AB 52 applies to all projects initiating environmental review in or after July 2015. However, no tribes have requested consultation in accordance with AB 52 for projects within the City of Palo Alto, thus the City is not obligated to notify or consult with any tribes in regards to the proposed project...

Local Regulations

City of Palo Alto Municipal Code – Historic Preservation (Chapter 16.49)

In adopting Section 16.49.010 ("Purpose") of the City Municipal Code, the City found that the protection, enhancement, perpetuation, and use of structures, districts, and neighborhoods of historical and architectural significance located within the City are of cultural and aesthetic benefit to the community. The City further found that respecting the City's heritage would support the City's economic, cultural, and aesthetic standing. According to Section 16.49.010, the purposes of the City's Historic Preservation chapter are to:

(a) Designate, preserve, protect, enhance and perpetuate those historic structures, districts and neighborhoods which contribute to the cultural and aesthetic heritage of Palo Alto;

(b) Foster civic pride in the beauty and accomplishments of the past;

(c) Stabilize and improve the economic value of certain historic structures, districts and neighborhoods;

(d) Develop and maintain appropriate settings for such structures;

(e) Enrich the educational and cultural dimensions of human life by serving aesthetic as well as material needs and fostering knowledge of the living heritage of the past;

(f) Enhance the visual and aesthetic character, diversity and interest of the city;

(g) Establish special requirements so as to assure the preservation and the satisfactory maintenance of significant historic structures within the downtown area.

Historic Resource Designation Criteria

In accordance with Section 16.49.404(b) of the City Municipal Code, the following criteria, along with the definitions of historic categories and districts in Section 16.49.020, shall be used as criteria for designating additional historic structures/sites or districts to the historic inventory:

(1) The structure or site is identified with the lives of historic people or with important events in the city, state or nation;

(2) The structure or site is particularly representative of an architectural style or way of life important to the city, state or nation;

(3) The structure or site is an example of a type of building which was once common, but is now rare;

(4) The structure or site is connected with a business or use which was once common, but is now rare;

(5) The architect or building was important;

(6) The structure or site contains elements demonstrating outstanding attention to architectural design, detail, materials or craftsmanship.

City of Palo Alto Historic Inventory

The City's Historic Inventory lists noteworthy examples of the work of important individual designers and architectural eras and traditions, as well as structures whose background is associated with important events in the history of the city, state, or nation. The Inventory is organized under the following four categories:

Category 1: An "Exceptional Building" of pre-eminent national or state importance. These buildings are meritorious works of the best architects, outstanding examples of a specific architectural style, or illustrate stylistic development of architecture in the United States. These buildings have had either no exterior modifications or such minor ones that the overall appearance of the building is in its original character.

Category 2: A "Major Building" of regional importance. These buildings are meritorious works of the best architects, outstanding examples of an architectural style, or illustrate stylistic development of architecture in the state or region. A major building may have some exterior modifications, but the original character is retained.

Category 3 or 4: A "Contributing Building" which is a good local example of an architectural style and relates to the character of a neighborhood grouping in scale, materials, proportion or other factors. A contributing building may have had extensive or permanent changes made to the original design, such as inappropriate additions, extensive removal of architectural details, or wooden facades resurfaced in asbestos or stucco.

City of Palo Alto Comprehensive Plan

The City's Comprehensive Plan provides specific policies for preserving historic and archaeological resources. The Land Use and Community Design Element emphasizes the value and importance of the sustainable management of archaeological resources as well as historic buildings and places (City of Palo Alto 2007).

The Land Use and Community Design Element of the Comprehensive Plan provides general guidelines for the treatment of archaeological resources. In general, these guidelines correspond with the Secretary of the Interior's Standards and Guidelines for Archeology and Historic Preservation (48 FR 44720–44726)) and the California Office of Historic Preservation (OHP) Instructions for Recording Historical Resources (1995). In addition to these standards and guidelines, the City's Comprehensive Plan Land Use and Community Design Element specifies, "using the archaeological sensitivity map [Figure L-8] in the Comprehensive Plan as a guide, continue to assess the need for archaeological surveys and mitigation plans on a project basis, consistent with the California Environmental Quality Act and the National Historic Preservation Act" (City of Palo Alto 2007).

6.3 PROJECT IMPACTS

Methods of Analysis

A records search along with a pedestrian survey of the site was conducted in February 2017 by Dudek's architectural historians Samantha Murray, MA, Sarah Corder, MFA, and Kara Dotter, MSHP, who meet the Secretary of the Interior's Professional Qualification Standards for architectural history, and Dudek archaeologists Adam Giacinto, MA, Registered Professional Archaeologist (RPA), and William Burns, MSc, RPA. The results of these searches and surveys are included in the *Cultural Resources Study for the Castilleja School Project, City of Palo Alto, Santa Clara County, California* (Appendix D). The survey also included consultation with the NAHC and a sacred lands file search. No Native American cultural resources were identified within the survey area. This research established the historic context and derived locations of other resources that may exist or have existed within the project area.

Although the project-specific impact analysis for cultural resources necessarily includes separate analyses for prehistoric resources, historic-period resources, and human remains, the cumulative analysis combines these resources into a single resource base and considers the additive effect of project-specific impacts to significant regional impacts on cultural resources.

Significance Criteria

Potential impacts associated with cultural resources have been evaluated using the following criteria, based on Appendix G of the CEQA Guidelines (14 CCR 15000 et seq.). The proposed project would have a potentially significant impact related to cultural resources if it would:

- Cause a substantial adverse change in the significance of a historical or archaeological resource as defined in CEQA Guidelines, Section 15064.5.
- Disturb any human remains, including those interred outside of formal cemeteries.

An adverse change in the significance of a historical or archaeological resource is one that would disturb, damage, or destroy the resource, while the disturbance of damage would reduce or eliminate the potential for the resource to yield important information and context regarding history.

Impact Analysis

IMPACT 6-1	Cause a substantial adverse change in the significance of a historical or archeological resource.
SIGNIFICANCE:	Potentially Significant
MITIGATION MEASURES:	Mitigation Measures 6a and 6b
SIGNIFICANCE AFTER MITIGATION:	Less than Significant

In preparation of the Cultural Resources Study, Dudek completed an extensive archival research and intensive pedestrian survey of the Castilleja School. It found that the campus contains one historical resource: the Administration/Chapel building, which is currently listed as a Category 3 building on the City's inventory of historic resources; listed in the Office of Historic Preservation's Historical Resources Inventory with a status code 5S2 (individual property that is eligible for local listing or designation). The report states that while the campus conveys its original plan on the most basic level, all other buildings/features on campus were found to be ineligible for either individual listing or as a contributing element of a historic district. Only buildings and structures over 45 years old were evaluated for historical significance. Table 6-2 provides a summary of findings for all buildings/features on campus.

Table 6-2
Castilleja School Buildings

Component	Year Built	Findings
Gunn Family Administration Center Building/ Elizabeth Hughes Chapel Theater	1910/1926	Locally listed (Category 3)
Circle greenspace feature	1910	Not eligible
Arrillaga Family Campus Center	1960–1962	Not eligible
Rhoades Hall	1965–1967	Not eligible
Maintenance Building	1960	Not eligible
Leonard Ely Fine Arts Center	1980	Not eligible
Swimming Pool	2001	Not eligible
Pool Storage Building	2001	Not eligible
Joan Z. Lonergan Fitness and Athletic Center	2008	Not eligible
1263 Emerson Street (Lockey House)	1912	Not eligible
1235 Emerson Street	1979	Not eligible

Source: Appendix D

The proposed project does not include any alterations to the Gunn Family Administration Center Building/ Elizabeth Hughes Chapel Theater. The project proposes to demolish the existing classroom building, which is adjacent to the Administration Center. A new academic building would be constructed in generally the same location as the existing classroom building, but it would be located approximately 50 feet to the south of the Administration Center as shown on Figure 3-6, Site Plan, in Chapter 3, Project Description and Figure 4-2, Building Elevations, in Chapter 4, Land Use and Planning. This would improve the visibility of the Administration Center from Bryant Street. Thus the project would have no adverse effects on the historic significance and integrity of the Administration Center and Chapel Theater.

The residence located at 1215 Emerson Street, which is adjacent to the project site, is a historic resource that is eligible for listing on the NRHP due to its association with an important political figure in Palo Alto from 1918 to 1936. The proposed project would not alter any portion of the property that supports this resource. It would demolish the nearest adjacent residence, but the determination of historic significance and integrity of the building at 1215 Emerson Street is not dependent on the presence of adjacent or nearby structures; and the adjacent residence that is proposed to be demolished was constructed in 1979, which is outside the period of significance for 1215 Emerson Street (Appendix D).

Demolition and construction activities would occur in close proximity to the Administrative Center/Chapel Theater building and could result in inadvertent damage to the structure. Similarly the residence located at 1215 Emerson Street could be inadvertently damaged during project construction. The discussion under Impact 8-3 in Chapter 8, Noise, demonstrates that the project does not include activities that generate the highest levels of vibration, such as blasting and pile driving, and the anticipated levels of vibration resulting from project construction are not anticipated to adversely affect any adjacent historic resources. However, the historic buildings could be adversely affected by dust, debris, and damage from accidental contact with construction equipment. Thus the project would result in a **potentially significant** impact to these historic buildings. Mitigation Measure 6a requires the development and approval of a preservation protection plan for each phase of construction. With the implementation of Mitigation Measure 6a, the proposed project will have a **less-than-significant** impact on historical resources.

Because of the prevalence of archeological resources in the area, there is a potential for earth-moving activities to disturb previously unknown archeological resources. No archeological resources were identified during the record searches or surveys. However, it is possible that earth-moving construction activities, such as grading and excavation, could disturb archeological resources, if any occurred on site, thus the project would result in a **potentially significant** impact to archaeological resources. Mitigation Measure 6b would require the education of construction workers on archeological resources and the steps to take in the event of the discovery of any previously unrecorded resource. With implementation of the Mitigation Measure 6b, the proposed project will have a **less than significant** impact to archeological resources.

IMPACT 6-2	Disturb any human remains, including those interred outside of dedicated cemeteries.
SIGNIFICANCE:	Less than Significant
MITIGATION MEASURES:	None required
SIGNIFICANCE AFTER MITIGATION:	Less than Significant

Because of the prevalence of dedicated burials in prehistoric and historic periods in the area, there is a potential for earth-moving activities to disturb human remains. No burial sites or cemeteries were identified during the record searches or surveys. However, it is possible that earth-moving construction activities, such as grading and excavation, could disturb human remains, if any dedicated burials occurred on site. In the event any human remains are discovered, the project contractor is required to comply with Section 7050.5(b) of the California Health and Safety Code, which specifies the following protocol when human remains are discovered:

> In the event of discovery or recognition of any human remains in any location other than a dedicated cemetery, there shall be no further excavation or disturbance of the site or any nearby area reasonably suspected to overlie adjacent remains until the coroner of the county in which the human remains are discovered has determined … the circumstances, manner and cause of death, and the recommendations concerning treatment and disposition of the human remains have been made to the person responsible for the excavation, or to his or her authorized representative, in the manner provided in section 5097.98 of the Public Resources Code.

All construction contractors would be required as a matter of law to follow the protocols set forth by the California Health and Safety Code and Public Resources Code in the event human remains are discovered. This would ensure that any human remains are not adversely affected by project construction and the impact would remain **less than significant.**

IMPACT 6-3	Contribute to a cumulative loss of cultural resources.
SIGNIFICANCE:	No Impact
MITIGATION MEASURES:	None required
SIGNIFICANCE AFTER MITIGATION:	No Impact

Archaeological Resources

Because all significant archaeological resources and human remains are unique and non-renewable members of finite classes, all adverse effects or negative impacts erode a dwindling resource base. The loss of any one archaeological site affects all others in a region, because the cultural setting context for a given region is a reflection of all the cultural resources in that region and these resources are best understood in the context of the entirety of the cultural system of which they are a part. Cultural resources could therefore be a cumulatively considerable impact to archaeological resources if any cultural resources (including subsurface and surface archaeological resources) are disturbed and/or destroyed.

For the analysis of cumulative impacts to archaeological resources, the geographic area is the City of Palo Alto. Development under the cumulative scenario in this area is expected to include buildout of the City of Palo Alto General Plan and the individual projects described in Chapter 4, Land Use, of this EIR.

The Palo Alto Comprehensive Plan, state law, and federal law require that archaeological resources be preserved in place whenever feasible, and require resources that cannot be preserved be properly recorded, evaluated, and curated. Therefore, although development is anticipated in the region and could occur in proximity to known archaeological resource sites, compliance with the applicable state and federal regulations and general plan policies would ensure that no loss of archaeological resources and research potential would occur in the cumulative scenario. The project-specific potential impacts would remain less than significant with implementation of Mitigation Measures 6a and 6b. This would ensure that the project would comply with the City of Palo Alto Comprehensive Plan and applicable state and federal regulations. As the cumulative impact would remain less than significant, there is no cumulative impact to which the project could contribute.

Historic Resources

For the analysis of cumulative impacts to historic resources, the geographic area is the City of Palo Alto. The Comprehensive Plan EIR concluded that "Development allowed by the proposed Plan, in combination with other future development in the city and the region, has the potential to cause adverse cumulative cultural resource impacts, which would be a significant impact." However, the Comprehensive Plan EIR concluded that with implementation of the mitigation measures identified in the Comprehensive Plan EIR, the cumulative impacts to historic resources would be reduced to a less than significant level. Thus there is no significant cumulative impact to which the project could contribute.

As discussed in Chapter 4, there are several projects in the City that include modifications to historic buildings. The City's Historic Review Board has the authority to review and make recommendations on any project that has a potential to affect a historic resource, and the Comprehensive Plan encourages protection of all historic resources, consistent with the Comprehensive Plan EIR mitigation measures. Similarly, the Castilleja School Project would prevent disturbance of historical resources consistent with the Comprehensive Plan policies with implementation of Mitigation Measure 6a. This would ensure that the project would comply with the City of Palo Alto Comprehensive Plan and applicable state and federal regulations. Therefore, the recently approved and pending projects in the cumulative scenario, including the proposed Castilleja School Project, would be consistent with the analysis in the Comprehensive Plan EIR, and impacts to historic resources in the cumulative scenario would remain less than significant.

6.4 MITIGATION MEASURES

Mitigation Measure 6a A protection plan shall be implemented for the Administration/Chapel Theater building and the residence at 1215 Emerson Street during proposed new construction and renovation activities to prevent damage to these structures. A clear and concise preservation protection plan shall be developed to provide these details. The protection plan shall be prepared by a qualified historic preservation specialist and shall be appended to the final set of construction plans for each construction phase. At a minimum, the protection plan shall include the following:

- Protective fencing shall be installed approximately 15 feet from the perimeter of the Administration/Chapel Theater building and from the southern and eastern property lines of the residence at 1215 Emerson Street, or a lesser distance if recommended by a qualified historic preservation specialist. All construction workers shall be instructed to keep all people, materials, and equipment outside of the areas surrounded by protective fencing. The protective fencing shall consist of brightly-colored mesh fencing at least four feet in height. The mesh shall be mounted on six-foot tall poles, with at least two feet below ground, and spaced a maximum of six feet apart.

- Material and equipment delivery and stockpile areas shall be identified on the protection plan, and shall be located as far as practicable from the Administration/Chapel Theater building and the residence at 1215 Emerson Street.

- If cranes are used to install buildings or building components, no materials or structures shall be suspended above or within 30 feet measured horizontally from the exterior walls of the Administration/Chapel Theater building and the residence at 1215 Emerson Street.

- For demolition of the existing Classroom building, the protection plan shall document the specific nature of demolition activities that would occur on any portion of the building that touches or is within 25 feet of the Administration/Chapel Theater building and provide recommendations for equipment usage and demolition techniques that will avoid adverse effects to the Administration/Chapel Theater building.

- The protection plan shall prescribe measures for containment of dust during demolition, excavation, and construction. This may include wetting soils and materials to prevent wind-blown dust; covering exposed materials, soil, and unfinished buildings; and use of temporary barriers to prevent any wind-blown dust from reaching historic structures.

Mitigation Measure 6b Prior to initiation of construction for each construction phase, all construction crew members, consultants, and other personnel shall receive project-specific Cultural Resource Awareness training. The training shall be conducted in coordination with qualified cultural resource specialists and shall inform project personnel of the potential to encounter sensitive archaeological material. In the event that archaeological resources (sites, features, or artifacts) are exposed during construction activities for the proposed project, all construction work occurring within 100 feet of the find shall immediately stop until a qualified archaeologist, meeting the Secretary of the Interior's Professional Qualification Standards, can evaluate the significance of the find and determine whether additional study is warranted. Prehistoric archaeological deposits may be indicated by the presence of discolored or dark soil, fire-affected material, concentrations of fragmented or whole marine shell, burned or complete bone, non-local lithic materials, or the characteristic observed to be atypical of the surrounding area. Common prehistoric artifacts may include modified or battered lithic materials; lithic or bone tools that appeared to have been used for chopping, drilling, or grinding; projectile points; fired clay ceramics or non-functional items; and other items. Historic-age deposits are often indicated by the presence of glass bottles and shards, ceramic material, building or domestic refuse, ferrous metal, or old features such as concrete foundations or privies. Depending upon the significance of the find under CEQA (14 CCR 15064.5(f); PRC Section 21082), the archaeologist may simply record the find and allow work to continue. If the discovery proves significant under CEQA, additional work, such as preparation of an archaeological treatment plan, testing, or data recovery may be warranted and would be implemented if recommended by the qualified archeologist.

6.5 REFERENCES CITED

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CHAPTER 7
TRANSPORTATION AND CIRCULATION

This section describes the results of the transportation impact analysis conducted to evaluate potential transportation-related impacts of the Castilleja School Project (proposed project) on roadways, intersections, transit, bicycle, and pedestrian movements. The analysis includes a discussion of existing and cumulative transportation and circulation conditions as well as potential impacts from construction and operation of the project. Quantitative transportation analyses have been conducted for the following scenarios: Existing (without project), Existing Plus Project, Year 2030 (no project), and Year 2030 Plus Project.

In response to the Notice of Preparation (NOP) for this Environmental Impact Report (EIR), the City of Palo Alto (City) received several comments that raised specific concerns regarding traffic volumes and congestion and bicycle safety. These included concerns about changes in traffic patterns, congestion at parking garage entrance and exit, and increased traffic volumes and congestion on the local neighborhood streets. Other comments described local residents' observances related to the effectiveness of the Transportation Demand Management (TDM) programs that Castilleja has implemented in recent years. The NOP described the anticipated scope of the Traffic Impact Study, including the intersections and roadway segments that would be evaluated. Comments in response to the NOP included specific suggestions regarding additional intersections and roadway segments that should be included in the Traffic Impact Study. All of the comments on the NOP were considered by City staff and the EIR preparers and adjustments were made to the scope of the Traffic Impact Study. The NOP and comments received in response to the NOP are included in Appendix A. The analysis in this chapter is based on the Traffic Impact Study for the project. This study, which was prepared by W-Trans in December 2018, is provided in Appendix E.

7.1 EXISTING CONDITIONS

Existing Roadway Conditions

This section provides descriptions of the primary roadways in the vicinity of the project site. Figure 7-1, Transportation Study Area, identifies the roadway segments and intersections that are evaluated in the Traffic Impact Study.

U.S. Route 101 (US-101) is a freeway facility located east of the project site. Generally, US-101 serves Santa Clara County and the San Francisco Bay Area's major population centers, providing vital connectivity along California's Pacific Ocean coastline. Primary access to the project site from US-101 is provided at the Embarcadero Road interchange. In 2017, the average daily traffic volume on US-101 in the vicinity of Embarcadero Road/Oregon Expressway was approximately

230,000 vehicles per day with four travel lanes in each direction (Caltrans 2018). The project site is approximately 1.6 miles southwest of US-101.

El Camino Real (State Route 82) is a major arterial roadway located west of the project site that parallels US-101, providing similar connectivity between the Bay Area's population and employment centers. Access to the project site from El Camino Real is provided at Embarcadero Road. El Camino Real currently accommodates approximately 41,000 vehicles per day with three travel lanes in each direction.

Embarcadero Road is a four lane east-west aligned minor arterial with a 25-miles per hour (mph) speed limit which provides access between El Camino Real and US 101.

Waverly Street is a two-lane north-south local street with on-street parking and single-family homes on each side of the street. The posted speed limit of Waverly Street is 25 mph.

Bryant Street is a north-south two-lane roadway with fronting residences and on-street parking. Bryant Street is a bicycle boulevard near the project, with traffic calming elements and intermittent posted 15-mph zones providing protection for cyclists.

Emerson Street is a north-south local street with on-street parking and single-family homes on each side. Emerson Street has one lane in each direction and has a posted speed limit of 25 mph.

Churchill Avenue is an east-west two-lane roadway with fronting residences and on-street parking on the southbound side. Churchill Avenue has a Class II bicycle lane south of Bryant Street. The posted speed limit of Churchill Avenue is 25 mph.

Alma Street is a north-south collector roadway that provides access between Downtown Palo Alto and San Antonio Road. Between Churchill and Kingsley streets Alma Street is a four-lane roadway with fronting residences and no on-street parking. Between Kingsley and Lincoln streets Alma Street has three lanes with one lane of northbound traffic and two lanes for southbound travel; single-family homes on both sides with prohibited on-street parking. North of Lincoln Street, Alma Street is a four-lane roadway with fronting residences and on-street parking on the east side. Alma Street has a posted speed limit of 25 mph.

Lincoln Avenue is an east-west local roadway with two lanes providing access between Alma Street and Middlefield Road. Lincoln Avenue has single-family homes and on-street parking on both sides and has a posted speed limit of 25 mph.

Kingsley Avenue is an east-west local two-lane roadway with single-family homes and on-street parking. Kingsley Avenue provides local access for private residences and has a 25-mph posted speed limit.

High Street is a north-south local street with on-street parking and single-family homes on each side. High Street has one lane in each direction and has a posted speed limit of 25 mph.

Ramona Street has one lane each direction and provides local access to single family residences in the "Professorville" neighborhood of Palo Alto. It is lined with single-family homes with on-street parking and has a 25-mph speed limit.

Middlefield Road is a north-south two-lane roadway with fronting residences and on-street parking. Walter Hayes Elementary School is located in the northeast quadrant of the intersection of Middlefield Road and Embarcadero Road. At this intersection, Middlefield Road has one through lane and one left-turn lane in each direction.

Pedestrian, Bicycle, and Transit Facilities

Pedestrian Facilities

Pedestrian facilities include sidewalks, crosswalks, traffic signals that include pedestrian phases, curb ramps, curb extensions, and various streetscape amenities such as lighting, benches and landscaping. In general, a network of sidewalks, crosswalks, pedestrian signals, and curb ramps provide access for pedestrians near Castilleja School.

In the project vicinity, there are continuous sidewalks are provided along both sides of Waverly Street, Bryant Street, Emerson Street, High Street, and Ramona Street as well as Churchill Avenue, Lincoln Avenue, Kingsley Avenue and Melville Avenue. There are continuous sidewalks on the east side of Alma Street. These streets include curb ramps and overhead lighting provided at intersections. Crosswalks are provided at the intersections of Waverly and Bryant streets with Embarcadero Road.

Bicycle Facilities

The Traffic Impact Study (Appendix E) provides the following bikeway classifications, as defined in the California Department of Transportation (Caltrans) Highway Design Manual (2017, as cited in Appendix E) and Design Information Bulletin Number 89: Class IV Bikeway Guidance (2105, as cited in Appendix E). The Traffic Impact Study also identifies the existing and planned bicycle facilities in the project area, as shown in Table 7-1.

- **Class I Multi-Use Path** – a completely separated right-of-way for the exclusive use of bicycles and pedestrians with cross flows of motorized traffic minimized.
- **Class II Bike Lane** – a striped and signed lane for one-way bike travel on a street or highway.

- **Class III Bike Route** – signing only for shared use with motor vehicles within the same travel lane on a street or highway. Bicycle boulevards fall under this bikeway classification.
- **Class IV Bikeway** – also known as a separated bikeway, a Class IV Bikeway is for the exclusive use of bicycles and includes a separation between the bikeway and the motor vehicle traffic lane. The separation may include, but is not limited to, grade separation, flexible posts, inflexible physical barriers, or on-street parking.

Table 7-1
Bicycle Facility Summary

Facility	Class	Length (miles)	Begin Point	End Point
Existing				
Embarcadero Bike Path	I	1.20	Castilleja Ave	University Ave
Ellen Fletcher Bicycle Boulevard (Bryant Street)	III	3.40	East Meadow Dr	Palo Alto Ave
Coleridge Ave Bike Lane	II	0.40	Bryant St	Middlefield Rd
Churchill Ave Bike Lane	II	0.40	El Camino Real	Bryant St
Planned				
Alma St Shared Arterial	III	2.90	East Charleston Rd	Homer Ave
Kingsley Ave Bicycle Boulevard	III	0.60	Guinda St	Embarcadero Rd
Middlefield Rd Shared Roadway	III	2.00	Marion Ave	Palo Alto Ave
Embarcadero Rd Shared Arterial	III	2.40	El Camino Real	East Bayshore Rd

Source: Appendix E

Transit Facilities

The Valley Transit Authority (VTA) provides fixed route bus service and dial-a-ride service in Palo Alto. In the project vicinity, bus stops on Embarcadero Road at Bryant Street and at Waverly Street are serviced by VTA Local Shuttle E route. Shuttle E provides loop service to several destinations throughout the City and operates Monday through Friday with approximately twenty-minute headways from 7:00 AM to 10:00 AM and from 3:30 PM to 7:30 PM. Dial-a-ride, or door-to-door service, is available from VTA Paratransit for individuals in the City and the Santa Clara County for individuals who are unable to independently use the transit system due to a physical or mental disability.

Most VTA buses include bike racks with capacity for two bicycles, with space allocated on a first come, first served basis. Additional bicycles are allowed on VTA buses at the discretion of the driver.

The project site is located within one-half mile of the Caltrain Corridor and 1.5 miles from the Palo Alto station. Caltrain provides rail service from San Francisco to Gilroy with connections to San Francisco and San Jose international airports. Castilleja School operates a private shuttle service between the Palo Alto station and the school campus. In addition, the school provides bus service, which consists of two routes that serve students in surrounding cities.

Study Area

For traffic analysis purposes, a set of intersections and roadway segments were selected for inclusion in the study area. The study area was identified based on knowledge of local traffic patterns and represents those locations that could potentially be impacted by the proposed project. The following lists identify the locations evaluated in the Traffic Impact Study, as shown on Figure 7-1.

Intersections

1. El Camino Real/Embarcadero Road
2. Embarcadero Road Spur/Alma Street
3. Kingsley Avenue/Alma Street
4. Embarcadero Road/Emerson Street
5. Embarcadero Road/Bryant Street
6. Middlefield Road/Embarcadero Road
7. Emerson Street/Melville Avenue
8. Alma Street/Melville Avenue
9. Emerson Street/Kellogg Avenue
10. Emerson Street/Churchill Avenue
11. Churchill Avenue/Alma Street

Roadway Segments

1. Waverley Street from:
    a. Lincoln Avenue to Kingsley Avenue
    b. Kingsley Avenue to Whitman Court
    c. Whitman Court to Melville Avenue
    d. Melville Avenue to Embarcadero Road

   e. Embarcadero Road to Kellogg Avenue
   f. Kellogg Avenue to Churchill Avenue

2. Bryant Street from:
   a. Lincoln Avenue to Kingsley Avenue
   b. Kingsley Avenue to Whitman Court
   c. Whitman Court to Embarcadero Road
   d. Embarcadero Road to Kellogg Avenue
   e. Kellogg Avenue to Churchill Avenue

3. Emerson Street from:
   a. Lincoln Avenue to Kingsley Avenue
   b. Kingsley Avenue to Embarcadero Road
   c. Embarcadero Road to Melville Avenue
   d. Melville Avenue to Kellogg Avenue
   e. Kellogg Avenue to Churchill Avenue

4. Churchill Avenue from:
   a. Waverley Street to Bryant Street
   b. Bryant Street to Emerson Street
   c. Emerson Street to Alma Street

5. Alma Street from:
   a. Lincoln Avenue to Embarcadero Road
   b. Embarcadero Road to Kingsley Avenue
   c. Kingsley Avenue to Melville Avenue
   d. Melville Avenue to Kellogg Avenue
   e. Kellogg Avenue to Churchill Avenue

6. Lincoln Avenue from:
   a. Waverly Street to Bryant Street
   b. Bryant Street to Ramona Street

   c. Ramona Street to Emerson Street
   d. Emerson Street to High Street
   e. High Street to Alma Street

7. Kingsley Avenue from:
   a. Waverly Street to Bryant Street
   b. Bryant Street to Ramona Street
   c. Ramona Street to Emerson Street
   d. Emerson Street to High Street
   e. High Street to Alma Street

8. High Street from Lincoln Avenue to Embarcadero Road;

9. Ramona Street from Lincoln Avenue to Kingsley Avenue; and

10. Melville Avenue from Alma Street to Emerson Street

Existing Traffic Volumes

The existing daily traffic volumes on the roadway segments evaluated in the Traffic Impact Study are shown on Figure 7-2. As shown, traffic volumes on Alma Street range between approximately 25,500 and 26,700 vehicles, while Churchill Avenue, Waverly Street, Lincoln Avenue, the southern end of Kingsley Avenue, and the westerly portion of Bryant Street support between 2,000 and 5,125 vehicles per day. Other roadway segments in the study area carry fewer than 1,000 vehicles per day.

Level of Service

To assess the quality of existing traffic conditions, operating levels of service (LOS) were calculated at each study intersection. LOS is a qualitative measure of traffic operating conditions whereby a letter grade "A" through "F," corresponding to progressively worsening traffic operating conditions, is assigned to an intersection.

Table 7-2 presents the characteristics associated with each LOS grade. As shown in the table, LOS A, B, and C are considered satisfactory to most motorists, and LOS D is marginally acceptable. LOS E and F are associated with increasingly long delays and congestion and are unacceptable to most motorists. The specific amount of delay that correlates with each LOS grade is different for signalized and unsignalized intersections, other than for LOS A conditions.

Table 7-2
Level of Service Definitions and Roadway Conditions

LOS	Signalized Intersection		Two-Way Stop-Controlled Intersection
A	Uncongested operations, all queues clear in a single-signal cycle. Delay of less than 10.1 seconds		Little or no delay. Gaps in traffic are readily available for drivers existing the minor street Delay of 0 to 10 seconds
B	Uncongested operations, all queues clear in a single cycle.		Free flow, presence of other vehicles noticeable. Gaps in traffic are somewhat less readily available than with LOS A, but no queuing occurs on the minor street. Delay of 10 to 15 seconds
	LOS B+	Delay between 10.1 and 12.0 seconds	
	LOS B	Delay between 12.1 and 18.0 seconds	
	LOS B-	Delay between 18.1 and 20.0 seconds	
C	Light congestion, occasional backups on critical approaches.		Average traffic delays. Ability to maneuver and select operating speed affected. Delay of 15 to 25 seconds
	LOS C+	Delay between 10.1 and 12.0 seconds	
	LOS C	Delay between 12.1 and 18.0 seconds	
	LOS C-	Delay between 18.1 and 20.0 seconds	
D	Significant congestion of critical approaches but intersection functional. Cars required to wait through more than one cycle during short peaks. No long queues formed.		Long traffic delays. Unstable flow, speeds and ability to maneuver restricted. There are fewer acceptable gaps in traffic, and side streets may experience queues of one or two vehicles. Delay of 25 to 35 seconds
	LOS D+	Delay between 35.1 and 39.0 seconds	
	LOS D	Delay between 39.1 and 51.0 seconds	
	LOS D-	Delay between 51.1 and 55.0 seconds	
E	Severe congestion with some long standing queues on critical approaches. Blockage of intersection may occur if traffic signal does not provide for protected turning movements. Traffic queue may block nearby intersection(s) upstream of critical approach(es).		Very long traffic delays with intersection at or near capacity. Few acceptable gaps in traffic are available and longer queues may form on the side street. Delay of 35 to 50 seconds
	LOS E+	Delay between 55.1 and 60.0 seconds	
	LOS E	Delay between 60.1 and 75.0 seconds	
	LOS E-	Delay between 75.1 and 80.0 seconds	
F	Total breakdown, stop-and-go operation. Delay greater than 80.0 seconds		Drivers may wait for long periods before there is an acceptable gap in traffic for exiting the side streets, creating long queues. Delay of more than 50 seconds

Source: Appendix E

In preparing the Traffic Impact Study, W-Trans obtained existing traffic volume counts of the study area intersections and calculated the corresponding LOS based on the lane configurations and traffic controls (signals and stop signs) present at each location. The existing lane configurations and traffic controls are shown in Figure 7-3.

For intersections that are controlled by a traffic signal, the LOS is determined by the average time (in seconds) that a vehicle is stopped at the intersection, which is expressed as the average delay per vehicle. For intersections that have stop signs on the side-streets, which is called a two-way stop-controlled (TWSC) intersection, the LOS is determined by considering the average delay per vehicle for each turning movement made through the intersection. Results for the overall intersection reflect the weighted overall average delay and a separate LOS is calculated for individual movements. The existing LOS and delay at each study area intersection is identified in Table 7-3 and the existing peak hour traffic volumes at each intersection are shown on Figure 7-4.

Table 7-3
Existing Peak Hour Intersection Levels of Service

Intersection	Control Type	AM Peak		School PM Peak		PM Peak	
Approach		Delay	LOS	Delay	LOS	Delay	LOS
El Camino Real/ Embarcadero Rd	Signal	39.9	D	41.2	D	42.6	D
Embarcadero Rd Spur/ Alma St	TWSC	2.2	A	1.0	A	0.8	A
Westbound (Embarcadero)		***54.5***	***F***	*20.4*	*C*	*25.3*	*C*
Alma St/Kingsley Ave	TWSC	1.4	A	1.3	A	4.3	A
Westbound (Kingsley)		***70.5***	***F***	***43.2***	***E***	**	***F***
Embarcadero Rd/ Emerson St	TWSC	0.6	A	0.4	A	0.6	A
Northbound (Emerson)		*14.7*	*B*	*13.8*	*B*	*13.4*	*B*
Embarcadero Rd/ Bryant St	Signal	13.1	B	12.0	B+	11.5	B+
Middlefield Rd/ Embarcadero Rd	Signal	38.5	D+	35.4	D+	39.7	D
Melville Ave/ Emerson St	TWSC	3.2	A	3.6	A	3.0	A
Westbound (Melville)		*9.7*	*A*	*9.6*	*A*	*9.4*	*A*
Melville Ave/Alma St	TWSC	0.3	A	0.3	A	0.1	A
Westbound (Melville) Approach		*21.3*	*C*	*16.0*	*C*	*15.0*	*C*
Kellogg Ave/Emerson St	TWSC	5.1	A	6.3	A	5.4	A
North & Southbound (Emerson)		*10.1*	*B*	*9.5*	*A*	*9.3*	*A*
Churchill Ave/Emerson St	AWSC	7.6	A	7.9	A	7.7	A
Churchill Ave/Alma St	Signal	24.9	C	28.8	C	32.4	C

Notes:
Delay is measured in average seconds per vehicle
TWSC = two-way stop-controlled
LOS = Level of Service
Results for minor approaches to two-way stop-controlled intersections are indicated in *italics.*
** = delay greater than 120 seconds
Bold text = deficient operation
Source: Appendix E

7.2 REGULATORY FRAMEWORK

Federal Regulations

There are no federal regulations that govern the analysis of the transportation and circulation aspects of the proposed project.

State Regulations

Caltrans Guidance

The California Department of Transportation's (Caltrans') responsibilities include the planning, design, construction, and maintenance of interstate freeways as wells as State highways. Within this study area, El Camino Real (SR-82) falls under Caltrans' jurisdiction. Caltrans' Guide for the Preparation of Traffic Impact Studies (December 2002, as cited in Appendix E) identifies the information that Caltrans requires in evaluating the effect of local development and land use changes on State highway facilities.

Senate Bill 743

On September 27, 2013, Governor Brown signed Senate Bill (SB) 743. Among other things, SB 743 creates a process to change the way transportation impacts are analyzed under CEQA (Public Resources Code Section 21000 and following). Currently, environmental review of transportation impacts focuses on the delay that vehicles experience at intersections and on roadway segments. Delay is often measured using LOS as described previously. Mitigation for increased delay associated with a new project often involves increasing capacity (i.e., the width of a roadway or size of an intersection), which may increase auto use and emissions and discourage alternative forms of transportation. To implement the requirements of SB 743, the California Office of Planning and Research is currently in the process of amending the CEQA Guidelines. Once the guidelines have been updated, the focus of transportation analysis will shift from driver delay to reduction of greenhouse gas emissions, creation of multimodal networks and promotion of a mix of land uses. An official policy regarding the impact threshold criteria to be applied in CEQA analyses has not yet been adopted by either the City of Palo Alto or Santa Clara County.

Local Regulations

Santa Clara Valley Transportation Plan

The *Valley Transportation Plan 2040* (VTP 2040, as cited in Appendix E) is the countywide long-range transportation plan for Santa Clara County. As the congestion management agency for the county, the Santa Clara VTA periodically updates this 25-year plan. VTP 2040 provides a planning and policy framework for developing and delivering future transportation projects. Location-specific improvements for all modes of travel are covered in program areas. The plan also identifies existing and future transportation needs through a systematic approach based on input from local jurisdictions, elected officials, and the community.

The VTP feeds into the *Regional Transportation Plan*, prepared by the Metropolitan Transportation Commission for the Bay Area region. In 2013, the Metropolitan Transportation Commission adopted *Plan Bay Area*, an integrated transportation and land-use strategy through 2040 that marks the nine-county region's first long-range plan to meet the requirements of Senate Bill 375 by tying together regional housing needs allocation and regional transportation planning in an effort to reduce greenhouse gas emissions. *Plan Bay Area* is the successor to *Transportation 2035*, the *Regional Transportation Plan* adopted in 2009.

VTA Transportation Impact Analysis Guidelines

The VTA, as part of its role as the congestion management agency for the county, has developed guidelines for preparing transportation impact analyses. The guidelines are intended to be used by member agencies as part of their regular process of evaluating land-use decisions and may be viewed as a minimum scope for assessing transportation impacts. The guidelines include methodology for existing and future scenarios, project impacts, and thresholds of significance for transportation facilities that are part of the Congestion Management Program (CMP) system. The CMP establishes LOS E as the minimum acceptable LOS for intersection operations.

City of Palo Alto Comprehensive Plan

The Transportation Element of the Comprehensive Plan includes goals, policies, and programs to address the transportation needs of the City of Palo Alto (City). The vision for the Transportation Element is to provide accessible, attractive, economically viable, and environmentally sound transportation options for residents, employers, employees, and visitors. The first three goals of the element emphasize a balanced transportation system with transit, pedestrian, and bicycle modes as viable options. Goals 4 and 5 address the roadway system hierarchy and protection of residential neighborhoods. Goal 6 calls for a high level of safety for motorists, pedestrians, and bicyclists. The remaining goals address special transportation needs, parking, regional transportation, and air transportation. The element does not include level-of-service standards or other standards applicable to individual development projects.

City of Palo Alto Bicycle and Pedestrian Transportation Plan

The *Bicycle and Pedestrian Transportation Plan* (City of Palo Alto 2012, as cited in Appendix E) strategically guides public and private investments in non-motorized transportation facilities and related programs. The plan includes coverage of pedestrian issues, priorities, and design standards in addition to revising the proposed bikeway network and design guidelines. The plan contains policy vision, design guidance, and specific recommendations to increase walking and biking rates. The plan supports the City's Comprehensive Plan but is also applicable to the review of individual projects.

City of Palo Alto Municipal Code

Palo Alto Municipal Code Chapter 18.52 *Parking and Loading Requirements* Section 18.52.050 item (d) *Transportation Demand Management (TDM)* requires a TDM for any project generating 50 or more net new weekday AM or PM peak hour trips, enables the Director to adopt guidelines for preparing TDM plans and measures, requires submittal of monitoring reports two years after building occupancy and every year thereafter to note the effectiveness of measures compared to initial performance targets and implementing modifications if necessary to enhance trip reductions, and allowing the Director to require program modifications and to impose administrative penalties if identified deficiencies are not addressed within six months.

7.3 PROJECT IMPACTS

Analysis Scenarios

The Traffic Impact Study considers the project's effects during the peak traffic hours within the peak morning and evening commute periods as well as the afternoon peak for local schools. Consideration of these periods allows the Traffic Impact Study to determine how the project-generated traffic would affect the local transportation network during the periods when traffic volumes are highest. The peak hour is determined based on the actual traffic volume data; it is defined by the City and Caltrans guidance as the 60-minute period during which the highest traffic volumes were observed. The peak period for morning commute traffic is from 7:00 AM to 9:00 AM; and the morning peak hour (AM peak) traffic volume used for this analysis is the highest volume that was observed during a period of 60 consecutive minutes within the peak period. This morning peak period captures traffic associated with home-to-work commuters as well as morning school drop-offs and arrivals. The school afternoon peak period occurs between 2:00 PM and 4:00 PM and reflects conditions during the school pick-up/departure period. The evening peak period, between 4:00 PM and 6:00 PM, reflects the homeward-bound commute, which is typically when the highest level of congestion occurs.

Trip Generation

The Institute of Transportation Engineers (ITE) publication Trip Generation is typically used to determine the likely number of new trips that a project may generate. However, the ITE rate for private schools reflects all grades kindergarten through 12 in a wide variety of locations and settings. Additionally, several characteristics of Castilleja School indicate that the school may have a unique trip generation rate. These include the school's proximity to an extensive bicycle network and commuter rail service as well as the school's ongoing implementation of a TDM program intended to reduce the number of vehicles arriving and departing the school campus.

To determine the number of vehicle trips that would be expected to result from implementation of the proposed project, W-Trans conducted a survey of existing traffic volumes in the project vicinity, including counting the vehicles entering and exiting the school driveways during each of the analysis scenarios. The observed trip generation rate is higher than those in the Trip Generation Manual, 10th Edition, 2017 for the "Private School (K-12)" land use (ITE 2017, as cited in Appendix E). The observed rates were used to calculate the expected trip generation for the proposed project. While the school is planning to implement an expanded TDM program with the project, no additional trip reductions have been applied. Thus, the impacts identified in this section assume that no increase in the TDM effectiveness is realized. This allows for an understanding of the potential for traffic impacts based on the proposed increase in enrollment in the absence of additional TDM measures.

At the time of the existing conditions traffic counts in January 2017, enrollment at Castilleja School was 438 students. Site-specific trip generation rates for the AM, School PM, and PM peak hours were developed based on driveway counts and adjusted based on results from a student travel pattern survey. It is estimated that the school site currently generates 352 vehicle trips during the AM peak hour, 274 vehicle trips during the School PM peak hour, and 176 vehicle trips during the PM peak hour, resulting in estimated trip generation rates of 0.82, 0.63 and 0.41 vehicle trips per student for the AM, School PM, and PM peak hours respectively. Applying these trip generation rates toward the full project build out would result in the addition of 279 new trips daily, including 91 new trips during the AM peak hour, 66 new trips during the School PM peak hour and 45 new trips during the PM peak hour. The existing, projected, and total increase in peak hour trips is shown in Table 7-4 while the project-generated trips through each study area intersection are shown on Figure 7-5. For comparison, the ITE rates for K-12 private schools are slightly less; at those rates a 540-student school would be expected to generate 1,339 daily trips, with 437 AM peak hour trips, 313 School PM hour trips, and 92 PM peak hour trips, as shown in Appendix E.

Table 7-4
Trip Generation Summary

Condition	Number of Students	Daily Trips	AM Peak Hour				School PM Peak Hour				PM Peak Hour			
			Rate	Total Trips	*In*	*Out*	Rate	Total Trips	*In*	*Out*	Rate	Total Trips	*In*	*Out*
Existing Campus	438	1,198	0.82	352	194	158	0.63	274	123	151	0.41	176	77	99
Proposed Campus	540	1,477	0.82	443	244	199	0.63	340	153	187	0.41	221	97	124
Increase	102	279		91	50	41		66	30	36		45	20	25

Source: Appendix E

Trip Distribution

To estimate the distribution of future traffic trips associated with the school, W-Trans developed a likely travel pattern between each of the home zip codes for existing students and staff and the project site. The resulting trip distribution assumptions, which reflect the number of students and staff residing within each zip code and the likely travel patterns, are shown in Table 7-5.

Table 7-5
Project-Generated Trip Distribution Assumptions

Route	Percent	Daily trips	AM Trips	School PM Trips	PM Trips
To/from the east on Embarcadero Rd	40%	112	36	26	18
To/from the north on Alma St	22%	61	20	15	10
To/from the south on Alma St	20%	56	18	13	9
To/from the west on Embarcadero Rd	13%	36	12	9	6
To/from the south on Emerson St	2%	6	2	1	1
To/from the south on El Camino Real	3%	8	3	2	1
Totals	**100%**	**279**	**91**	**66**	**45**

Source: Appendix E

Significance Criteria

The following significance criteria are based on Appendix G of the California Environmental Quality Act (CEQA) Guidelines (14 CCR 15000 et seq.), the VTA's Traffic Impact Analysis Guidelines, and the City's environmental review procedures. These criteria are used by the City to determine the significance of potential transportation and traffic impacts. Impacts to transportation and traffic would be significant if the proposed project would:

- Conflict with an applicable plan, ordinance or policy establishing measures of effectiveness for the performance of the circulation system, taking into account all modes of transportation including mass transit and non-motorized travel and relevant components of the circulation system, including but not limited to intersections, streets, highways and freeways, pedestrian and bicycle paths, and mass transit.
- Conflict with an applicable congestion management program, including, but not limited to level of service standards and travel demand measures, or other standards established by the county congestion management agency for designated roads or highways.
- Result in a change in air traffic patterns, including either an increase in traffic levels or a change in location that results in substantial safety risks.
- Substantially increase hazards due to a design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment).
- Result in inadequate emergency access.
- Conflict with adopted policies, plans, or programs regarding public transit, bicycle, or pedestrian facilities, or otherwise decrease the performance or safety of such facilities.
- Make a considerable contribution to cumulative increases in traffic that conflicts with adopted policies and plans related to intersection and roadway segment function.

Impact Analysis

IMPACT 7-1	Conflict with an applicable plan, ordinance or policy establishing measures of effectiveness for the performance of the circulation system, taking into account all modes of transportation including mass transit and non-motorized travel.
SIGNIFICANCE:	Potentially Significant
MITIGATION MEASURES:	Mitigation Measure 7a
SIGNIFICANCE AFTER MITIGATION:	Significant and Unavoidable

Intersection Impacts

The measures of effectiveness for intersections within the study area are the LOS standards for signalized and unsignalized intersections. Specifically, LOS E is the minimum acceptable level for signalized intersections that are within the County's CMP network, while LOS D is the minimum acceptable level for both signalized and unsignalized City intersections that are outside of the CMP network. For signalized intersections that are already operating below the minimum acceptable level, a project would have a significant impact if it would increase the average control delay for critical movements by four seconds or more and increase the critical volume-capacity (v/c) ratio by 0.01 or more. At an unsignalized intersection a project's impact is considered significant if it causes intersection operations to degrade to LOS E or F from acceptable operations and the intersection satisfies a peak hour signal warrant from the California Manual on Uniform Traffic Control Devices (MUTCD). The MUTCD identifies nine different metrics, or warrants, for evaluating whether a signal is an appropriate traffic control measure at a given intersection. These warrants are not intended to be definitive. Rather they are guidelines that help inform the consideration of traffic management decisions and the satisfaction of a particular traffic signal warrant or warrants does not require the installation of a traffic control signal, because other factors (warrants) must be considered. Other signal warrants include the eight-hour traffic volume and four-hour traffic volume.

W-Trans determined the existing plus project LOS for all study area intersections by adding the project-generated trips to the existing traffic volumes. The resulting intersection traffic volumes are shown on Figure 7-6, and the intersection delay and LOS is shown in Table 7-6.

Table 7-6
Existing and Existing Plus Project Peak Hour Intersection Levels of Service

Intersection *Approach*	Control Type	AM Peak				School PM Peak				PM Peak			
		Existing		Existing Plus Project		Existing		Existing Plus Project		Existing		Existing Plus Project	
		Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS
El Camino Real/ Embarcadero Rd	Signal	39.9	D	39.8	D	41.2	D	41.4	D	42.6	D	42.6	D
Embarcadero Rd Spur/ Alma St	TWSC	2.2	A	2.0	A	1.0	A	0.9	A	0.8	A	0.8	A
Westbound (Embarcadero)		***54.5***	***F***	***49.9***	***E***	*20.4*	*C*	*19.4*	*C*	*25.3*	*C*	*24.5*	*C*
Alma St/Kingsley Ave	TWSC	1.4	A	1.7	A	1.3	A	1.4	A	4.3	A	4.5	A
Westbound (Kingsley)		***70.5***	***F***	***82.1***	***F***	***43.2***	***E***	***45.2***	***E***	**	***F***	**	***F***
Embarcadero Rd/ Emerson St	TWSC	0.6	A	2.5	A	0.4	A	2.1	A	0.6	A	1.5	A
Northbound (Emerson)		*14.7*	*B*	*22.7*	*C*	*13.8*	*B*	*22.6*	*C*	*13.4*	*B*	*17.0*	*C*
Embarcadero Rd/ Bryant St	Signal	13.1	B	13.7	B	12.0	B+	12.4	B	11.5	B+	11.5	B+
Middlefield Rd/ Embarcadero Rd	Signal	38.5	D+	38.3	D+	35.4	D+	35.3	D+	39.7	D	39.6	D
Melville Ave/Emerson St	TWSC	3.2	A	7.9	A	3.6	A	7.7	A	3.0	A	6.6	A
Westbound (Melville)		*9.7*	*A*	*10.6*	*B*	*9.6*	*A*	*9.7*	*A*	*9.4*	*A*	*9.6*	*A*
Melville Ave/Alma St	TWSC	0.3	A	0.2	A	0.3	A	0.2	A	0.1	A	0.1	A
Westbound (Melville)		*21.3*	*C*	*24.8*	*C*	*16.0*	*C*	*18.0*	*C*	*15.0*	*C*	*15.6*	*C*
Kellogg Ave/Emerson St		5.1	A	5.9	A	6.3	A	5.4	A	5.4	A	4.4	A
North/Southbound (Emerson)		*10.1*	*B*	*9.7*	*A*	*9.5*	*A*	*9.2*	*A*	*9.3*	*A*	*9.2*	*A*
Churchill Ave/Emerson St	AWSC	7.6	A	7.7	A	7.9	A	7.9	A	7.7	A	7.7	A
Churchill Ave/Alma St	Signal	24.9	C	25.9	C	28.8	C	29.5	C	32.4	C	33.1	C-

Notes: Delay is measured in average seconds per vehicle
TWSC = two-way stop-controlled; LOS = Level of Service; ** = delay greater than 120 seconds
Results for minor approaches to two-way stop-controlled intersections are indicated in *italics.*
Bold text = deficient operation
Source: Appendix E

In comparison to the existing delay and LOS, the proposed project would decrease delay for the westbound approach at the Embarcadero Rd Spur/Alma Street intersection but increase delay for the westbound approach at the Alma Street/Kingsley Avenue intersection. The Embarcadero Road Spur/Alma Street intersection would operate unacceptably at LOS E in both the existing and existing plus project conditions in the AM peak hour. Because the project would decrease delay from 54.5 seconds to 49.9 seconds, the project would have a **less than significant** impact at this intersection. Additionally, the volume of traffic traveling through this intersection would not meet the standards for requiring signalization.

At the Alma Street/Kingsley Avenue intersection, the overall intersection operations would remain at LOS A but the westbound (Kingsley Avenue) approach would operate at unacceptable LOS in the AM and PM peak hours. The proposed project would not alter the LOS for this movement in each of the three peak hours studied compared to the existing condition, but it would increase the delay as follows:

- In the AM peak hour, the project would increase delay by 11.6 seconds (the delay under existing conditions is 70.5 seconds; the project would increase this to 82.1 seconds; the movement would operate at LOS F).
- In the School PM peak hour, the project would increase delay by 2 seconds (the delay under existing conditions is 43.2 seconds; the project would increase this to 45.2 seconds; the movement would operate unacceptably at LOS E).
- As shown on Figure 7-5, in the PM peak hour, the project would reduce the number of through trips on Alma Street by 27 vehicles but increase the number of trips turning onto Kingsley Avenue from Alma Street by 34 vehicles. The project would not alter the traffic volumes on Kingsley Avenue but the change in volumes and turning movements on Alma Street would increase delay for the vehicles waiting to turn onto Alma Street from Kingsley Avenue. The specific increase in delay cannot be calculated because the delay in both the existing and existing plus project conditions is greater than 120 seconds, and the traffic modeling software cannot calculate delays beyond this length. The movement would operate at LOS F.

Although the project would increase the traffic volumes and delay through the intersection, the project would not result in a change in the LOS during any of the three peak hours and the volume of traffic using this intersection would not meet the traffic signal warrants for requiring signalization. Thus this is considered a **less than significant** impact of the proposed project.

Roadway Segments

To determine whether there is a substantial increase in traffic on roadway segments in the project vicinity, the City applies the Traffic Infusion on Residential Environment (TIRE) index. This index provides a measurement of a typical residents' perception of the effect of increased daily traffic volumes on residential streets. TIRE index values range from 0.0 to 5.0 depending on daily traffic volume, with 0.0 representing the lowest volumes and 5.0 the greatest, and, thereby the poorest residential environment. A TIRE index of 3.0 represents the threshold at which the character of a residential street changes. Residential streets with a TIRE index above this mid-range point of 3.0 typically exhibit higher traffic volumes, while streets with a TIRE index below 3.0 are usually more suitable for residential activities. Under the TIRE index methodology, a significant impact would occur on a residential street when a proposed project increase the index for that street by 0.10 or more. Refer to Table 4 in the Traffic Impact Study (Appendix E) for additional data regarding the traffic volumes associated with the TIRE index values, and the amount of additional daily traffic needed to increase the value by 0.10.

To determine whether the project would significantly increase traffic volumes on neighborhood streets, W-Trans compared the existing average daily traffic (ADT) to the anticipated ADT under the existing plus project conditions. The existing ADT was determined based on 24-hour machine counts conducted in January 2017 and September/October 2018. The existing plus project ADT was determined by adding the project trips, based on the trip generation shown in Table 7-4 and the trip distribution shown in Table 7-5, to the study area roadway network. Table 7-7 identifies the existing and existing plus project traffic volumes on each roadway segment, and the corresponding TIRE index. The project-generated traffic volumes for each segment (the net new trips on each segment) are also shown on Figure 7-5. The approach used for this analysis considers the redistribution of trips and its effect on the roadway segments based on the proposed site design; it should be noted that although the trips numbers may seem high on specific segments due to site ingress/egress reconfiguration, several of these trips are already associated with the current school operations and are being redistributed from other streets rather than being added to the neighborhood in general. The net new trips associated with the increased enrollment is 279 or an 18.9% increase from the existing conditions.

Table 7-7
TIRE Index Analysis Results

Study Roadway	**Existing Conditions**		**Volume Needed to Increase TIRE Index by 0.10**	**Daily Project Trips**	**Significant Impact? (Y/N)**
Roadway Segment	***ADT***	***TIRE Index***			
Waverly Street					
Lincoln Ave to Kingsley Ave	3,859	3.6	1,025	0	N

Table 7-7
TIRE Index Analysis Results

Study Roadway	Existing Conditions		Volume Needed to Increase TIRE Index by 0.10	Daily Project Trips	Significant Impact? (Y/N)
Roadway Segment	***ADT***	***TIRE Index***			
Kingsley Ave to Whitman Ct	3,879	3.6	1,025	0	N
Whitman Ct to Melville Ave	4,347	3.6	1,025	0	N
Melville Ave to Embarcadero Rd	5,125	3.7	1,250	0	N
Embarcadero Rd to Kellogg Ave	3,761	3.6	1,025	281	N
Kellogg Ave to Churchill Ave	3,083	3.5	825	281	N
Bryant Street					
Lincoln Ave to Kingsley Ave	2,391	3.4	650	162	N
Kingsley Ave to Whitman Ct	2,394	3.4	650	162	N
Whitman Ct to Embarcadero Rd	2,574	3.4	650	162	N
Embarcadero Rd to Kellogg Ave	870	2.9	170	-40	N
Kellogg Ave to Churchill Ave	567	2.8	140	-216	N
Emerson Street					
Lincoln Ave to Kingsley Ave	463	2.7	114	0	N
Kingsley Ave to Embarcadero Rd	296	2.5	79	0	N
Embarcadero Rd to Melville Ave	842	2.9	170	**679**	**Y**
Melville Ave to Kellogg Ave	655	2.8	140	-60	N
Kellogg Ave to Churchill Ave	744	2.9	170	-174	N
Churchill Avenue					
Waverly St to Bryant St	2,448	3.4	650	266	N
Bryant St to Emerson St	2,692	3.4	650	74	N
Emerson St to Alma St	2,945	3.5	825	-100	N
Alma Street					
Lincoln Ave to Embarcadero Rd	26,469	4.4	6,600	-101	N
Embarcadero Rd to Kingsley Ave	26,710	4.4	6,600	-179	N
Kingsley Ave to Melville Ave	26,186	4.4	6,600	-157	N
Melville Ave to Kellogg Ave	25,775	4.4	6,600	-133	N
Kellogg Ave to Churchill Ave	25,553	4.4	6,600	95	N
Lincoln Avenue					
Waverly St to Bryant St	2,558	3.4	650	0	N

Table 7-7
TIRE Index Analysis Results

Study Roadway	Existing Conditions		Volume Needed to Increase TIRE Index by 0.10	Daily Project Trips	Significant Impact? (Y/N)
Roadway Segment	***ADT***	***TIRE Index***			
Bryant St to Ramona St	2,216	3.4	650	162	N
Ramona St to Emerson St	2,445	3.4	650	162	N
Emerson St to High St	2,119	3.3	500	162	N
High St to Alma St	2,088	3.3	500	162	N
Kingsley Avenue					
Waverly St to Bryant St	874	2.9	170	0	N
Bryant St to Ramona St	573	2.9	140	0	N
Ramona St to Emerson St	46	1.7	10	0	N
Emerson St to High St	580	2.8	140	0	N
High St to Alma St	2,170	3.3	500	347	N
High Street					
Lincoln Ave to Embarcadero Rd	255	2.4	65	0	N
Ramona Street					
Lincoln Ave to Kingsley Ave	240	2.4	65	0	N
Melville Avenue					
Alma St to Emerson St	316	2.5	79	0	N

Notes:
ADT = Average Daily Traffic
Bold indicates significant impact
Source: Appendix E

As shown in Table 7-7, the project would result in a significant increase in traffic on the segment of Emerson Street between Embarcadero Road and Melville Avenue by adding 679 daily trips to this segment, which currently carries 842 daily trips. This is considered a significant impact since the addition of new project-related or project alternative-related trips plus the redistribution of existing trips would increase the TIRE index for this segment by more than 0.10 and would result in a noticeable change in conditions for residents along this segment, which includes the occupants of the single residence located on the north side of this segment of Emerson Street and the five residences located on the south side of the street. The City of Palo Alto considered whether this impact could be mitigated by requiring that Castilleja allow all turning movements out of the parking garage (instead of restricting exiting traffic to right-turn only movements as is currently proposed) herein referred to as the "garage exit modification." This would allow for traffic to be more disbursed, reducing the ADT on Emerson Street between Melville Avenue and Embarcadero Road. W-Trans prepared an analysis to determine whether allowing for traffic to be redirected out of the parking garage would 1) be sufficient to reduce any of the project's significant impacts, and 2) whether any additional impacts could result from the change in trip distribution patterns. To complete this analysis, W-Trans analyzed the intersection LOS and roadway segment TIRE index under the existing plus project condition but also assuming the implementation of the garage exit modification, which is referred to as the "project plus garage exit modification" condition. Table 7-8 compares the intersection LOS under the existing conditions, the "existing plus project" condition, and the "project plus garage exit modification" condition. As shown, implementation of the garage exit modification would result in significant increases in traffic volumes on two additional roadway segments and an increased delay for the Kingsley approach to the Alma Street/Kingsley Avenue intersection compared to existing conditions and compared to the proposed project without mitigation. The intersection would continue to operate at LOS A overall, while the Kingsley approach would operate at LOS F in the AM and PM peak hours and LOS E in the school PM peak hour. The impact would remain less than significant because the traffic volumes through this intersection would not be sufficient to meet traffic signal warrants.

The garage exit modification would increase the delay on the Embarcadero approach to the Embarcadero Road Spur/Alma Street intersection. This approach currently functions at LOS F; the delay would be slightly reduced and the intersection operations would be improved to LOS E under the proposed project (4.6 seconds less delay than the existing conditions). If the garage exit modification were implemented, the delay would increase further (1.3 seconds more delay than existing or 5.9 seconds more delay than the existing plus project). With the garage exit modification, the intersection would remain at LOS F, which is the same as the existing condition. Because the intersection already operates at LOS F and because the signal warrant still would not be met even with implementation of the garage exit modification, impacts to this intersection would remain less than significant both under the existing plus project conditions and under the project plus garage exit redirect conditions.

All other intersections would continue to operate at acceptable LOS.

W-Trans also completed the TIRE index analysis for the project plus garage exit modification condition. Table 7-9 compares the TIRE index rating for each roadway segment under existing, existing plus project, and project plus garage exit modification conditions. Table 7-9 shows that implementation of the garage exit modification would decrease ADT on Emerson Street, but that the impact to the segment between Melville Avenue and Embarcadero Road would remain significant, and that two additional segments would experience a significant increase in ADT. Specifically, this table shows that implementation of the garage exit modification would result in decreased traffic volumes on six roadway segments compared to existing conditions and increases in traffic volumes on eight segments. Of these eight segments, there would be a significant impact on three segments – Emerson Street between Embarcadero Road and Melville Avenue, Emerson Street between Melville Avenue and Kellogg Avenue, and Melville Avenue between Alma Street and Emerson Street as shown in Table 7-9, where only one segment (Emerson Street between Embarcadero Road and Melville Avenue) would be significantly impacted under the existing plus project scenario. Because the garage exit modification could reduce impacts on some segments, but would result in new significant impacts on other segments, implementation of the garage exit modification is not recommended as a mitigation measure.

Table 7-8
Existing, Existing Plus Project, and Project Plus Garage Exit Modification Peak Hour Intersection Levels of Service

Intersection *Approach*	**Control Type**	**AM Peak**						**School PM Peak**						**PM Peak**					
		Existing		**Existing Plus Project**		**Project Plus Garage Exit Modification**		**Existing**		**Existing Plus Project**		**Project Plus Garage Exit Modification**		**Existing**		**Existing Plus Project**		**Project Plus Garage Exit Modification**	
		Delay	*LOS*	*Delay*	*LOS*	*Delay*	*LOS*	*Delay*	*LOS*	*Delay*	*LOS*	*Delay*	*LOS*	*Delay*	*LOS*	*Delay*	*LOS*	*Delay*	*LOS*
El Camino Real/ Embarcadero Rd	Signal	39.9	D	39.8	D	39.8	D	41.2	D	41.4	D	41.4	D	42.6	D	42.6	D	42.6	D
Embarcadero Rd Spur/Alma St	TWSC	2.2	A	2.0	A	2.2	A	1.0	A	0.9	A	1.0	A	0.8	A	0.8	A	0.8	A
Westbound (Embarcadero)		***54.5***	***F***	***49.9***	***E***	***55.8***	***F***	*20.4*	*C*	*19.4*	*C*	*20.6*	*C*	*25.3*	*C*	*24.5*	*C*	*25.6*	*D*
Alma St/ Kingsley Ave	TWSC	1.4	A	1.7	A	1.8	A	1.3	A	1.4	A	1.5	A	4.3	A	4.5	A	4.9	A
Westbound (Kingsley)		***70.5***	***F***	***82.1***	***F***	***91.4***	***F***	***43.2***	***E***	***45.2***	***E***	***49.3***	***E***	**	***F***	**	***F***	**	***F***
Embarcadero Rd/ Emerson St	TWSC	0.6	A	2.5	A	1.1	A	0.4	A	2.1	A	0.8	A	0.6	A	1.5	A	0.9	A
Northbound (Emerson)		*14.7*	*B*	*22.7*	*C*	*15.8*	*C*	*13.8*	*B*	*22.6*	*C*	*16.2*	*C*	*13.4*	*B*	*17.0*	*C*	*14.6*	*B*
Embarcadero Rd/ Bryant St	Signal	13.1	B	13.7	B	13.3	B	12.0	B+	12.4	B	12.3	B	11.5	B+	11.5	B+	11.6	B
Middlefield Rd/ Embarcadero Rd	Signal	38.5	D+	38.3	D+	38.3	D+	35.4	D+	35.3	D+	35.3	D+	39.7	D	39.6	D	39.6	D
Melville Ave/Emerson St	TWSC	3.2	A	7.9	A	8.8	A	3.6	A	7.7	A	8.3	A	3.0	A	6.6	A	7.1	A
Westbound (Melville)		*9.7*	*A*	*10.6*	*B*	*11.5*	*B*	*9.6*	*A*	*9.7*	*A*	*10.5*	*B*	*9.4*	*A*	*9.6*	*A*	*9.9*	*A*
Melville Ave/Alma St	TWSC	0.3	A	0.2	A	0.6	A	0.3	A	0.2	A	0.5	A	0.1	A	0.1	A	0.3	A

Table 7-8
Existing, Existing Plus Project, and Project Plus Garage Exit Modification Peak Hour Intersection Levels of Service

Intersection *Approach*	Control Type	AM Peak						School PM Peak						PM Peak					
		Existing		Existing Plus Project		Project Plus Garage Exit Modification		Existing		Existing Plus Project		Project Plus Garage Exit Modification		Existing		Existing Plus Project		Project Plus Garage Exit Modification	
		Delay	*LOS*	*Delay*	*LOS*	*Delay*	*LOS*	*Delay*	*LOS*	*Delay*	*LOS*	*Delay*	*LOS*	*Delay*	*LOS*	*Delay*	*LOS*	*Delay*	*LOS*
Westbound (Melville)		*21.3*	*C*	*24.8*	*C*	19.0	C	16.0	C	*18.0*	*C*	*14.1*	*B*	*15.0*	*C*	*15.6*	*C*	*14.4*	*B*
Kellogg Ave/Emerson St		5.1	A	5.9	A	7.4	A	6.3	A	5.4	A	3.5	A	5.4	A	4.4	A	2.9	A
North & Southbound (Emerson)		*10.1*	*B*	*9.7*	*A*	*10.2*	*B*	*9.5*	*A*	*9.2*	*A*	*9.6*	*A*	*9.3*	*A*	*9.2*	*A*	*9.5*	*A*
Churchill Ave/Emerson St	AWSC	7.6	A	7.7	A	7.4	A	7.9	A	7.9	A	7.7	A	7.7	A	7.7	A	7.6	A
Churchill Ave/Alma St	Signal	24.9	C	25.9	C	25.9	C	28.8	C	29.5	C	29.5	C	32.4	C	33.1	C-	33.1	C-

Notes: Delay is measured in average seconds per vehicle
TWSC = two-way stop-controlled; LOS = Level of Service; ** = delay greater than 120 seconds
Results for minor approaches to two-way stop-controlled intersections are indicated in *italics.*
Bold text = deficient operation
Source: Appendix E

Table 7-9
TIRE Index Analysis Results

Study Roadway *Roadway Segment*	Existing Conditions		Volume Needed to Increase TIRE Index by 0.10	Proposed Project		Project Plus Garage Exit Modification	
	ADT	*TIRE Index*		*Daily Trips*	*Significant Impact? (Y/N)*	*Daily Trips*	*Significant Impact? (Y/N)*
Waverly Street							
Lincoln Ave to Kingsley Ave	3,859	3.6	1,025	0	N	0	N
Kingsley Ave to Whitman Ct	3,879	3.6	1,025	0	N	0	N
Whitman Ct to Melville Ave	4,347	3.6	1,025	0	N	0	N
Melville Ave to Embarcadero Rd	5,125	3.7	1,250	0	N	0	N
Embarcadero Rd to Kellogg Ave	3,761	3.6	1,025	281	N	0	N
Kellogg Ave to Churchill Ave	3,083	3.5	825	281	N	0	N
Bryant Street							
Lincoln Ave to Kingsley Ave	2,391	3.4	650	162	N	0	N
Kingsley Ave to Whitman Ct	2,394	3.4	650	162	N	0	N
Whitman Ct to Embarcadero Rd	2,574	3.4	650	162	N	0	N
Embarcadero Rd to Kellogg Ave	870	2.9	170	-40	N	-40	N
Kellogg Ave to Churchill Ave	567	2.8	140	-216	N	-216	N
Emerson Street							
Lincoln Ave to Kingsley Ave	463	2.7	114	0	N	0	N
Kingsley Ave to Embarcadero Rd	296	2.5	79	0	N	0	N
Embarcadero Rd to Melville Ave	842	2.9	170	**679**	**Y**	**236**	**Y**
Melville Ave to Kellogg Ave	655	2.8	140	-60	N	**221**	**Y**
Kellogg Ave to Churchill Ave	744	2.9	170	-174	N	107	N
Churchill Avenue							
Waverly St to Bryant St	2,448	3.4	650	266	N	0	N
Bryant St to Emerson St	2,692	3.4	650	74	N	-192	N
Emerson St to Alma St	2,945	3.5	825	-100	N	-100	N
Alma Street							
Lincoln Ave to Embarcadero Rd	26,469	4.4	6,600	-101	N	61	N

Table 7-9
TIRE Index Analysis Results

Study Roadway *Roadway Segment*	**Existing Conditions**		**Volume Needed to Increase TIRE Index by 0.10**	**Proposed Project**		**Project Plus Garage Exit Modification**	
	ADT	***TIRE Index***		***Daily Trips***	***Significant Impact? (Y/N)***	***Daily Trips***	***Significant Impact? (Y/N)***
Embarcadero Rd to Kingsley Ave	26,710	4.4	6,600	-179	N	-16	N
Kingsley Ave to Melville Ave	26,186	4.4	6,600	-157	N	6	N
Melville Ave to Kellogg Ave	25,775	4.4	6,600	-133	N	-133	N
Kellogg Ave to Churchill Ave	25,553	4.4	6,600	95	N	95	N
Lincoln Avenue							
Waverly St to Bryant St	2,558	3.4	650	0	N	0	N
Bryant St to Ramona St	2,216	3.4	650	162	N	0	N
Ramona St to Emerson St	2,445	3.4	650	162	N	0	N
Emerson St to High St	2,119	3.3	500	162	N	0	N
High St to Alma St	2,088	3.3	500	162	N	0	N
Kingsley Avenue							
Waverly St to Bryant St	874	2.9	170	0	N	0	N
Bryant St to Ramona St	573	2.9	140	0	N	0	N
Ramona St to Emerson St	46	1.7	10	0	N	0	N
Emerson St to High St	580	2.8	140	0	N	0	N
High St to Alma St	2,170	3.3	500	347	N	347	N
High Street							
Lincoln Ave to Embarcadero Rd	255	2.4	65	0	N	0	N
Ramona Street							
Lincoln Ave to Kingsley Ave	240	2.4	65	0	N	0	N
Melville Avenue							
Alma St to Emerson St	316	2.5	79	0	N	**162**	**Y**

Notes:
ADT = Average Daily Traffic
Bold indicates significant impact
Source: Appendix E

To ensure that impacts are reduced to the extent feasible, Mitigation Measure 7a requires Castilleja School to implement the proposed enhanced TDM plan to minimize traffic volumes associated with the school. This includes the following:

- additional shuttle bus routes and hours;
- expanded carpool program for students and staff;
- off-site drop-off, pick-up, and/or parking areas;
- providing transit passes; and
- providing bicycle repair opportunities.

Mitigation Measure 7a would be required to reduce traffic sufficiently to avoid 510 daily trips on Emerson Street in order to reduce this impact to a less than significant level.

The Castilleja School Transportation Demand Management (TDM) Plan, provided in Appendix B, demonstrates the anticipated effectiveness of each of the TDM measures. Overall, the TDM plan is anticipated to reduce trips by between 12% and 22%. This would reduce the anticipated daily trip generation of Castilleja School at full enrollment of 540 students from 1,339 daily trips to between 1,178 and 1,044 trips. If trip reductions occur proportionally on each roadway segment, the TDM plan would reduce daily traffic on Emerson Street between Embarcadero Road and Melville Avenue by between 81and 149 trips. This range of trip reductions would lessen the project effects on the roadway segment but would not achieve a less than significant impact. Thus the project's impacts related to ADT on roadway segments would remain **significant and unavoidable.**

Implementation of Mitigation Measure 7a would be monitored through the existing Castilleja School TDM monitoring process, under which Castilleja School contracts with a traffic consulting firm to evaluate and report on the number of daily and peak hour trips associated with the campus and the rates of use for individual TDM measures. Monitoring reports are submitted annually and reviewed by the City's Planning and Transportation departments. Monitoring and enforcement provisions and requirements that would be included in the TDM plan are identified in the memorandum included in Appendix B.

Alternative Travel Modes

As discussed in Section 7.1, there are sidewalks present on each roadway surrounding the project site. The project does not propose to alter the pedestrian network but would be expected to increase the number of pedestrians accessing the site from nearby residential neighborhoods as well as from the Town & Country Village Shopping Center and the Caltrain Palo Alto station. With the continuous sidewalk connectivity throughout the neighborhood surrounding the project site, the existing pedestrian facilities are adequate to serve the project and the project would have a **less than significant** impact associated with pedestrian activity.

Bicycle facilities that serve the project site are also identified in Section 7.1. The project does not propose to alter the bicycle network in the area but would be expected to increase the number of bicyclists accessing the site from nearby residential neighborhoods as well as from the Town & Country Village Shopping Center and the Caltrain Palo Alto station.

As shown in Table 7-7, the project would add traffic to the segments of Bryant Street between Lincoln Avenue and Embarcadero Road but would reduce traffic on Bryant Street between Embarcadero Road and Kellogg Avenue. Bryant Street is identified in the City of Palo Alto Bicycle and Pedestrian Transportation Plan as a Bicycle Boulevard, which is defined as a local street with low traffic speeds and volumes and that contains other elements that contribute to safe bicycle travel. One element that is considered when determining to designate a corridor as a bicycle boulevard is that it carry a daily traffic volume of fewer than 2,000 vehicles. Under existing plus project conditions, total ADT on Bryant Street south of Embarcadero Road is expected to remain below 2,000 vehicles per day. The existing traffic volumes on Bryant Street north of Embarcadero Road area already above 2,000 vehicles per day. The project would add 162 vehicle trips to those segments. This additional volume would not increase the TIRE index for those segments, and therefore would not substantially alter traffic conditions or impair the function of Bryant Street as a bicycle boulevard.

The project includes a reduction in total curb cut driveways from eleven driveways three driveways on Bryant Street, four driveways on Kellogg Avenue, and four driveways on Emerson Street including the two driveways accessing the two residential structures) to six driveways (two on Bryant Street, one on Kellogg Avenue, three on Emerson Street). The reduction in driveway curb cuts will improve bicycle safety.

The project proposes to create a bicycle parking area and repair station in front of the proposed library with parking for 35 bicycles, and a parking area with spaces for 44 bicycles immediately north of the proposed pool. Combined with the existing parking for 61 bicycles immediately north of the athletic center, the project would provide for 140 bicycle parking spaces within the campus. This exceeds the requirement for private schools with grades 6 through 12 to provide one bicycle parking space for every five students, as established in Chapter 18.52, Section 18.52.040 of the City of Palo Alto Municipal Code. With a proposed enrollment of 540 students, the school would need a minimum of 108 bicycle parking spaces to meet this code requirement.

The existing and proposed bicycle facilities in the area surrounding the project site are adequate to serve the project, the project would not adversely affect use of the Ellen Fletcher Bicycle Boulevard, and the project would provide sufficient bicycle parking for the proposed enrollment. Thus the project would have a **less than significant** impact related to established measures of effectiveness for bicycle travel in the project vicinity.

Similarly, existing transit routes that serve the project are identified in Section 7.1, and the proposed project would not alter any portion of the transit system. The project is expected to generate a limited amount of additional demand for mass transit services, and this additional demand is expected to be accommodated by existing facilities. The school's private shuttle and bus system would meet a portion of the additional transit demand associated with the increased enrollment. Thus the project would have a **less than significant** impact associated with transit facilities and services.

Vehicle Miles Traveled

Analysis of vehicle miles traveled (VMT) is not a required component of this EIR under the CEQA Guidelines or the standards of the City and Santa Clara County. However, the CEQA Guidelines require that all lead agencies consider VMT starting in June 2020. This VMT analysis is presented to provide information that further characterizes the project's potential transportation-related environmental effects. As there are no adopted policies or standards that require this analysis and no adopted thresholds of significance, this analysis is provided for informational purposes only.

W-Trans developed site-specific VMT estimates based on the intersection, roadway and driveway counts conducted in January 2017 and the home zip codes of all Castilleja School students and employees in 2017. W-Trans found that the average distance between home and school for all employees and students is 7.69 miles, and that the school generates 2.74 daily trips per student. Table 7-10 shows the total number of new daily trips and associated VMT for the proposed project. The analysis demonstrates that the project would add approximately 2,630 VMT to the region compared to the enrollment cap in the existing CUP, and 2,230 VMT to the region compared to the current enrollment level. As shown in the Palo Alto Comprehensive Plan EIR, existing VMT in the City is approximately 44.72 miles per person, or a total of 2,937,470 miles. This is expected to decrease slightly as the Comprehensive Plan is implemented, but would not drop below 39.12 miles per person and a total of 3,120,280 miles. The project would contribute less than 0.001% of the existing city-wide VMT.

Table 7-10
Vehicle Miles Traveled

Condition	Number of Students	Daily Trips	Estimated VMT
Existing CUP	415	1,135	8,728
2017 Enrollment	438	1,198	9,213
2018 Enrollment	434	1,187	9,128
Proposed Project	540	1,477	11,358

Source: Appendix E

IMPACT 7-2	Conflict with an applicable congestion management program, including, but not limited to level of service standards and travel demand measures, or other standards established by the county congestion management agency for designated roads or highways
SIGNIFICANCE:	No impact
MITIGATION MEASURES:	None required
SIGNIFICANCE AFTER MITIGATION:	No impact

The only location within the study area that is within the VTA CMP network is the intersection of El Camino Real with Embarcadero Road. As noted in Section 7.2, LOS E is the minimum acceptable level for signalized intersections that are within the County's CMP network. The proposed project would not alter the LOS at this intersection compared to existing conditions. As shown in Table 7-6, the intersection is expected to continue to operate at LOS D in each of the three analysis scenarios (AM peak hour, School PM peak hour, and PM peak hour). Thus the project would have **no impact** due to conflicts with the adopted CMP.

IMPACT 7-3	Result in a change in air traffic patterns, including either an increase in traffic levels or a change in location that results in substantial safety risks
SIGNIFICANCE:	No impact
MITIGATION MEASURES:	None required
SIGNIFICANCE AFTER MITIGATION:	No impact

The project proposes to complete campus renovations and increase enrollment at Castilleja School. The project site would have no effect on air traffic patterns and the project would have **no impact** associated with increased air traffic levels or any air traffic safety risks.

IMPACT 7-4	Substantially increase hazards due to a design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment).
SIGNIFICANCE:	Potentially significant
MITIGATION MEASURES:	Mitigation Measure 7b
SIGNIFICANCE AFTER MITIGATION:	Less than significant

The project would not alter any land uses in the project vicinity and would not introduce vehicles or roadway operations that are incompatible with the existing traffic patterns and activities in the area. Further, the project would not modify existing intersections or roadways, thus it would not increase hazards due to design features. However, by redistributing traffic that is entering and leaving the school and by increasing total daily traffic volumes, the project could create traffic hazards due to vehicle queues extending beyond the project site or inadequate sight distance.

Proposed Site Access

The project site currently has eleven driveway access points serving various parking lots and service roads and the project proposes to reduce this to seven access points. This would include:

- two driveways on Bryant Street creating a drop-off/pick-up loop;
- one driveway on Bryant Street providing access to a 15-space off-street parking lot;
- one driveway on Kellogg Avenue providing access to a 12-space off-street parking lot at the south-west corner of the project site;
- one driveway on Emerson Street providing access to the 12-space parking lot that also has access onto Kellogg Avenue;
- one driveway on Emerson Street providing access to a service road for deliveries, pool maintenance, and trash collection; and
- the underground garage exit-only driveway located on Emerson Street at its intersection with Melville Avenue, with all vehicles restricted to right turns.

No driveways currently exist or are being proposed on Embarcadero Road.

Drop-off Lane Queuing

Castilleja School currently requires families to use a specific drop-off/pick-up location, based on their student's grade level and last name. Compliance with these requirements and other traffic management efforts that Castilleja has implemented under their current TDM plan is enforced with active traffic monitors and ongoing communication with families, as summarized in the proposed enhanced TDM plan provided in Appendix B. Under the proposed project, Castilleja School will instruct all families to conduct all drop-off and pick-up activities within the parking garage. All traffic flow through the parking garage would be one-way, with ingress provided from Bryant Street and egress onto Emerson Street. The ingress route would allow cars to access the two-lane, one-way drop-off area within the garage. The proposed dual drop-off lanes would each be 200 feet long with a capacity of eight vehicles per lane (or 16 vehicles total). The drop-off area is positioned in such a way that any vehicles in the queue extending beyond the 16-vehicle capacity may block access to other areas of the parking lot. For this reason, the practical stacking storage of the drop-off area is 16 vehicles (or eight vehicles per lane) even though there is capacity for an additional 21 vehicles to stack up in the drive-aisle approach before spilling onto Bryant Street.

The drop-off lane queuing was analyzed for the morning drop-off period only because it represents the period with the largest peak hour demand. The queuing analysis also reflects use of a peak hour factor adjustment, which accounts for the concentration of vehicle arrivals in the short period before the first school bell. In other words, while the trip generation estimates indicate that there would be 199 vehicles arriving in the AM peak hour at full enrollment (540 students), these arrivals would not be spaced evenly throughout the full hour. Rather, the observed traffic patterns at Castilleja School show that the garage should be designed to accommodate a design flow rate of 460 vehicles per hour to meet the drop-off demand during the concentrated arrivals in the brief period preceding the first bell.

W-Trans conducted a sensitivity test to determine the slowest service rate that could accommodate the expected demand given the size of the proposed vehicle stacking area. Through this sensitivity test, it was determined that a service rate of approximately one vehicle discharged every 14 seconds would result in an average of 7.9 vehicles per lane in the queue and would have a low probability (4.3%) of exceeding eight vehicles in the queue at any point during the drop-off period. Probabilities of 5-percent or less are generally considered to be acceptable. Through this process, it was determined that the successful operation of the drop-off lanes would rely on the quick discharge of vehicles at a rate no slower than 14 seconds per vehicle during peak periods, or about four vehicles per minute. Discharge rates which are slower than this would increase the probability that the queue would exceed the available queue length of the drop-off lanes during the peak periods.

This analysis assumes that the egress from the drop-off lane to Emerson Street is uninterrupted and clear of congestion. If a queue exists on the egress route for any reason, the discharge at the drop-off lane would be compromised and the queue length would extend closer to Bryant Street. Note that if the discharge rate is occasionally slower than the target rate, there is space for an additional 21 vehicles to stack up in the drive-aisle approach before spilling onto Bryant Street.

A discharge rate of 14 seconds per vehicle is a reasonable, though fairly quick, standard and is achievable with strict management and practice, which Castilleja has already demonstrated an ability to accomplish, as indicated by the W-Trans survey of existing traffic operations. Further, this analysis is based on full enrollment of 540 students, and assumes no increase in TDM effectiveness over existing conditions. In the first three project phases, when enrollment is between 490 and 520 students, the total number of drop-offs would be reduced, and a slightly slower discharge rate would not result in adverse effects. Impacts would remain less than significant in these initial project phases. However, it is possible that the target discharge rate would not be met during full enrollment. Thus, this is a **potentially significant** impact of the project at full buildout. Implementation of Mitigation Measure 7a would reduce this impact to a **less-than-significant** level by requiring that the Castilleja School TDM program include educating staff, students, and families regarding the importance of an efficient and safe student drop-off operation to prevent excessive queuing in the garage, and adding ongoing monitoring of drop-off lane discharge rates and ingress and egress queues to the TDM program. This would ensure that Castilleja School and the City have appropriate data from which to determine if improvements to the drop-off procedures and TDM program are needed to ensure that no safety hazards are created. Such improvements could include increasing the time difference in the bell schedules for various grades or other strategies that would decrease vehicle trips or otherwise spread out the number of peak hour vehicle trips accessing the underground garage.

Site Egress Queuing

As noted above, a queue at the parking garage exit could delay drop-off procedures. Additionally, use of the parking garage could create a queue of vehicles waiting to make the northbound right turn from Emerson Street onto Embarcadero Road. The capacities of both these movements are regulated by stop-controlled intersections. The sole exit from the underground parking garage is to Emerson Street and is proposed to be right turn only. This turn restriction directs all exiting traffic toward the northbound approach to the intersection of Emerson Street/Embarcadero Road, which is also restricted to right turns only.

W-Trans conducted a queuing analysis to determine whether the existing vehicle storage capacity for the garage exit and for the right turn from Emerson Street onto Embarcadero Road is adequate for the expected demand during peak school traffic conditions. A summary of expected queue lengths for the existing plus project condition showing various periods and available storage capacity is provided in Table 7-11.

Table 7-11
Existing Plus Project Intersection Queue Length

Intersection	Movement	Available Storage (ft)	Period	Estimated Queue Length (ft)	Adequate Storage? (Y/N)
Embarcadero Rd/Emerson St	NBRT	320	AM	500	**N**
			School PM	450	**N**
			PM	300	Y
Emerson St/Project Exit/Melville Ave	WBRT	120	AM	200	**N**
			School PM	125	**N**
			PM	125	**N**

Note: **Bold** text = insufficient storage
Source: Appendix E

As shown in Table 7-11, the vehicle queues for both the garage exit and the right turn from Emerson Street onto Embarcadero Road are anticipated to exceed the available storage for every condition except for the PM peak hour. Additionally, the vehicle queue at the Embarcadero

Road/Emerson Street intersection is expected to be long enough that it would extend into the Emerson Street/Melville Avenue intersection and onward into the underground parking structure. This would be a **significant** impact. As discussed in the previous Drop-off Lane Queueing analysis, the queues for exiting the garage could delay drop-off procedures, which could result in queues for entering the parking garage to extend to Bryant Street. At its longest, during the AM peak hour, the queue at Embarcadero Road and Emerson Street would spill back 180 feet, or 7 car lengths, into the parking garage. The parking garage spillback would be an additional 80 feet, or 3 car lengths. Because there is sufficient space in the parking garage entrance for a queue of 21 vehicles, the exit queue would not create an adverse effect related to safety and impacts would remain **less than significant**.

As discussed previously, this analysis is based on full enrollment of 540 students, and assumes no increase in TDM effectiveness over existing conditions. Implementation of the enhanced TDM plan referenced under Mitigation Measure 7a (as applied to Impact 7-1) would even further reduce vehicle queues by reducing the total daily and peak hour trips to and from the campus. Additionally, in the first three project phases, when enrollment is between 490 and 520 students, the total number of drop-offs would be reduced, and vehicle queues leaving the garage and turning onto Embarcadero Road would be slightly shorter than at full buildout.

Driveway Sight Distance

Sight distance refers to the distance that a driver can see along a street, and thus the distance within which the driver can observe other vehicles, bicyclists, pedestrians, and any potential hazards. At driveways, an adequate sight distance allows for a driver exiting the project site to be able to identify an appropriate gap in traffic such that they can safely pull out of the driveway and enter the flow of traffic on the adjacent street.

W-Trans evaluated sight distances along Bryant Street, Kellogg Avenue and Emerson Street from the project access driveways based on stopping sight distance criteria contained in the Highway Design Manual published by Caltrans. The stopping sight distance is the distance needed for a driver already traveling along the street to observe a vehicle entering the traffic flow and to stop for that vehicle if necessary. When average traffic speeds are 25 mph, the recommended stopping sight distance is 150 feet. Based on a review of aerial photography, sight lines at the driveways on Bryant Street, Kellogg Avenue and Emerson Street are clear for more than 150 feet in both directions, which would be adequate for the anticipated travel speeds. However, if vegetation is not maintained and on-street parking adjacent to each driveway is not prohibited, lines of sight may be blocked or substantially limited. Thus the project would result in a **potentially significant** impact. This would be reduced to a **less-than-significant** level with implementation of Mitigation Measure 7b, which requires that vegetation near the project's driveways be trimmed so that there is no vegetation between three and seven feet from the surface of the roadway, and requires that on-street parking be prohibited adjacent to each driveway.

IMPACT 7-5	Result in inadequate emergency access.
SIGNIFICANCE:	No impact
MITIGATION MEASURES:	None required
SIGNIFICANCE AFTER MITIGATION:	No impact

As discussed in Section 7.1, the project site is located adjacent to Embarcadero Road and several residential neighborhood streets. There is adequate accessibility to all portions of the existing and proposed campus to allow for emergency responders to provide medical, fire, and police services. As discussed in Impact 7-1, the project would not substantially increase delay or traffic congestion at study area intersections and roadway segments. The project would result in a substantial increase in the TIRE index for Emerson Street between Melville Avenue and Embarcadero Road. This effect would be lessened, but not to a less than significant level, with implementation of Mitigation Measure 7a. Additionally, the traffic volumes on Emerson Street and the all study area intersections would remain at levels that would accommodate emergency response. The grid street pattern in the area would allow emergency vehicles to choose from several routes to avoid periodic or temporary pockets of congestion. As discussed in Impact 7-4, the project would not modify any public roadways and it would reduce the number of points of access from the campus to the adjacent public streets. Thus the project would not result in an inability of emergency responders to access other properties in the project area and would not substantially lengthen response times and the project would have **no impact** related to emergency response.

IMPACT 7-6	Conflict with adopted policies, plans, or programs supporting alternative transportation or otherwise decrease the performance or safety of such facilities.
SIGNIFICANCE:	No impact
MITIGATION MEASURES:	None required
SIGNIFICANCE AFTER MITIGATION:	No impact

As discussed in Impact 7-1, the project would not result in adverse effects related to pedestrian, bicycle, or transit activities and facilities. Thus the project would have **no impact** associated with conflicts with policies, plans, and programs regarding alternative transportation and the performance and safety of associated facilities.

IMPACT 7-7	Contribute to a cumulative increase in traffic that conflicts with adopted policies and plans related to intersection and roadway segment function, including consideration of LOS and ADT.
SIGNIFICANCE:	Significant
MITIGATION MEASURES:	Mitigation Measures 7a and 7c
SIGNIFICANCE AFTER MITIGATION:	Significant and Unavoidable

Intersection Level of Service

As stated in Impact 7-1, LOS E is the minimum acceptable level for signalized intersections that are within the County's CMP network, while LOS D is the minimum acceptable level for both signalized and unsignalized City intersections that are outside of the CMP network. For signalized intersections that are projected to operate below the minimum acceptable level, a project would have a cumulatively considerable contribution to the significant impact if it would increase the average control delay for critical movements by four seconds or more and increase the critical v/c ratio by 0.01 or more. At an unsignalized intersection a project's impact is considered significant if it causes intersection operations to degrade to LOS E or F from acceptable operations and the intersection satisfies a peak hour signal warrant from the California MUTCD.

W-Trans determined the cumulative peak hour intersection LOS for all study area intersections based on turning movement forecasts developed using roadway segment volumes from the 2014 and 2030 Santa Clara County travel demand models. The increment of new traffic projected by subtracting the model's 2014 data from 2030 data was added to the actual counts used in the Existing Conditions scenario. In some instances, the model projected a traffic volume decrease. Decreases are attributable to assumed infrastructure improvements and forecast changes in demographic data throughout the region. Rather than assume volume decreases, existing counts were maintained as a "floor." This is a common technique used to ensure that future projections are conservative.

Cumulative No Project Scenario

No changes to the road network, including geometric changes to intersections or lane configurations, are expected to be completed in the cumulative scenario. Table 7-12 identifies the anticipated delay and LOS under cumulative no project and cumulative plus project conditions; Figure 7-7 shows the intersection volumes under cumulative no project conditions, and Figure 7-8 shows the intersection volumes under cumulative plus project conditions. As indicated, there are two locations where LOS would not meet the established standards under the cumulative no project conditions:

- Embarcadero Road Spur/Alma Street would operate at LOS A overall but with the westbound Embarcadero Road approach operating deficiently at LOS F during the AM peak hour;

- Alma Street/Kingsley Avenue would operate deficiently at LOS E overall and LOS F on the westbound Kingsley Avenue approach during the AM and PM peak hours, and at LOS F on the westbound Kingsley Avenue approach during the School PM peak; and

- Alma Street/Melville Avenue would operate at LOS A overall but with the westbound Melville Avenue approach operating deficiently at LOS E during the AM peak hour.

Cumulative With Project Scenario

As shown in Table 7-12, addition of project-generated traffic to the cumulative scenario would have the following effects

- The delay on the westbound approach to the Embarcadero Road Spur/Alma Street intersection would improve slightly but the approach would continue to operate at LOS F in the AM peak hour. Because the project would decrease delay, the project would not make a considerable contribution to this significant cumulative impact, thus the project impacts would be **less than significant**;

- The delay at the Alma Street/Kingsley Avenue overall would increase in the AM and PM peak hours, reducing the LOS from E to F. The project would add 8.5 seconds of delay in the AM peak hour and 1.8 seconds of delay in the PM peak hour. The volume of traffic using the intersection would meet the peak hour volume signal warrant. The project would have cumulatively considerable contribution to impacts at this location, thus this would be a **significant** impact; and

- Alma Street/Melville Avenue would operate at LOS A overall but with the westbound Melville Avenue approach operating deficiently at LOS F during the AM peak hour. The project would add 13 seconds of delay to this movement. Because the intersection would not meet the peak hour volume signal warrant, the impact would be considered **less than significant**.

Conclusion

Under the proposed project conditions, the project would have a significant impact at the Alma Street/Kingsley Avenue intersection because it would add 8.5 seconds of delay in the AM peak hour. The westbound approach would remain at LOS F during all peak hours in the cumulative and cumulative plus project scenarios, with delays that exceed 120 seconds. This indicates that traffic waiting to turn onto Alma Street from Kingsley Avenue would have to wait for long periods before finding an acceptable gap in traffic to make the turn movement. The peak hour volume warrant is satisfied at this intersection for all three peak hours evaluated, however the City has not previously identified this intersection for signalization (such as in the Capital Improvement Program [CIP] or as part of other planned transportation improvements). Mitigation Measure 7c requires the City to consider adding signalization of this intersection to the CIP. However, because the City's determination of which intersections to signalize is based on a variety of factors, it is uncertain that signalization at this intersection would be added to the CIP and thus the impact would remain **significant and unavoidable**.

Table 7-12
Cumulative and Cumulative Plus Project Peak Hour Intersection Levels of Service

Intersection *Approach*	Control Type	AM Peak				School PM Peak				PM Peak			
		Cumulative		Cumulative Plus Project		Cumulative		Cumulative Plus Project		Cumulative		Cumulative Plus Project	
		Delay	*LOS*	*Delay*	*LOS*	*Delay*	*LOS*	*Delay*	*LOS*	*Delay*	*LOS*	*Delay*	*LOS*
El Camino Real/ Embarcadero Rd	Signal	63.6	E	64.3	E	74.8	E	74.8	E	61.5	E	61.9	E
Embarcadero Rd Spur/Alma St	TWSC	3.7	A	3.3	A	0.9	A	0.9	A	0.8	A	0.8	A
Westbound (Embarcadero)		***109.8***	***F***	***98.6***	***F***	*21.8*	*C*	*20.5*	*C*	*26.8*	*D*	*25.8*	*D*
Alma St/ Kingsley Ave	TWSC	**45.0**	**E**	**53.5**	**F**	14.8	B	15.9	C	**48.2**	**E'**	**50.0**	**F**
Westbound (Kingsley)		**	***F***	**	***F***	**	***E***	**	***F***	**	***F***	**	***F***
Embarcadero Rd/ Emerson St	TWSC	0.5	A	2.1	A	0.3	A	1.9	A	0.5	A	1.5	A
Northbound (Emerson)		*16.3*	*C*	*24.7*	*C*	*14.6*	*B*	*24.0*	*C*	*14.9*	*B*	*20.1*	*C*
Embarcadero Rd/ Bryant St	Signal	12.4	B	12.8	B	11.9	B	12.3	B	10.8	B+	11.3	B+
Middlefield Rd/ Embarcadero Rd	Signal	47.1	D	47.2	D	44.0	D	44.0	D	49.6	D	49.7	D
Melville Ave/Emerson St	TWSC	3.5	A	7.2	A	3.8	A	7.4	A	3.5	A	6.6	A
Westbound (Melville)		*9.2*	*A*	*9.7*	*A*	*9.4*	*A*	*9.4*	*A*	*9.2*	*A*	*9.3*	*A*
Melville Ave/Alma St	TWSC	0.5	A	0.4	A	0.3	A	0.3	A	0.1	A	0.1	A
Westbound (Melville)		***49.5***	***E***	***62.5***	***F***	*24.5*	*C*	*29.2*	*D*	*17.7*	*C*	*18.9*	*C*

Table 7-12
Cumulative and Cumulative Plus Project Peak Hour Intersection Levels of Service

Intersection *Approach*	Control Type	AM Peak				School PM Peak				PM Peak			
		Cumulative		Cumulative Plus Project		Cumulative		Cumulative Plus Project		Cumulative		Cumulative Plus Project	
		Delay	*LOS*	*Delay*	*LOS*	*Delay*	*LOS*	*Delay*	*LOS*	*Delay*	*LOS*	*Delay*	*LOS*
Kellogg Ave/Emerson St		5.5	A	6.3	A	5.7	A	4.6	A	4.5	A	3.3	A
North & Southbound (Emerson)		*10.2*	*B*	*9.8*	*A*	*9.6*	*A*	*9.3*	*A*	*9.5*	*A*	*9.4*	*A*
Churchill Ave/Emerson St	AWSC	8.0	A	8.0	A	8.0	A	8.0	A	7.8	A	7.9	A
Churchill Ave/Alma St	Signal	26.4	C	27.6	C	28.3	C	29.1	C	32.1	C-	32.9	C-

Notes: Delay is measured in average seconds per vehicle
TWSC = two-way stop-controlled; LOS = Level of Service; ** = delay greater than 120 seconds
Results for minor approaches to two-way stop-controlled intersections are indicated in *italics.*
Bold text = deficient operation
Source: Appendix E

7.4 MITIGATION MEASURES

Mitigation Measure 7a Castilleja School shall implement the proposed enhanced Transportation Demand Management (TDM) plan to reduce the number of project-related trips by between 12 and 22 percent. As described in the TDM plan (Appendix B), this is expected to include:

1. late afternoon shuttle departures
2. off-site drop-off/pick-up area
3. expanded carpool/trip planning program
4. additional off-site parking
5. parking/carpool incentives program for employees
6. alternative transportation information
7. bike tune-up day and on-site repair stations
8. Guaranteed Ride Home program
9. on-site car or bike sharing program
10. provide transit passes
11. mandatory ridesharing
12. other TDM measures developed by Castilleja in coordination with the City of Palo Alto (City), including the monitoring and enforcement provisions identified in Appendix B.

In addition, Castilleja School shall modify the proposed enhanced TDM plan to include the following

13. educating staff, students, and families regarding the importance of an efficient and safe student drop-off operation to prevent excessive queuing in the garage,
14. conduct ongoing monitoring of drop-off lane discharge rates and ingress and egress queues; and

15. if vehicle queues are causing spillover into the public right of way on Bryant Street, modify the drop-off procedures and TDM program to include greater staggering of bell schedules or other strategies that would decrease vehicle trips or otherwise spread out the number of peak hour vehicle trips accessing the underground garage.

16. Provide bicycle safety education for students, parents, and staff to encourage students and staff to ride bicycles to and from school.

17. Host school-wide bicycle encouragement events (such as competitions, incentives, and other fun events) to support biking, walking, carpooling, and transit use so that the school community understands that active transportation is a community-held value.

Mitigation Measure 7b Castilleja School shall maintain vegetation within 40 feet of the school's driveways onto public streets such that vegetation is trimmed down to a height of less than three feet and trees trimmed up so that nothing hangs below a height of seven feet from the surface of the roadway. Vegetation shall be trimmed no less once per month. Castilleja School shall provide the City with evidence of a landscaping management plan or active landscape maintenance contract annually. Castilleja School and the City shall provide curb markings to prohibit on-street parking within 35 feet of each driveway.

Mitigation Measure 7c The City shall consider adding signalization of the Alma Street/Kingsley Avenue intersection to the Capital Improvement Program.

7.5 REFERENCES CITED

Caltrans 2018. 2017 traffic count data. Accessed November 21, 2018. http://www.dot.ca.gov/trafficops/census/volumes2017/Route101.html

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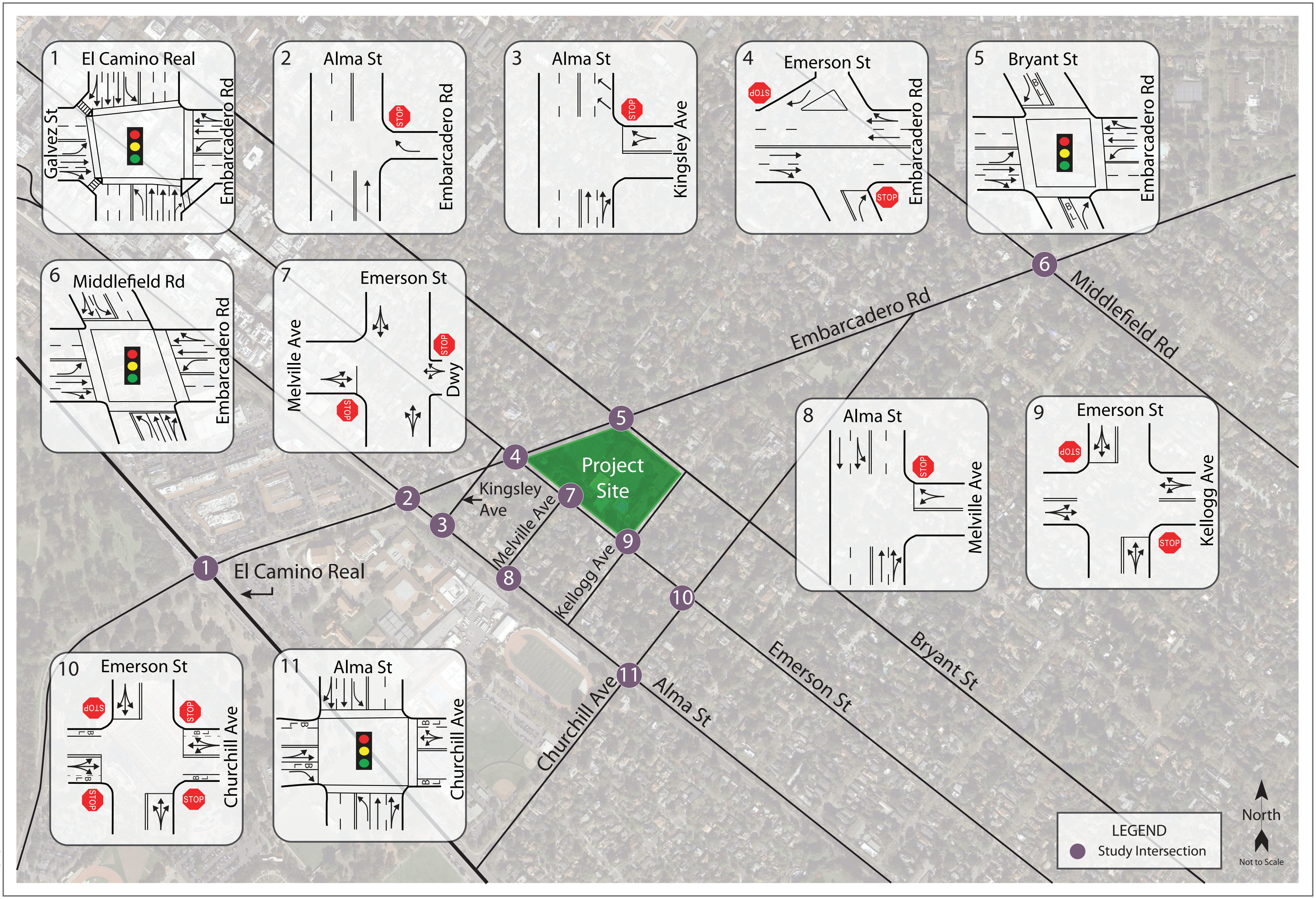

SOURCE: W-Trans 2019

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FIGURE 7-1

Transportation Study Area

Castilleja School Project EIR

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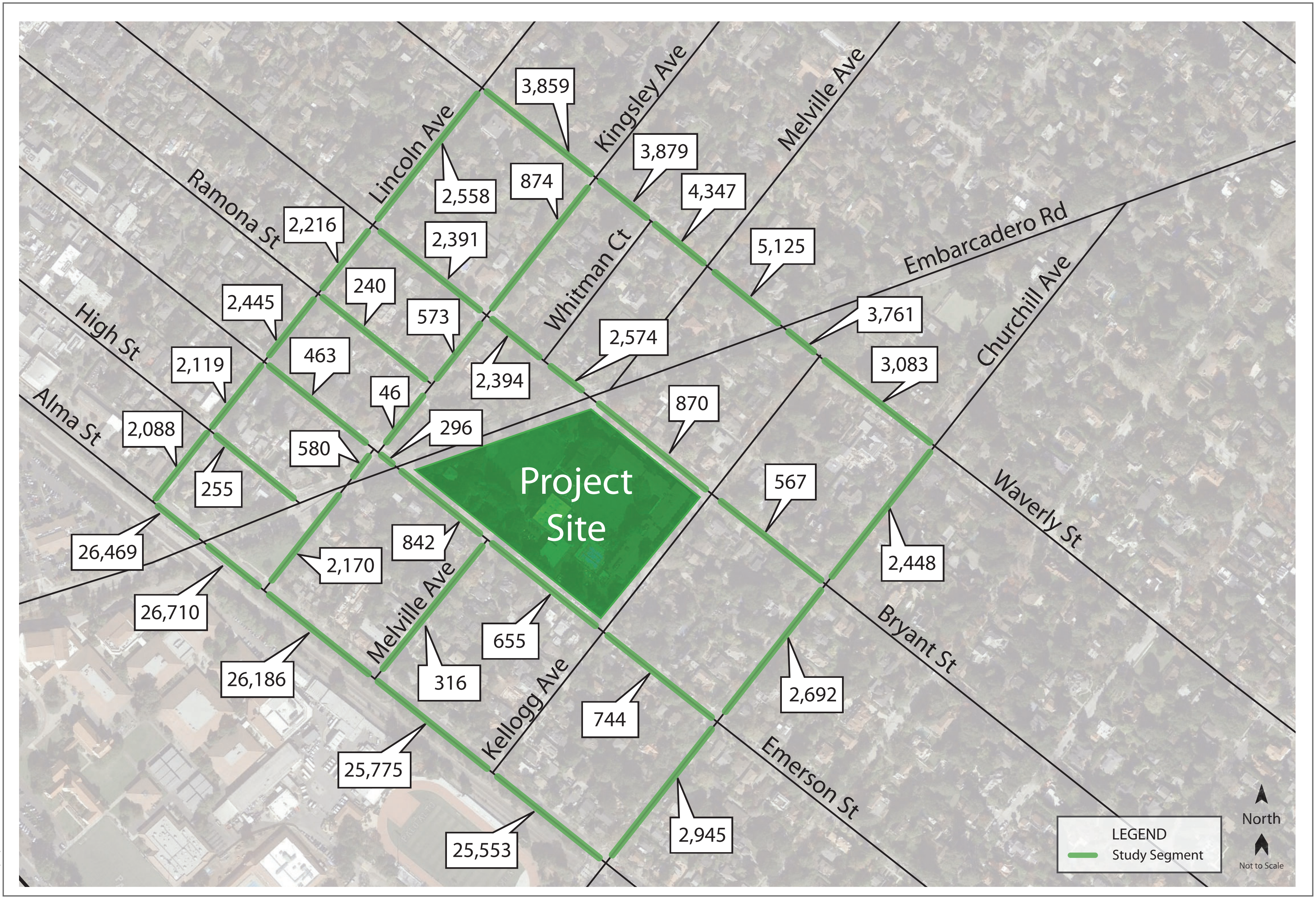

SOURCE: W-Trans 2019

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FIGURE 7-2

Existing Road Segment Daily Volumes

Castilleja School Project EIR

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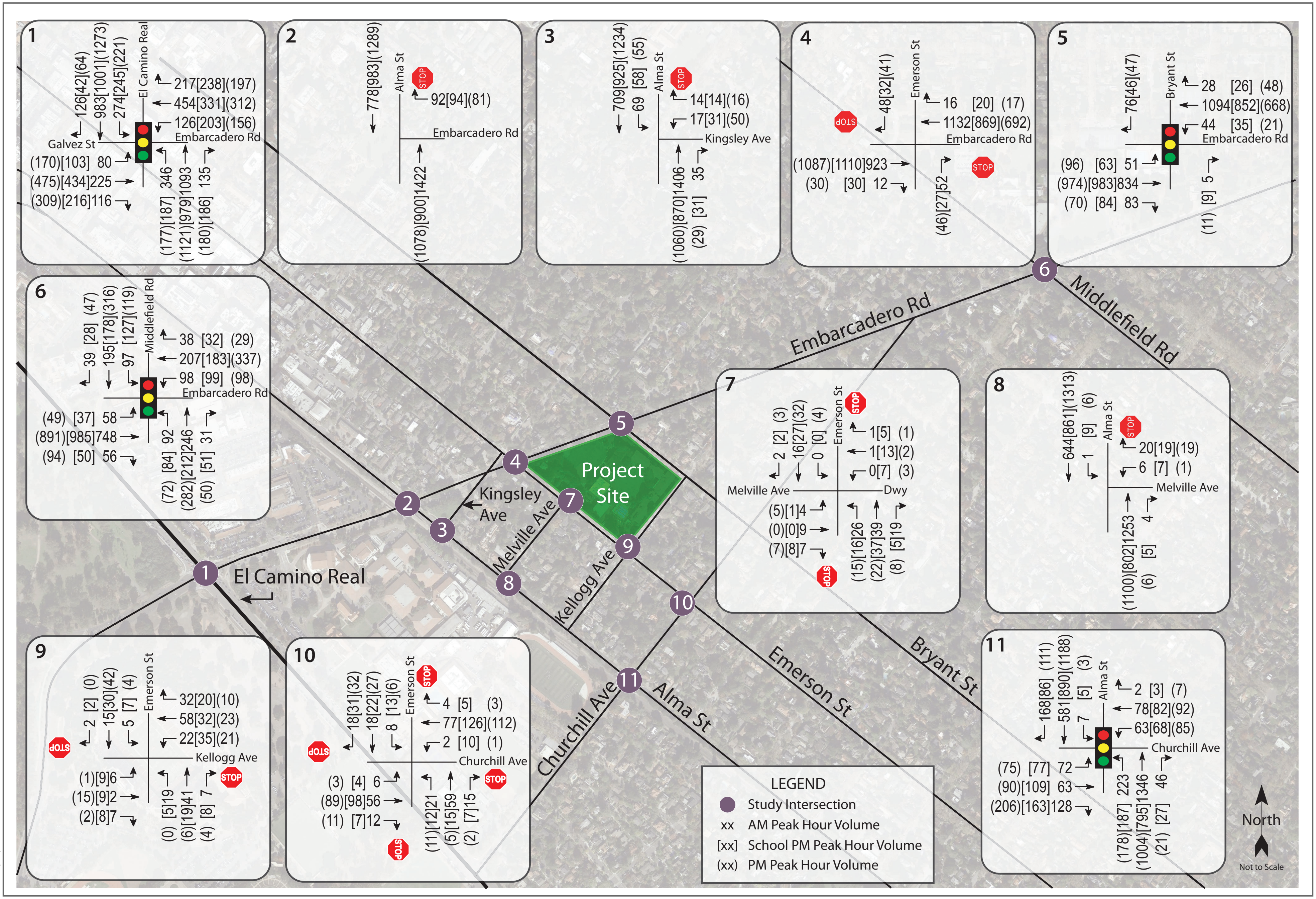

SOURCE: W-Trans 2019

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FIGURE 7-3

Existing Peak Hour Intersection Volumes

Castilleja School Project EIR

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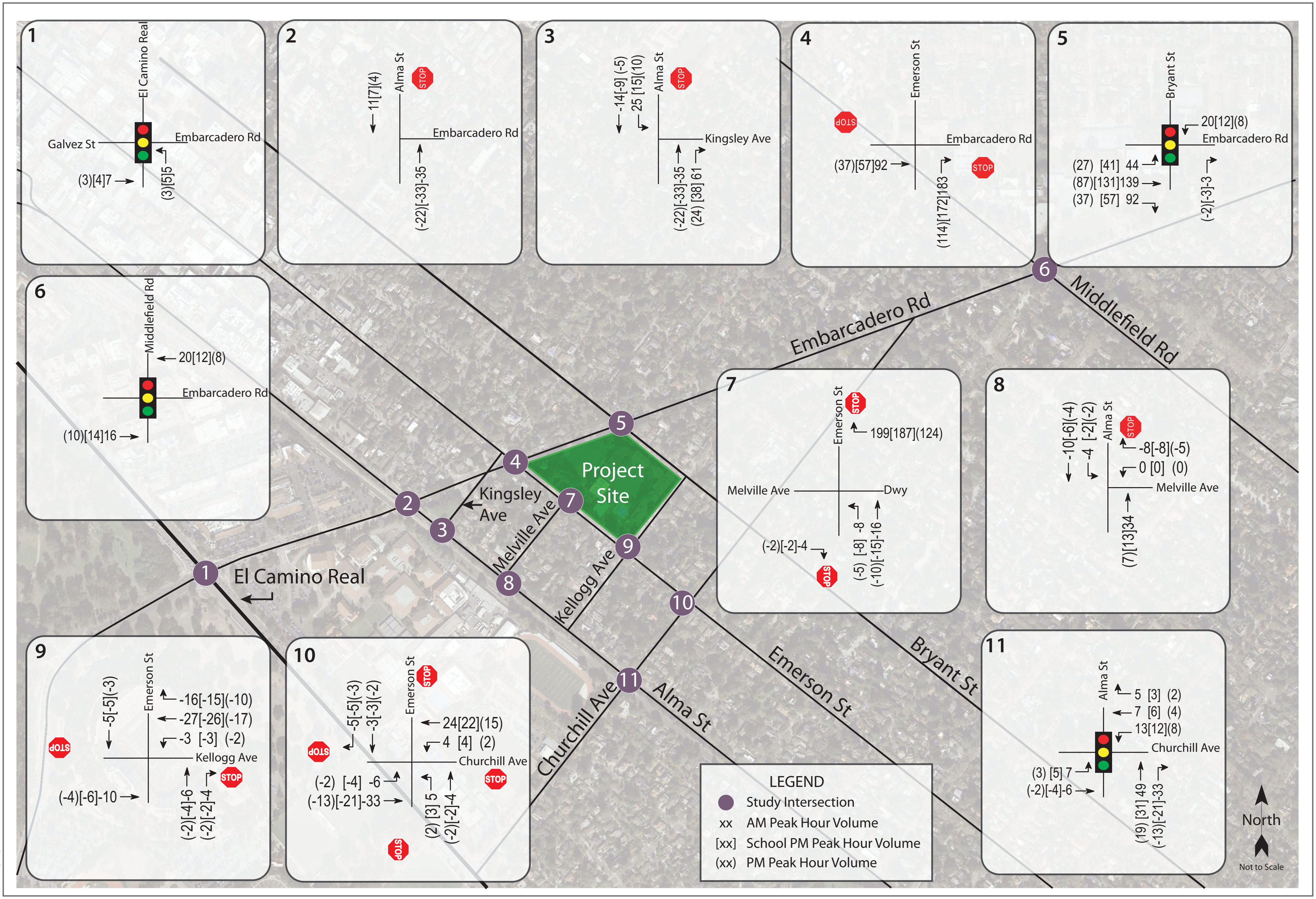

SOURCE: W-Trans 2019

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FIGURE 7-4

Project Generated Intersection Traffic Volumes

Castilleja School Project EIR

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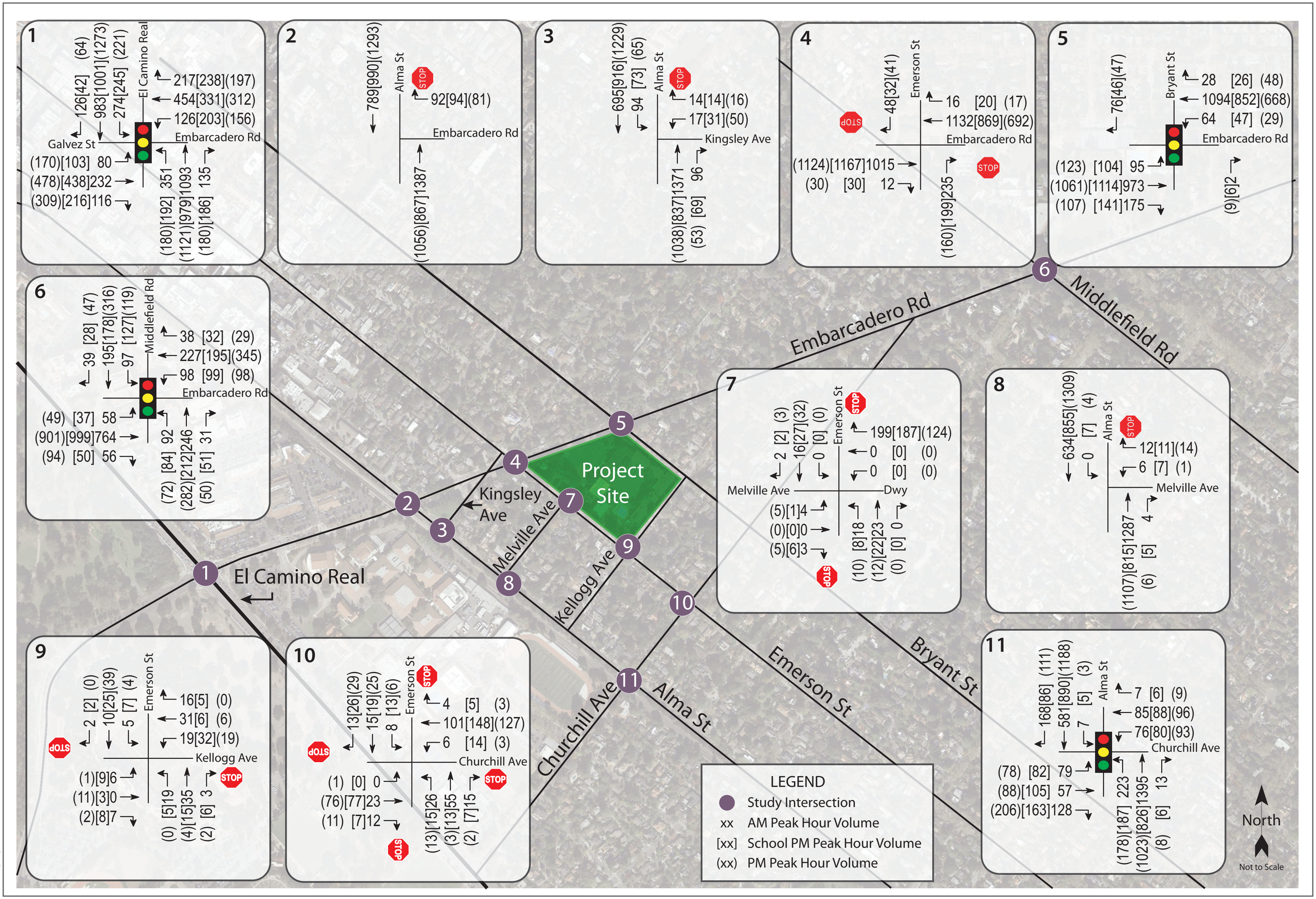

SOURCE: W-Trans 2019

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FIGURE 7-5

Existing Plus Project Intersection Traffic Volumes

Castilleja School Project EIR

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SOURCE: W-Trans 2019

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FIGURE 7-6

Project Generated Roadway Segment Traffic Volumes

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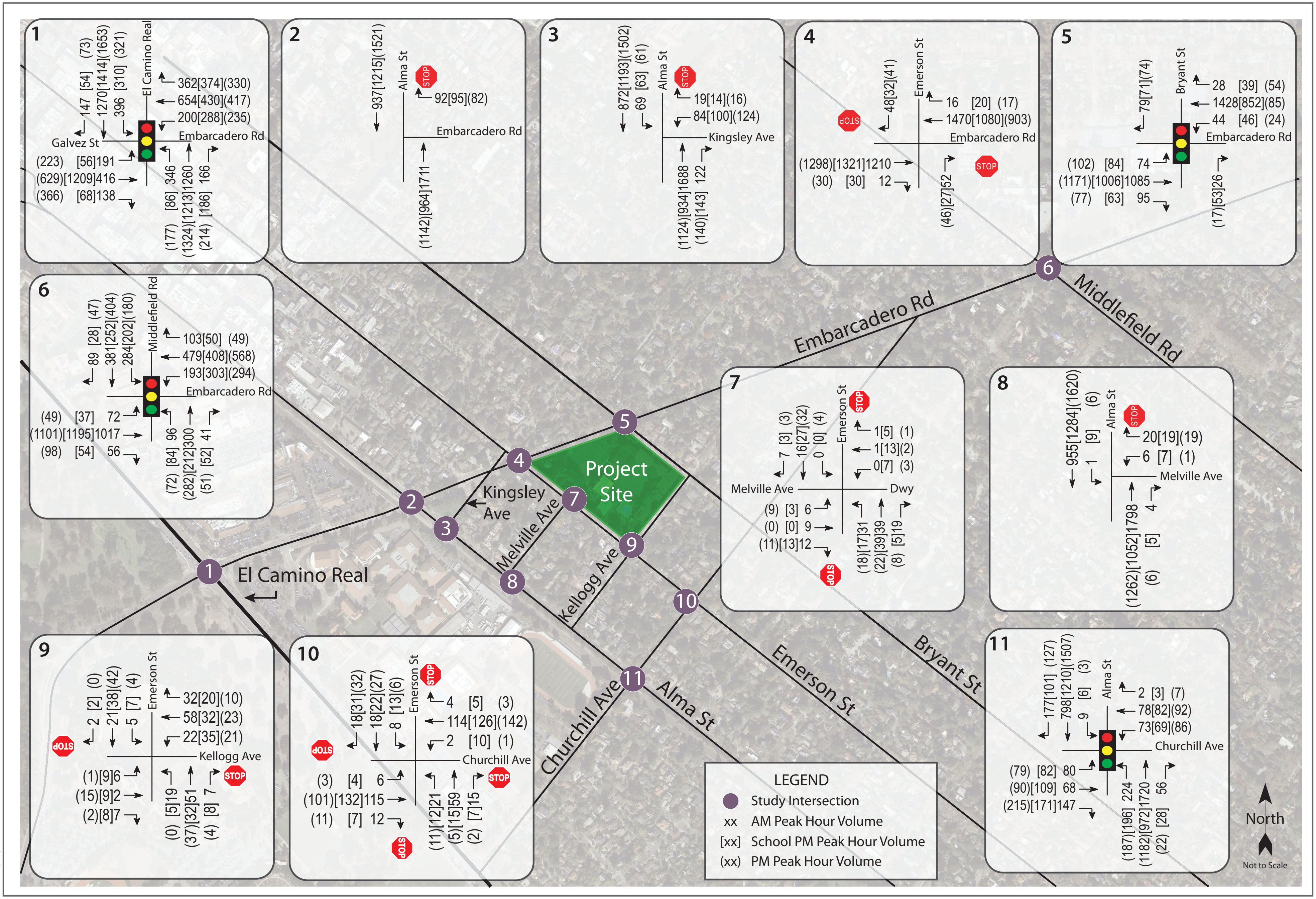

SOURCE: W-Trans 2019

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FIGURE 7-7

Cumulative Intersection Volumes

Castilleja School Project EIR

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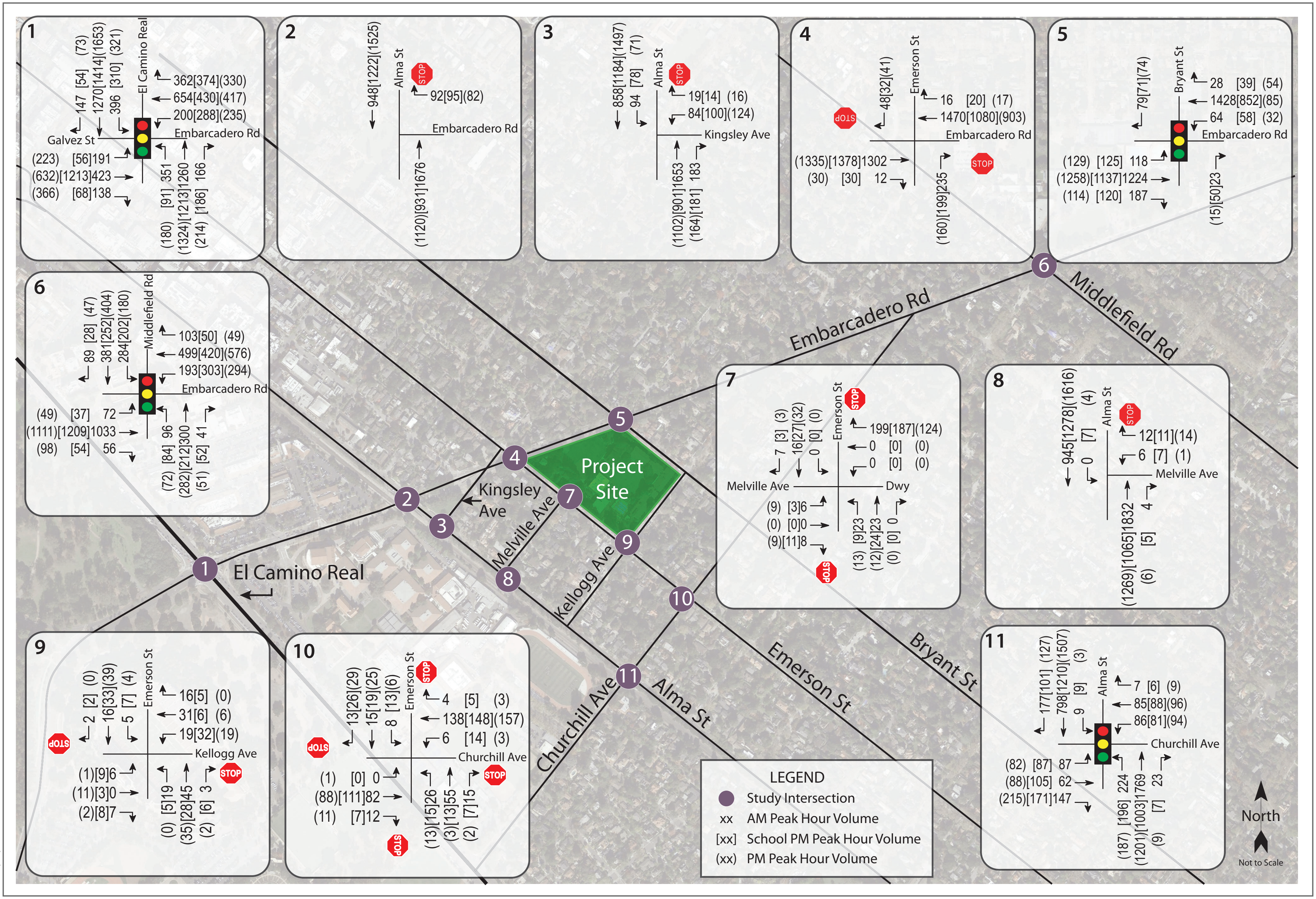

SOURCE: W-Trans 2019

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FIGURE 7-8

Cumulative Plus Project Intersection Volumes

Castilleja School Project EIR

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CHAPTER 8
NOISE

This section describes the existing noise setting of the project site, identifies associated regulatory requirements, evaluates potential impacts, and identifies mitigation measures related to implementation of the proposed Castilleja School Project (proposed project). This section is based on the Environmental Noise Study prepared by Charles M. Salter Associates Inc. and peer reviewed by Dudek (Appendix F).

Comments received in response to the Notice of Preparation (NOP) for this Environmental Impact Report (EIR) relating to noise impacts identified concerns that surrounding neighbors would be exposed to substantial noise during construction and resulting from the proposed increase in enrollment, the parking garage, and truck traffic to the site. The NOP, Initial Study, and comments received in response to the NOP are provided in Appendix A.

8.1 EXISTING CONDITIONS

Characteristics of Environmental Noise

Fundamentals of Acoustics

Noise is generally defined as loud, unpleasant, unexpected, or undesired sound that disrupts or interferes with normal human activities. Although exposure to high noise levels over an extended period has been demonstrated to cause hearing loss, the principal human response to noise is annoyance. The response of individuals to similar noise events is diverse and influenced by the type of noise, the perceived importance of the noise, its appropriateness in the setting, the time of day, the type of activity during which the noise occurs, and the sensitivity of the individual.

Sound is a physical phenomenon consisting of vibrations that travel through a medium, such as air, and are sensed by the human ear. Sound is generally characterized by a number of variables including frequency and level. Frequency describes the sound's pitch and is measured in Hertz (Hz), while intensity describes the sound's loudness and is measured in decibels (dB). Decibels are measured using a logarithmic scale. A sound level of 0 dB is approximately the threshold of human hearing and is barely audible under extremely quiet listening conditions. Normal speech has a sound level of approximately 60 dB. Sound levels above approximately 120 dB begin to be felt inside the human ear as discomfort and eventually pain at still higher levels. The minimum change in the sound level of individual events that an average human ear can detect is approximately 3 dB. An increase (or decrease) in sound level of approximately 10 dB is usually perceived by the average person as a doubling (or halving) of the sound's loudness, this relation holds true for loud sounds and for quieter sounds.

Because of the logarithmic nature of the decibel unit, sound levels cannot be added or subtracted directly and are somewhat cumbersome to handle mathematically. However, some simple rules of thumb are useful in dealing with sound levels. First, if a sound's source is doubled, the sound level increases by 3 dB, regardless of the initial sound level. Thus, for example:

$$60 \text{ dB} + 60 \text{ dB} = 63 \text{ dB, and}$$
$$80 \text{ dB} + 80 \text{ dB} = 83 \text{ dB}$$

Hertz (Hz) is a measure of how many times each second the crest of a sound pressure wave passes a fixed point. For example, when a drummer beats a drum, the skin of the drum vibrates a number of times per second. A particular tone that makes the drum vibrate 100 times per second generates a sound pressure wave that is oscillating at 100 Hz; this pressure oscillation is perceived as a tonal pitch of 100 Hz. Sound frequencies between 20 Hz and 20,000 Hz are within the range of sensitivity of the human ear.

Sound from a tuning fork (a pure tone) contains a single frequency. In contrast, most sounds one hears in the environment consist of a broad band of frequencies differing in sound level. The method commonly used to quantify environmental sounds consists of evaluating all of the frequencies of a sound according to a weighting system that reflects the fact that human hearing is less sensitive at low frequencies and extremely high frequencies than at the mid-range frequencies. This is called "A" weighting, and the decibel level measured is called the A-weighted sound level (dBA). In practice, the level of a noise source is conveniently measured using a sound level meter that includes a filter corresponding to the dBA curve, which de-emphasizes low and high frequencies of sound in a manner similar to the human ear.

Although the A-weighted sound level may adequately indicate the level of environmental noise at any instant in time, community noise levels vary continuously. Most environmental noise includes a conglomeration of noise from several sources that creates a relatively steady background noise in which no particular source is identifiable. A single descriptor called the equivalent sound level (L_{eq}) represents the "equivalent" constant sound level that would have to be produced by a given source to equal the fluctuating level measured. L_{eq} is the mean A-weighted sound level during a measured time interval. In addition, it is often desirable to know the acoustic range of the noise source being measured. This is accomplished through the L_{max} and L_{min} indicators. They represent the maximum and minimum noise levels measured.

To describe the time-varying character of environmental noise, the statistical noise descriptors L_{10}, L_{50}, and L_{90} are commonly used. They are the noise levels equaled or exceeded during 10%, 50%, and 90% of a stated time. Sound levels associated with the L_{10} typically describe transient or short-term events, while levels associated with the L_{90} describe the steady-state (or most prevalent) noise conditions.

Another sound measure known as the day/night average noise level (L_{dn}) is defined as the A-weighted average sound level for a 24-hour day. It is calculated by adding a 10 dBA penalty to sound levels in the night (10 p.m. to 7 a.m.) to compensate for the increased sensitivity to noise during the quieter evening and nighttime hours. The L_{dn} is used by agencies such as the U.S. Department of Housing and Urban Development, the State of California, Santa Clara County, and the City of Palo Alto (City) to define acceptable land use compatibility with respect to noise.

Community Noise

Community noise is commonly described in terms of the “ambient” noise level, which is defined as the all-encompassing noise level associated with a given noise environment. A common statistical tool to measure the ambient noise level is the average, or equivalent, sound level (L_{eq}), over a given time period (usually 1 hour). The L_{eq} is the foundation of the day/night average noise descriptor (L_{dn}), and shows very good correlation with community response to noise for the average person.

The L_{dn} is based on the average noise level over a 24-hour day, with a +10 dB weighting applied to noise occurring during nighttime (10 p.m. to 7 a.m.) hours. The nighttime penalty is based upon the assumption that people react to nighttime noise exposures as though they were twice as loud as daytime exposures. Because L_{dn} represents a 24-hour average, it tends to disguise short-term variations in the noise environment. Where short-term noise sources are an issue, noise impacts may be assessed in terms of maximum noise levels, hourly averages, or other statistical descriptors.

Perception of Loudness

The perceived loudness of sounds and corresponding reactions to noise are dependent on many factors, including sound pressure level, duration of intrusive sound, frequency of occurrence, time of occurrence, and frequency content. As mentioned above; however, within the usual range of environmental noise levels, perception of loudness is relatively predictable, and can be approximated by weighing the frequency response of a sound level meter by means of the standardized A-weighing network. Table 8-1 shows examples of noise levels for several common noise sources and environments.

Table 8-1
Typical Sound Levels in the Environment and Industry

Common Outdoor Activities	Noise Level (dB)	Common Indoor Activities
—	110	Rock band
Jet flyover at 300 meters (1,000 feet)	100	—
Gas lawn mower at 1 meter (3 feet)	90	—
Diesel truck at 15 meters (50 feet), at 80 kph (50 mph)	80	Food blender at 1 meter (3 feet) Garbage disposal at 1 meter (3 feet)

Table 8-1
Typical Sound Levels in the Environment and Industry

Common Outdoor Activities	Noise Level (dB)	Common Indoor Activities
Noisy urban area, daytime gas lawn mower at 30 meters (100 feet)	70	Vacuum cleaner at 3 meters (10 feet)
Commercial area, heavy traffic at 90 meters (300 feet)	60	Normal speech at 1 meter (3 feet)
Quiet urban daytime	50	Large business office Dishwasher, next room
Quiet urban nighttime	40	Theater, large conference room (background)
Quiet suburban nighttime	30	Library
Quiet rural night time	20	Bedroom at night, concert hall (background)
—	10	Broadcast/recording studio
Lowest threshold of human hearing	0	Lowest threshold of human hearing

Source: Caltrans 2013a
Notes: kph = kilometers per hour; mph = miles per hour

Sound Propagation

It is commonly understood that sound decreases with distance. However, the propagation of sound is dependent on considerably more variables than distance alone. Those variables include the type of noise source (point, moving point, or line sources), the directionality of the noise source, the frequency content of the source (low frequency sound is absorbed in the atmosphere at a slower rate than high-frequency sound and therefore carries farther), atmospheric conditions (wind, temperature, humidity, gradients), ground type (e.g., dirt, grass fields, concrete), shielding (structures, noise barriers, topography), and vegetation.

As a general rule of thumb, stationary point sources of noise, including mechanical equipment at commercial or industrial sites or a group of construction equipment, attenuate (lessen) at a rate of approximately 6 dB per doubling of distance from the source. Moving point sources, typically represented by traffic along a roadway or train operations along a rail corridor, attenuate at a rate of approximately 4.5 dB per doubling of distance from the source, with the same considerations as point sources regarding atmospheric and barrier effects. Line sources, typically represented by extremely busy highways (i.e., interstates), attenuate at a rate of approximately 3 dB per doubling of distance from the source.

Vibration

According to the Federal Transit Administration's Noise and Vibration Impact Assessment Guidelines (Federal Transit Administration 2006), groundborne vibration can be a serious concern for nearby neighbors of a transit system route or maintenance facility, causing buildings to shake and rumbling sounds to be heard. Some common sources of groundborne vibration are trains, buses on rough roads, and construction activities such as blasting, pile driving, and operating heavy earth-moving equipment.

The effects of ground-borne vibration include "feelable" movement of the building floors, rattling of windows, shaking of items on shelves or hanging on walls, and rumbling sounds. In extreme cases, the vibration can cause damage to buildings. Annoyance from vibration often occurs when the vibration exceeds the threshold of perception by only a small margin. A vibration level that causes annoyance will be well below the damage threshold for normal buildings.

Vibration can be described in terms of acceleration, velocity, or displacement. A common practice is to monitor vibration measures in terms of peak particle velocities (inches/second). Table 8-2 shows expected responses to different levels of ground-borne vibration.

Table 8-2
Effects of Various Vibration Levels on Buildings

Structure and Condition	Maximum PPV (in/sec)	
	Transient Sources	Continuous/Frequent Intermittent Sources
Extremely fragile historic buildings, ruins, ancient monuments	0.12	0.08
Fragile buildings	0.20	0.10
Historic and some old buildings	0.50	0.25
Older residential structures	0.50	0.30
New residential structures	1.00	0.50
Modern industrial/commercial buildings	2.00	0.50

Source: Caltrans 2013b

Vibration can be measured in terms of acceleration, velocity, or displacement. The most common practice is to measure vibration in terms of peak particle velocities (inches per second). There are standards relating to perception of vibration as well as damage to structures, both of which are defined in terms of peak particle velocities.

Human and structural response to different levels of vibration is influenced by several factors, such as ground type, distance between the source and the receptor, duration of vibration, and the number of perceived vibration events. The vibration levels normally required to result in damage to structures, as recommended by Caltrans, are outlined in Table 8-2. The vibration levels are measured in peak particle velocity (PPV, in inches per second). The table indicates that the threshold for architectural damage to most newer structures from frequent or continuous vibration is 0.50 in/sec PPV, while continuous vibrations of approximately 0.30 in/sec PPV could cause damage to older residences and continuous vibrations of approximately 0.25 in/sec PPV could cause damage to historic buildings.

Land Uses in the Project Vicinity

Castilleja School is bounded by Embarcadero Road, Bryant Street, Kellogg Avenue, and Emerson Street. As described in Chapter 3, Project Description, the project site is fully developed with Castilleja School facilities, including four academic buildings, an outdoor pool, a grassy area, a soccer/baseball field, a small maintenance building, and surface parking lots. Two small residential structures are also located on site; one is used as rental housing and the other is used for school events. Properties surrounding the project site support single-family dwelling units.

Existing Noise Environment in the Project Vicinity

To quantify the existing noise environment in the project vicinity, Charles M. Salter Associates conducted two continuous long-term noise measurements between September 23 and September 27, 2016. One of the monitors was placed along Emerson Street and one was placed along Kellogg Avenue. The measurements are summarized in Table 8-3; they reflect the typical range of noise levels in the project vicinity during weekdays and weekends, and during a special event at Castilleja School. The noise levels identified in Table 8-3 indicate the general noise exposure in the project area; however, noise levels at specific locations will vary depending on proximity to roads and other noise sources.

Table 8-3
Existing Noise Measurements

Site	Location	Measured Noise Level (dB)	
		DNL	*Weekday Hourly Ambient Noise Levels*
L1	Emerson Street, approximately 30 feet northeast of centerline	58-60	46-56
L2	Kellogg Avenue, approximately 30 feet northwest of centerline	56-62	45-51

Source: Appendix F

8.2 REGULATORY FRAMEWORK

Federal Regulations

As required by the Noise Control Act of 1972, the EPA established guidelines regarding noise levels identified as a requisite to protect public health and welfare related to noise in its document entitled "Information on Levels of Environmental Noise Requisite to Protect Public Health and Welfare with an Adequate Margin of Safety." This document notes that the guidance provided therein was based on the best available information at the time, and that more investigations and analysis was needed. Additional research has been conducted since that document was prepared. Current guidance from the National Institutes of Health (NIH) provides that "sounds of less than 75 decibels, even after long exposure, are unlikely to cause hearing loss. However, long or repeated exposure to sounds at or above 85 decibels can cause hearing loss" (NIH 2016).

In order to determine a significant increase in noise exposure from the existing conditions to existing plus project condition or cumulative to cumulative plus project, the values in Table 8-4 are used as recommendations based on studies by the Federal Interagency Committee on Noise (FICON). The FICON studies assessed the annoyance effects of changes in ambient noise levels resulting from aircraft operations. The 2000 FICON findings provide some guidance as to the significance of changes in ambient noise levels due to transportation noise sources. The FICON recommendations are based on studies that relate aircraft and traffic noise levels to the percentage of persons highly annoyed by the noise. Annoyance is a summary measure of the general adverse reaction of people to noise that interferes with speech and conversation, sleep, or the desire for a tranquil environment.

The rationale for the FICON recommendations is that it is possible to consistently describe the annoyance of people exposed to transportation noise in terms of L_{dn}. The changes in noise exposure relative to existing noise levels, as shown in Table 8-4, are considered to be changes that are sufficient to cause annoyance and potentially to interfere with normal activities at sensitive land uses. Although the FICON recommendations were specifically developed to address aircraft noise impacts, they are used in this analysis for traffic noise described in terms of L_{dn}.

As shown in Table 8-4, when a new noise source similar to the existing noise sources generates an increase in noise of 5 dBA or more, the increase would be noticeable where the ambient level is less than 60 dBA. Where the ambient level is between 60 and 65 dBA, an increase in noise of 3 dBA or more would be noticeable, and an increase of 1.5 dBA or more would be noticeable where the ambient noise level exceeds 65 dBA L_{dn}. The rationale for the criteria shown in Table 8-4 is that, as ambient noise levels increase, a smaller increase in noise resulting from a project would be noticeable.

Table 8-4
Measures of Substantial Increase for Transportation Noise Exposure

Ambient Noise Level Without Project	Significant Impact Occurs if the Project Increases Ambient Noise Levels by:
<60 dBA	+ 5 dBA or more
<60–65 dBA	+ 3 dBA or more
>65 dBA	+ 1.5 dBA or more

Source: FICON 2000

State Regulations

Sections 46000 through 46080 of the California Health and Safety Code, known as the California Noise Control Act of 1973, declares that excessive noise is a serious hazard to the public health and welfare and that exposure to certain levels of noise can result in physiological, psychological, and economic damage. It also identifies a continuous and increasing bombardment of noise in the urban, suburban, and rural areas. The California Noise Control Act declares that the State of California has a responsibility to protect the health and welfare of its citizens by the control, prevention, and abatement of noise. It is the policy of the state to provide an environment for all Californians free from noise that jeopardizes their health or welfare.

Local Regulations

City of Palo Alto Comprehensive Plan

Chapter 4, Natural Environment, of the City of Palo Alto's (City) Comprehensive Plan identifies acceptable noise levels for various land uses. The Comprehensive Plan defines noise levels that are normally acceptable, conditionally acceptable, and unacceptable based on the day-night noise level (L_{dn}) and the Community Noise Equivalent Level (CNEL). The City establishes L_{dn} 60 dB as the upper end of the noise level range considered normally acceptable for residential land uses. When exterior noise levels are in the conditionally acceptable range, which is between L_{dn} 60 dB and L_{dn} 75 dB for residential land uses, the Comprehensive Plan requires preparation of a detailed analysis of the noise reduction methods, and requires that needed noise insulation features be included in the design of the project (City of Palo Alto 2017). Relevant policies of the Comprehensive Plan include:

Policy N-6.1 Encourage the location of land uses in areas with compatible noise environments. Use the guidelines in Table N-1 to evaluate the compatibility of proposed land uses with existing noise environments when preparing, revising, or reviewing development proposals. Acceptable exterior, interior and ways to discern noise exposure include:

- The guideline for maximum outdoor noise levels in residential areas is an Ldn of 60 dB. This level is a guideline for the design and location of future development and a goal for the reduction of noise in existing development. However, 60 Ldn is a guideline which cannot necessarily be reached in all residential areas within the constraints of economic or aesthetic feasibility. This guideline will be primarily applied where outdoor use is a major consideration (e.g., backyards in single-family housing developments, and recreational areas in multiple family housing projects). Where the City determines that providing an Ldn of 60 dB or lower outdoors is not feasible, the noise level in outdoor areas intended for recreational use should be reduced to as close to the standard as feasible through project design.

- Interior noise, per the requirements of the State of California Building Standards Code (Title 24) and Noise Insulation Standards (Title 25), must not exceed an Ldn of 45 dB in all habitable rooms of all new dwelling units.

Policy N-6.3 Protect the overall community and especially sensitive noise receptors, including schools, hospitals, convalescent homes, senior and child care facilities and public conservation land from unacceptable noise levels from both existing and future noise sources, including construction noise.

Policy N-6.7 While a proposed project is in the development review process, the noise impact of the project on existing residential land uses, public open spaces and public conservation land should be evaluated in terms of the increase in existing noise levels for the potential for adverse community impact, regardless of existing background noise levels. If an area is below the applicable maximum noise guideline, an increase in noise up to the maximum should not necessarily be allowed.

Policy N-6.11 Continue to prioritize construction noise limits around sensitive receptors, including through limiting construction hours and individual and cumulative noise from construction equipment.

City of Palo Alto Municipal Code

Title 9, Chapter 9.10, Noise, of the City of Palo Alto Municipal Code addresses limits on noise levels caused by stationary noise sources and construction on adjacent residential properties. In addition, Title 9, Chapter 9.12, Loudspeakers, is applicable to the proposed use of loudspeakers at the Castilleja School pool. The portions of the Municipal Code applicable to the analysis of the proposed project's potential noise impacts are as follows:

<u>9.10.010 Declaration of policy.</u>

It is hereby declared to be the policy of the city that the peace, health, safety and welfare of the citizens of Palo Alto require protection from excessive, unnecessary and unreasonable noises from any and all sources in the community. It is the intention of the city council to control the adverse effect of such noise sources on the citizen under any condition of use, especially those conditions of use which have the most severe impact upon any person.

<u>9.10.020 Definitions:</u>

(c) "Noise level" means the maximum continuous sound level or repetitive peak sound level, produced by a source or group of sources as measured with a precision sound level meter. In order to measure a noise level, the controls of the precision sound level meter should be arranged to the setting appropriate to the type of noise being measured.

(d) “Local ambient” means the lowest sound level repeating itself during a six-minute period as measured with a precision sound level meter, using slow response and “A” weighting. The minimum sound level shall be determined with the noise source at issue silent, and in the same location as the measurement of the noise level of the source or sources at issue. However, for purposes of this chapter, in no case shall the local ambient be considered or determined to be less than: (1) Thirty dBA for interior noise in Section 9.10.030(b); (2) Forty dBA in all other sections. If a significant portion of the local ambient is produced by one or more individual identifiable sources which would otherwise be operating continuously during the six-minute measurement period and contributing significantly to the ambient sound level, determination of the local ambient shall be accomplished with these separate identifiable noise sources silent.

9.10.030 Residential property noise limits.

(a) No person shall produce, suffer or allow to be produced by any machine, animal or device, or any combination of same, on residential property, a noise level more than six dB above the local ambient at any point outside of the property plane.

9.10.060 Special Provisions:

The special exceptions listed in this section shall apply, notwithstanding the provisions of Sections 9.10.030 through 9.10.050. Said exceptions shall apply only to the extent and during the hours specified in each of the following enumerated exceptions. Exceptions d through g and j through l are not applicable to this analysis.

(a) General Daytime Exception. Any noise source which does not produce a noise level exceeding seventy dBA at a distance of twenty-five feet under its most noisy condition of use shall be exempt from the provisions of Sections 9.10.030(a), 9.10.040, and 9.10.050(a) between the hours of eight a.m. and eight p.m. Monday through Friday, nine a.m. and eight p.m. on Saturday, except Sundays and holidays, when the exemption herein shall apply between ten a.m. and six p.m.

(b) Construction. Except for construction on residential property as described in subsection (c) of this section, construction, alteration, and repair activities which are authorized by valid city building permit shall be prohibited on Sundays and holidays and shall be prohibited except between the hours of eight a.m. and six p.m. Monday through Friday, [and] nine a.m. and six p.m. on Saturday provided that the construction, demolition, or repair activities during those hours meet the following standards:

1. No individual piece of equipment shall produce a noise level exceeding one hundred ten dBA at a distance of twenty-five feet. If the device is housed within a structure on the property, the measurement shall be made outside the structure at a distance as close to twenty-five feet from the equipment as possible.

2. The noise level at any point outside of the property plane of the project shall not exceed one hundred ten dBA.
3. The holder of a valid construction permit for a construction project in a non-residential zone shall post a sign at all entrances to the construction site upon commencement of construction for the purpose of informing all contractors and subcontractors, their employees, agents, material [personnel], and all other persons at the construction site, of the basic requirements of this chapter.

(c) Construction on Residential Property. Construction, alteration, demolition or repair activities conducted in a residential zone, authorized by valid city building permit, shall be prohibited on Sundays and holidays and is prohibited on all other days except during the hours of eight a.m. and six p.m. Monday through Friday, nine a.m. and six p.m. on Saturday, provided that the construction, demolition or repair activities during those hours meet the following standards:

(1) No individual piece of equipment shall produce a noise level exceeding one hundred ten dBA at a distance of twenty-five feet. If the device is housed within a structure on the property, the measurement shall be made outside the structure at a distance as close to twenty-five feet from the equipment as possible.

(2) The noise level at any point outside of the property plane of the project shall not exceed one hundred ten dBA.

(3) The holder of a valid building permit for a construction project located within any residential zone shall post a sign at all entrances to the construction site upon commencement of construction, for the purpose of informing all contractors and subcontractors, their employees, agents, materialmen and all other persons at the construction site, of the basic requirements of this chapter.

(h) Refuse Collection. Refuse collection activities shall be permitted between the hours of four a.m. and nine p.m. daily, provided they do not produce a noise level in excess of ninety-five dBA measured at a distance of twenty-five feet from the activity.

9.12.010 Open air loudspeakers.

The use of electronic equipment, including but not limited to amplifiers, radio loudspeakers, phonographs, tape amplifiers, electronically operated musical instruments or other device of like design used for producing sound in or upon any public street, park or grounds, or any other open area to which the public has access, whether publicly or privately owned, between the hours of eleven p.m. and one hour after sunrise is unlawful.

8.3 PROJECT IMPACTS

Methods of Analysis

The following assessment of the project's potential noise impacts is based on the technical analysis provided in the Environmental Noise Study (Appendix F). The analysis documents the existing noise environment in the project vicinity and calculates the increases in noise levels that are likely to be created by activities at Castilleja School after implementation of the proposed project. The determination of whether the project would expose neighbors to excessive noise levels or would generate a substantial increase in noise levels reflects consideration of the standards established in the Palo Alto Comprehensive Plan, Palo Alto Municipal Code, and the Palo Alto Environmental Criteria (Significance Thresholds) (Palo Alto 2007).

Significance Criteria

The following significance criteria are based on Appendix G of the California Environmental Quality Act (CEQA) Guidelines. As evaluated in this chapter, impacts associated with noise would be significant if the proposed project would result in any of the following:

- Exposure of persons to or generation of noise levels in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies.
- A substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project.
- A substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project.
- Exposure of persons to or generation of excessive ground borne vibrations or groundborne noise levels.

In addition, as noted in the City's published *Environmental Criteria Used by the City of Palo Alto*, which was published in 2007. for the proposed project's temporary construction noise, the City considers construction activities resulting in a 10 dB increase in average noise levels above ambient conditions to be a temporary and substantial increase in noise levels, provided this increase occurs for two or more hours a day, five days a week, for more than 12 months. A 10 dB increase above existing ambient conditions is typically perceived as a "doubling" of loudness, which in limited doses is not considered substantial. Prolonged exposure to project-specific construction noise levels that are twice as loud as the ambient environmental level in which the receiver is accustomed to, however, would be considered substantial, even if such noise levels occur on a temporary basis.

The Noise section of CEQA Guidelines Appendix G also identifies two significance criteria that requires consideration of whether a project would expose people to excessive noise levels associated with public or private airports or airstrips. As identified in the NOP for this EIR and Chapter 2, Introduction, there are no airports or airstrips in the project vicinity that expose the project site to substantial aircraft related noise and this issue is not discussed further.

Impact Analysis

IMPACT 8-1:	Expose people to or generate noise levels in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies; or create a substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project.
SIGNIFICANCE:	Potentially Significant
MITIGATION MEASURES:	Mitigation Measures 4a and 8a
SIGNIFICANCE AFTER MITIGATION:	Less than Significant

The project site and all adjacent parcels are zoned for residential use but allow for other uses, such as private schools, with approval of a Conditional Use Permit. The Comprehensive Plan defines the normally acceptable noise level for residential areas as 60 dB and the conditionally acceptable noise level as 75 dB. As shown in Table 8-3, the existing noise levels along Emerson Street range from 58 to 60 dB while noise levels along Kellogg Avenue range between 56 and 62 dB. The Environmental Noise Study (Appendix F) found that the activities within the project site that would generate the highest noise levels are special events occurring within the main Circle, such as the school's annual Gator Gathering, and water polo games and swim meets in the pool.

Special Events

With implementation of the proposed development, the southern boundary of the Circle would be surrounded by the new Classroom building which would serve to attenuate noise that could reach residences along Kellogg Avenue. Similarly the new Classroom building would provide noise attenuation for residences on Bryant Street nearest to Kellogg Avenue. There are no proposed features that would provide substantial noise attenuation to the west, thus residences along Emerson Street could be exposed to excessive noise levels.

The proposed project would demolish the existing outdoor pool and construct a new one closer to Emerson Street. The project proposes to place the pool at an elevation 15 feet below the existing ground level and to construct a noise attenuation barrier (sound wall) between the pool and the sidewalk on the eastern side of Emerson Street. Table 8-5 identifies the average and highest noise levels expected at adjacent residential properties due to special events within the Circle and due to swim meets and water polo games at the pool under existing and proposed conditions.

Table 8-5
Special Event Noise Levels at Adjacent Residential Properties (dB)

Location	Main Circle				Pool			
	Average		Highest		Average		Highest	
	Existing	Proposed	Existing	Proposed	Existing	Proposed	Existing	Proposed
1215 Emerson Street	43	42	51	50	<40	42	49	50
1260 Emerson Street	43	43	51	51	<40	46	50	54
1300 Emerson Street	46	57	54	65	42	47	54	59
1326 Emerson Street	61	58	69	66	59	47	71	55
1360 Emerson Street	48	44	56	52	44	41	54	52
230 Kellogg Avenue	46	46	54	54	46	<40	58	46
256 Kellogg Avenue	47	47	55	55	<40	<40	48	44

Source: Appendix F
Notes: Green shaded cells indicate a noise level increase from existing to proposed conditions.

Noise levels associated with special events in the Circle and at the pool would remain below 70 dBA at a distance of 25 feet, thus Municipal Code Section 9.10.060(a) exempts the noise associated with special events during daytime hours (between 8 a.m. and 8 p.m. Monday through Friday, and between 9 a.m. and 8 p.m. on Saturdays) from the provisions of Municipal Code Sections 9.10.030(a), 9.10.040, and 9.10.050(a). Mitigation Measure 4a, as identified in Chapter 4, Land Use, prohibits special events on campus on Sundays and requires that all athletic competitions occur only Monday through Friday and end by 8 p.m. It also defines the maximum number and size of special events that would be held on campus each year. Compliance with Mitigation Measure 4a would ensure that noise levels from outdoor special events are consistent with the Municipal Code.

The existing maximum noise levels associated with special events in the Circle and the pool exceed 60 dB at one location on Emerson Street – specifically 1326 Emerson Street currently experiences average noise levels from Circle events of 61 dB and maximum noise levels of 69 dB; these noise levels would be reduced by 3 dB as a result of the proposed project. This residence also experiences noise levels from pool events that can reach a maximum of 71 dB, this would be reduced to 55 dB as a result of the project.

Additionally, as shown in Table 8-3, the hourly ambient noise levels in the project vicinity currently range from 46 to 56 dB along Emerson Street and from 45 to 51 dB along Kellogg Avenue. Because the proposed project is not residential, the project would be required to meet the operational noise limits outlined in Municipal Code Section 9.10.040, which states that no person shall produce, suffer, or allow to be produced by any machine, animal, or device, or any combination of same, a noise level exceeding 8 dB above the ambient noise conditions in the area. For most of the receptor locations studied, the noise from daytime special events would not exceed 8 dB above the existing noise levels. The average noise levels at the residence at 1300 Emerson Street during events on the main Circle are expected to be 57 dB while the highest noise levels associated with special events are expected to be 65 dB. This could be more than 8 dB above ambient noise conditions depending on the background traffic noise levels at the time of the event, thus the project would have a **potentially significant** impact. However, because these noise levels would occur during special events and because the noise level would remain below 70 dB, compliance with Mitigation Measure 4a, as described in Chapter 4, Land Use, which restricts the time and days of special events, would ensure that the project complies with Municipal Code Section 9.10.060. Therefore, this impact would be **less than significant** with mitigation.

The noise levels for Circle events shown in Table 8-5 were based on measured noise levels during the Gator Gathering in September 2016, which included amplified music while the noise levels for pool events are based on measured noise levels during a varsity water polo game in October 2016 that did not include the use of amplified sound. Loudspeakers used during pool events could increase the average and maximum noise levels associated with these events. As shown in the Special Events Description in Table 4-2 (Chapter 4, Land Use and Planning) and in Appendix B, it is expected that there would be three swim meets at Castilleja School each year, all would occur on weekdays and end no later than 8 pm. Water polo games would also be held at the school several times during the water polo season, also all on weekdays and ending no later than 8 pm. The specific type and model of loudspeakers that would be installed at the pool has not been determined so detailed modeling cannot be completed. Depending on the speaker volume, position, and direction, it is possible that use of amplified sound at the pool could create noise levels that would exceed the Municipal Code and Comprehensive Plan limits. Thus, the project is considered to have a **potentially significant** impact. Mitigation Measure 8a requires that Castilleja School retain a qualified acoustical consultant to prepare an assessment of the average and maximum noise levels that could be generated by the amplified sound equipment at the pool, and provide site-specific recommendations for speaker positions and directions and the maximum equipment volume settings to ensure that sound levels remain below 70 dB at a distance of 25 feet from the property boundary. With implementation of Mitigation Measure 8a, the noise levels generated within the project site for special events would comply with the Municipal Code and Comprehensive Plan and the impact would be reduced to a **less-than-significant** level.

Trucks, Loading, and Buses

Currently, trash pick-up, delivery activities, and bus pick-up and drop-off occur on Kellogg Avenue in the vehicle pull-out area along the Arrillaga Family Campus Center building. The proposed project would relocate all bus pick-up and drop-off to the below-grade parking garage which would remove this noise source from the neighborhood. The proposed project would relocate trash pick-up and deliveries to a below-grade loading area accessed from Emerson Street. A solid gate would be installed between the loading area and Emerson Street. The Environmental Noise Study found that noise levels associated with trash pick-up and delivery for all of the receptors identified in Tables 8-2 and 8-4 would range from under 40 dB to 52 dB (the residence at 1326 Emerson Street is expected to experience the loudest noise level at 52 dB). These levels are well-below the Comprehensive Plan normally acceptable noise level for residential properties of 60 dB. Thus the project's impact associated with truck activity noise levels relative to the Comprehensive Plan standards would be **less than significant.**

Daily Operations

The project site and all adjacent parcels are zoned for residential use. The Comprehensive Plan defines the normally acceptable noise level for residential properties as 60 dB. As shown in Table 8-3, the existing noise levels along Emerson Street range from 58 to 60 dB while noise levels along Kellogg Avenue range between 56 and 62 dB. As outlined in the City of Palo Alto's Comprehensive Plan EIR, the City would consider this project to have a significant impact on permanent noise levels if:

- The project would cause the L_{dn} to increase by 3.0 dB or more in an existing residential area, thereby causing the L_{dn} in the area to exceed 60 dB.
- The project would cause an increase of 3.0 dB or more in an existing residential area where the L_{dn} currently exceeds 60 dB.

The Palo Alto Municipal Code establishes a maximum allowable noise increase of 8 dB above the ambient noise levels for commercial land uses. With hourly noise levels between 46 dB and 56 dB along Emerson Street, noise levels between 54 and 64 dB could create a significant impact, depending on location. The sources of permanent noise exposure associated with the project are vehicle traffic accessing the project site, and the noise from students on campus. The proposed increase in the number of students at the campus would not alter the general operational activities of the school. Most student activities occur within the campus buildings and do not substantially contribute to the ambient noise environment in the vicinity. Further, by relocating drop-off and pick-up to the parking garage, the noise associated with students arriving at and departing campus would occur within the interior of the campus, the pedestrian tunnel to the garage, and the garage itself. This would reduce the peak noise levels at adjacent residences during drop-off and pick-up periods.

As discussed in Impact 7-1 in Chapter 7, Transportation, the project would alter the pattern of trip distribution within the neighborhood. Table 7-7 shows that traffic volumes on several roadway segments would be reduced, which would slightly lessen noise levels along those segments. The anticipated increase in traffic volumes on road segments include the following:

- 281 new daily vehicle trips on Waverly Street between Embarcadero Road and Churchill Avenue, compared to existing traffic volumes of more than 3,000 vehicles;
- 162 new daily vehicle trips on Bryant Street between Lincoln Avenue and Embarcadero Road and on Lincoln Avenue between Bryant Street and Alma Street, compared to existing traffic volumes between 2,088 and 2,574 vehicles;
- 679 new daily vehicle trips on Emerson Street between Melville Avenue and Embarcadero Road, compared to an existing traffic volume of 842 vehicles;
- 266 new daily vehicle trips on Churchill Avenue between Waverly Street and Bryant Street, compared to an existing traffic volume of 2,448 vehicles and 74 new daily vehicle trips on Churchill Avenue between Bryant Street and Emerson Street, compared to an existing traffic volume of 2,692 vehicles;
- 95 new daily vehicle trips on Alma Street between Kellogg Avenue and Churchill Avenue, compared to an existing traffic volume of 25,553 vehicles; and
- 347 new daily vehicle trips on Kingsley Avenue between High Street and Alma Street, compared to an existing traffic volume of 2,170 vehicles.

Vehicle noise emissions increase with speed, and increased traffic volumes increase traffic noise, but it takes a doubling of traffic to increase noise levels by3 dB (Caltrans 2009). As shown in Table 7-7 and summarized above, the project would not result in a doubling of traffic volumes on any of the roadway segments in the project area and thus none of the roadway segments would substantial increase in traffic noise levels. Thus, the project would result in a **less than significant** impact associated with permanent increases in noise levels in the project vicinity.

IMPACT 8-2:	Create a substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the proposed project.
SIGNIFICANCE:	Potentially Significant
MITIGATION MEASURES:	Mitigation Measures 4a, 8a and 8b
SIGNIFICANCE AFTER MITIGATION:	Less than Significant

Construction Noise

During project construction, heavy equipment would be used for demolition, excavation, grading, paving, and building construction, which would temporarily increase ambient noise levels in the vicinity. Standard construction equipment, such as excavators, graders, backhoes, loaders, and trucks, would be used for this work.

Construction noise and vibration are temporary phenomena. Construction noise and vibration levels vary from hour-to-hour and day-to-day, depending on the equipment in use, the operations being performed, and the distance between the source and receptor. Noise exposure at any single point outside the project site would also vary depending on the proximity of construction activities to that point. In other words, the neighbors exposed to the greatest noise levels during construction of the proposed parking garage, which is located in the northwestern portion of the project site, would be the neighbors along Emerson Street near Melville Avenue. In contrast, the neighbors along Bryant Street and Kellogg Avenue would experience the greatest construction-related noise levels during construction of the new Academic building. The distance between the closest construction boundary and residences across Emerson Street is approximately 80 feet; residences across Bryant Street are at a distance of approximately 100 feet from the closest construction boundary; residences across Kellogg Street are at a distance of approximately 95 feet from the closest construction boundary; and, residences across Embarcadero Street are 85 feet from the closest construction boundary.

Equipment operates in alternating cycles of full power and low power. This produces noise levels that are less than the maximum level that would occur if equipment is run continuously at full power. The typical noise levels for various pieces of construction equipment at a distance of 50 feet are presented in Table 8-6. For example, measured backhoe maximum sound levels are 78 dBA at a distance of 50 feet.

Table 8-6
Typical Construction Equipment Noise Emission Levels and Usage Factors

Equipment Description	Impact Device?	Acoustical Use Factor (%)	Spec 721.560 L_{max} @ 50ft (dBA, slow)	Actual Measured L_{max} @50ft (dBA, slow) samples averaged
All Other Equipment > 5 HP	No	50	85	N/A
Auger Drill Rig	No	20	85	84
Backhoe	No	40	80	78
Bar Bender	No	20	80	N/A
Compressor (air)	No	40	80	78
Concrete Pump Truck	No	20	82	81
Crane	No	16	85	81
Dozer	No	40	85	82
Dump Truck	No	40	84	76
Excavator	No	40	85	81
Flat Bed Truck	No	40	84	74
Front End Loader	No	40	80	79
Generator	No	50	82	81
Generator (<25KVA, VMS signs)	No	50	70	73
Hydra Break Ram	Yes	10	90	N/A
Man Lift	No	20	85	75
Pickup Truck	No	40	55	75
Pneumatic Tools	No	50	85	85
Pumps	No	50	77	81
Roller	No	20	85	80
Sand Blasting (Single Nozzle)	No	20	85	96
Scraper	No	40	85	84
Tractor	No	40	84	N/A
Welder / Torch	No	40	73	74

Source: DOT 2006

To convert the maximum noise level (L_{max}) to an average noise level (L_{eq}) occurring during construction for any piece of equipment in Table 8-6, the following formula may be used (DOT 2006):

$$L_{eq} = L_{max} + 10 \log (U.F.)$$

Where: L_{max}. is the maximum noise emission level reported in Table 8.6
U.F. is the acoustical Use Factor reported in Table 8.6.

For example, a dozer with measured L_{max} of 82 dBA and a use factor of 40% would produce average noise (L_{eq}) of 78 dBA at 50 feet during construction. An auger drill rig with measured L_{max} of 82 dBA and a use factor of 20% would produce average noise (L_{eq}) of 75 dBA at 50 feet during construction. Pneumatic tools with measured L_{max} of 85 dBA and a use factor of 50% would produce average noise (L_{eq}) of 82 dBA at 50 feet during construction.

As shown in Section 8.2, the Palo Alto Municipal Code identifies time and day restrictions for construction within a residential zone, specifically prohibiting construction on Sundays and holidays and limiting construction hours on other days to the hours between 8:00 a.m. and 6:00 p.m. during the week and between 9:00 a.m. and 6:00 p.m. on Saturdays. The code also establishes maximum noise levels for construction through limiting each individual piece of equipment to no more than 110 dBA (L_{max}) at a distance of 25 feet and through limiting the total noise level at any point outside the property plane to 110 dBA (L_{max}).

As shown in Table 8-6, the highest typical noise level from an individual piece of equipment is 96 dB at 50 feet (this noise level is associated with sand blasting using a single nozzle). As noted in Section 8.1, a general rule of thumb is that the noise produced by a stationary source would reduce by 6 dB when the distance from the source is doubled. Thus, the noise level from sand blasting at 25 feet from the source would be expected to be 102 dB. This would comply with the City's requirements for individual equipment.

The specific mix of construction equipment for each phase of the proposed development is not known at this time. It is possible that the equipment proposed to be used in a given phase could have the ability to generate noise at the Castilleja School property boundary that exceeds 110 dBA. Thus the project would result in a **potentially significant** noise impact. Mitigation Measure 8b would reduce this to a **less-than-significant** impact by requiring for each construction phase that Castilleja School submit to the City an inventory and schedule of the construction equipment proposed to be used during that phase, a technical analysis of the noise levels that could be generated during construction, and recommended measures to ensure that noise levels during construction meet the City's standards. This analysis must include and be based on the specific construction equipment that would be used in that construction phase, including the schedule of use and location for each piece.

In addition, the City considers construction activities resulting in a 10 dB increase in noise levels above ambient conditions to be a temporary and substantial increase in noise levels, provided this increase occurs for two or more hours a day, five days a week, for more than 12 months (i.e. on a long-term basis during temporary construction). Actual construction noise levels would depend upon the construction equipment in simultaneous use at any point in the construction process, and the location of each piece of equipment relative to the individual noise receiver. A construction equipment list by phase has not been developed at this point. However, under general assessment guidelines for construction noise (DOT 2006), average noise levels from a given construction phase can be assessed based upon the two noisiest pieces of equipment likely to be used. Pneumatic tools (L_{max} of 85 dBA at 50 feet), and a dozer (L_{max} of 85 dBA at 50 feet) are the two loudest pieces of equipment in Table 8-6 which are likely both to be used at any point during the project construction. As calculated previously, a dozer has an L_{eq} of 78 dBA at 50 feet, as do pneumatic tools. The combined noise level from this equipment would be 81 dBA L_{eq} at 50 feet. Using the outdoor attenuation rate for point noise sources of 6 dBA with each doubling of the distance from source to receiver, and the distance from the closest construction boundary to the adjacent residence, average noise levels at the closest residence across each street from the project site were calculated. These average noise levels would represent construction activity occurring immediately adjacent to the construction zone boundary, construction located internal to the site (and further from the boundary) would generate lower noise levels at the adjacent residences. Average noise level values at adjacent residences for construction occurring along the construction zone boundary adjacent to a given street are presented in Table 8-7.

Table 8-7
Average Construction Noise Levels at Adjacent Residences

Street	Ambient (Daytime Hourly L_{eq})	Contruction Noise Leq dBA
Embarcadero Road	66 [a]	76
Bryant Street	56 [b]	75
Kellogg Avenue	51 [c]	75
Emerson Street	56 [d]	77

Notes:
[a] Palo Alto Comprehensive Plan EIR 2017
[b] Estimated from Emerson value
[c] Appendix F

Table 8-7 reveals average construction noise levels at sensitive receivers greater than 10 dBA above ambient, which is considered a **potentially significant** temporary noise impact. Specifically, it is estimated that construction activity during allowed hours would increase ambient noise by up to 21 dBA L_{eq} at nearby noise-sensitive receptors. Mitigation Measure 8b requires Castilleja School submit to the City an inventory and schedule of the construction equipment proposed to be used during each construction phase, a technical analysis of the noise levels that could be generated during that construction phase, and measures to ensure that noise levels during construction meet the City's standards.

Implementation of Mitigation Measure 8b would reduce noise levels from construction activity through the provision of various noise controls as included in the required construction noise control plan for each construction phase. Available noise control measures include the use of manufacturer-certified mufflers associated with construction equipment, which has been shown to reduce noise levels by 8 to 10 dBA L_{eq} (DOT 2006). The placement of stationary noise equipment at locations at least 150 feet from construction zone boundaries, or the use of individual barriers around such stationary equipment, which can reduce average noise levels by 6 to 8 dBA L_{eq} (DOT 2006). Finally, the erection of a solid temporary barrier along the construction boundary between the construction area and the closest off-site receivers has the potential to reduce noise levels an additional 8 to 10 dBA L_{eq} (DOT 2006). Therefore, a combination of available measures, included in a required noise control plan, would be sufficient to reduce ambient noise increases during construction from 21 dBA L_{eq} by at least 12 dBA L_{eq} dBA such that an increase in 10 dBA or greater in hourly noise levels above ambient conditions would not occur for two or more hours per day, five days per week, for a period of 12 months or more. The above mitigation would reduce construction noise to the extent feasible, and resultant noise levels from construction activity after mitigation would not exceed the City' maximum allowable level of 110 dBA at any point outside of the project site (Municipal Code Section 9.10.060). Therefore, this impact would be **less than significant** with mitigation incorporated.

Special Event Noise

As discussed in Impact 8-1, the proposed project would alter the noise levels at nearby residences associated with special events at the Circle and pool. In some locations, the average and maximum noise levels would increase, while in other locations the noise levels would decrease. As discussed in Impact 8-1, noise levels associated with special events in the Circle and at the pool would remain below 70 dBA at a distance of 25 feet. Municipal Code Section 9.10.060(a) exempts the noise associated with special events during daytime hours (between 8 a.m. and 8 p.m. Monday through Friday, and between 9 a.m. and 8 p.m. on Saturdays) from the provisions of Municipal Code Sections 9.10.030(a), 9.10.040, and 9.10.050(a). Mitigation Measure 4a, as identified in Chapter 4, Land Use, prohibits special events on Sundays, requires that all athletic competitions occur only Monday through Friday and end by 8 p.m., and defines the maximum number and size of special events that would be held on campus each year. Compliance with Mitigation Measure 4b would ensure that noise levels from outdoor special events are consistent with the Municipal Code and that the temporary noise increases associated with special events would result in a **less than significant** impact in relation to the ambient noise conditions in the project vicinity.

Additionally, the loudspeakers used at the outdoor pool could generate substantial periodic noise level increases, resulting in a **potentially significant** impact. Mitigation Measure 8a requires Castilleja School to submit additional noise level modeling and evaluation prior to installation of the loudspeakers to demonstrate compliance with the Municipal Code for increases in noise levels. Implementation of Mitigation Measure 8a and 8b would ensure that periodic increases in noise levels associated with special events at Castilleja School remains below the Municipal Code standards and would reduce the project's impact to a **less-than-significant** level.

IMPACT 8-3	Expose people to or generate excessive ground borne vibrations or ground borne noise levels.
SIGNIFICANCE:	Potentially Significant
MITIGATION MEASURES:	Mitigation Measure 6a
SIGNIFICANCE AFTER MITIGATION:	Less than Significant

As described under Impact 8-2, project construction would involve use of a variety of heavy equipment. The primary vibration-generating activities associated with the project would occur during grading, excavation, installation of utilities, and construction of parking lots. Sensitive receptors could be impacted by construction related vibrations, particularly those construction activities requiring vibratory compactors/rollers. Project construction would not involve the principal sources for vibration generation and complaints, which are pile driving and blasting. Construction vibration impacts could include cosmetic or minor structural damage if safe levels of vibration are exceeded. Table 8-8 shows the typical vibration levels produced by construction equipment, at distances of 25 feet and 100 feet.

Table 8-8

Vibration Levels for Varying Construction Equipment

Type of Equipment	Peak Particle Velocity @ 25 feet (inches/second)	Peak Particle Velocity @ 100 feet (inches/second)
Large Bulldozer	0.09	0.03
Loaded Trucks	0.08	0.03
Small Bulldozer	0.00	0.00
Auger/drill Rigs	0.09	0.03
Jackhammer	0.04	0.01
Vibratory Hammer	0.07	0.02
Vibratory Compactor/roller	0.21	0.07

Source: FTA 2006.

As shown in Table 8-8, the types of equipment anticipated to be used throughout project construction would have a maximum PPV of 0.21 inches per second at a distance of 25 feet. This is below the Caltrans vibration damage criteria outlined in Table 8-2, which shows that damage to historic buildings may occur when continuous vibrations exceed 0.25 in/sec PPV and damage to “older residential structures” may occur when continuous vibrations exceed 0.3 in/sec PPV. No construction equipment is predicted to cause vibrations exceeding 0.25 in/sec PPV at distances of 25 feet or greater. Therefore, none of the residential structures in the project vicinity, including the adjacent residence that has been identified as a historic resource (refer to Chapter 6, Cultural Resources), would be exposed to vibrations that could cause vibration damage. The onsite

Administration/Chapel building has also been identified as a historic resource. The existing Academic building, which is proposed for demolition, is located adjacent to the Administration/Chapel building. Thus there is a potential for vibration during demolition to adversely affect that building. Mitigation Measure 6a requires that a protection plan be implemented for the Administration/Chapel Theater building that documents the specific nature of demolition activities that would occur on any portion of the building that touches or is within 25 feet of the Administration/Chapel Theater building and provides recommendations for equipment usage and demolition techniques that will avoid adverse effects to the Administration/Chapel Theater building. With implementation of Mitigation Measure 6a, the project's impact associated with groundborne vibration and noise during construction would be reduced to a **less-than-significant** level.

After construction, the project would not include any operations that would result in groundborne vibration or noise that would be perceptible off site. Therefore, project operations would have **no impact** with respect to groundborne vibration and noise.

IMPACT 8-4	Expose people to noise levels that exceed established noise standards or generate a substantial permanent increase in ambient noise levels in cumulative plus project conditions.
SIGNIFICANCE:	No Impact
MITIGATION MEASURES:	None required
SIGNIFICANCE AFTER MITIGATION:	No Impact

As discussed in Chapter 4, Land Use, there are several recently approved or pending projects in the vicinity. The majority of these are located on single-family residential parcels and consist of modifications to or demolition and replacement of the existing dwelling units. After construction, the projects in the cumulative scenario are not expected to alter the ambient noise environment in the project vicinity. Thus there is no significant cumulative impact to which the project could contribute.

8.4 MITIGATION MEASURES

Mitigation Measure 4a is required as identified in Chapter 4, Land Use and Planning. Mitigation Measure 6a is required as identified in Chapter 6, Cultural Resources The following are also required:

Mitigation Measure 8a Prior to issuance of a building permit for the outdoor pool, Castilleja School shall submit to the City a technical analysis documenting the specific loudspeaker equipment proposed for use at the pool, the locations and positioning of speakers, and the likely noise levels for each of the receptor locations evaluated in the Environmental Noise Study for the proposed Castilleja School Conditional

Use Permit Amendment and Master Plan. The technical analysis shall demonstrate that use of the loudspeaker would not generate noise levels that are more than 6 dB greater than existing noise levels.

Mitigation Measure 8b Prior to issuance of demolition, grading and/or building permits for each construction phase, Castilleja School shall submit to the City a technical analysis of the noise levels that could be generated during construction and recommended measures to ensure that noise levels during construction meet the City's standards. This analysis must include and be based on a list of the construction equipment proposed to be used (including horsepower), a schedule for the use of each piece of equipment during that phase, and the general location where each piece of equipment would operate. Noise reduction measures may include modifying the equipment list, restrictions on the number of individual pieces of equipment that may be used at one time, modifying the location of individual pieces of equipment, providing shielding for individual pieces of equipment, use of temporary noise attenuation barriers, and/or other measures that are demonstrated to be sufficient to ensure that the maximum noise level at the property boundary would remain at or below 110 dB and increases in hourly noise levels at the property boundary would not exceed 10 dBA above the ambient noise level for two or more hours per day, more than five days per week, for a period of 12 months or more.

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CHAPTER 9
AIR QUALITY

This section defines existing air quality conditions, summarizes regulatory guidance and requirements for the consideration of air quality effects, evaluates the project's impacts on air quality and contribution to regional air quality conditions, and identifies mitigation measures related to implementation the proposed Castilleja School project.

In response to the Notice of Preparation for this Environmental Impact Report (EIR), the City received comments requesting analysis of the emissions of air pollutants during construction and generated by vehicle traffic and garage operations. The Notice of Preparation, Initial Study and comments received are provided in Appendix A.

9.1 EXISTING CONDITIONS

Air quality is affected by the rate, amount, and location of pollutant emissions and the associated meteorological conditions that influence pollutant movement and dispersal. Atmospheric conditions (for example, wind speed, wind direction, and air temperature) in combination with local surface topography (for example, geographic features such as mountains and valleys), determine how air pollutant emissions affect local air quality.

The proposed project is located in the City of Palo Alto, which lies within the San Francisco Bay Area Air Basin (SFBAAB) and is within the jurisdictional boundaries of the Bay Area Air Quality Management District (BAAQMD). Ambient air quality is generally affected by climatological conditions, the topography of the air basin, the type and amounts of pollutants emitted, and, for some pollutants, sunlight. The BAAQMD has the primary responsibility for ensuring that the SFBAAB attains and maintains compliance with federal and state ambient air quality standards. The BAAQMD regulates air quality through its permit authority over most types of stationary emissions sources and through its planning and review process.

Meteorology and Topography

The regional climate of the Bay Area is considered semiarid and is characterized by warm summers, mild winters, infrequent seasonal rainfall, moderate daytime onshore breezes, and moderate humidity. A wide range of emissions sources—such as dense population centers, heavy vehicular traffic, and industry—and meteorology influence the air quality in the Bay Area.

As described in the Palo Alto Comprehensive Plan EIR, the SFBAAB is "characterized by complex terrain, consisting of coastal mountain ranges, inland valleys, and bays" that affect wind flow patterns. Further "the climate is dominated by the strength and location of a semi-permanent, subtropical high-pressure cell. During the summer, the Pacific high-pressure cell is centered over the northeastern Pacific Ocean, resulting in stable meteorological conditions and a steady northwesterly wind flow. Upwelling of cold ocean water due to the northwesterly flow produces a band of cold water off the California coast. The cool and moisture-laden air approaching the coast from the Pacific Ocean is further cooled by the presence of the cold water band, resulting in condensation and the presence of fog and stratus clouds along the Northern California coast. In the winter, the Pacific high-pressure cell weakens and shifts southward, resulting in wind flow offshore, the absence of upwelling, and the occurrence of storms. Weak inversions coupled with moderate winds result in a low air pollution potential" (Palo Alto 2016).

Air pollutant emissions are typically generated by three sources: (1) stationary, (2) area-wide, and (3) mobile. Stationary sources occur at a particular location and are usually associated with large manufacturing and industrial facilities. Area-wide sources consist of many smaller point sources that are widely distributed spatially; examples include residential and commercial water heaters, painting/coating operations, power lawn mowers, agricultural operations, landfills, and the use of consumer products, such as barbeque lighter fluid, hair spray, and cleaning products. Mobile sources include on-road motor vehicles and other transportation sources like aircraft, ships, trains, and self-propelled construction equipment.

Pollutants and Effects

Criteria Air Pollutants

Criteria air pollutants are defined as pollutants for which the federal and state governments have established ambient air quality standards, or criteria, for outdoor concentrations to protect public health. The federal and state standards have been set, with an adequate margin of safety, at levels above which concentrations could be harmful to human health and welfare. Criteria air pollutants include ozone (O_3), nitrogen dioxide (NO_2), carbon monoxide (CO), sulfur dioxide (SO_2), particles less than 10 microns in diameter (PM_{10}), particles less than 2.5 microns in diameter ($PM_{2.5}$), and lead. In California, sulfates, vinyl chloride, hydrogen sulfide, and visibility-reducing particles are also regulated as criteria air pollutants. O_3, NO_2, CO, PM_{10}, and $PM_{2.5}$, as well as toxic air contaminants (TACs), are discussed in the following paragraphs.[1]

When monitoring indicates that a region regularly experiences air pollutant concentrations that exceed applicable limits, the region is designated as nonattainment and is required to develop an air quality plan that describes air pollution control strategies to be implemented to reduce air pollutant emissions and concentrations.

The SFBAAB is designated nonattainment for the federal 8-hour O_3 standard. The area is in attainment or unclassified for all other federal standards. The area is designated nonattainment for

[1] The descriptions of the criteria air pollutants and associated health effects are based on the U.S. Environmental Protection Agency's (EPA's) Criteria Air Pollutants (EPA 2016) and the California Air Resources Board's (CARB's) Glossary of Air Pollutant Terms (CARB 2016a).

state standards for 1-hour and 8-hour O_3, 24-hour PM_{10}, annual PM_{10}, and annual $PM_{2.5}$. To address the region's nonattainment status, BAAQMD adopted the *Bay Area 2005 Ozone Strategy* (BAAQMD 2006) and the *Bay Area 2010 Clean Air Plan* (BAAQMD 2010), which is an update to the 2005 document. Since the proposed project is consistent with the land use and zoning designations for the project site, it is consistent with the *Bay Area 2010 Clean Air Plan*.

Ozone

O_3 is a strong-smelling, pale blue, reactive, toxic chemical gas consisting of three oxygen atoms. It is a secondary pollutant formed in the atmosphere by a photochemical process involving the sun's energy and O_3 precursors. These precursors are mainly oxides of nitrogen (NO_x) and reactive organic gases (ROG, also termed volatile organic compounds [VOCs]). The maximum effects of precursor emissions on O_3 concentrations usually occur several hours after they are emitted and many miles from the source. Meteorology and terrain play major roles in O_3 formation, and ideal conditions occur during summer and early autumn on days with low wind speeds or stagnant air, warm temperatures, and cloudless skies. O_3 exists in the upper atmosphere O_3 layer (stratospheric ozone) and at the Earth's surface in the troposphere (ozone).[2] The O_3 that the U.S. Environmental Protection Agency (EPA) and the California Air Resources Board (CARB) regulate as a criteria air pollutant is produced close to the ground level, where people live, exercise, and breathe. Ground-level O_3 is a harmful air pollutant that causes numerous adverse health effects and is thus considered "bad" O_3. Stratospheric, or "good," O_3 occurs naturally in the upper atmosphere, where it reduces the amount of ultraviolet light (i.e., solar radiation) entering the Earth's atmosphere. Without the protection of the beneficial stratospheric O_3 layer, plant and animal life would be seriously harmed.

O_3 in the troposphere causes numerous adverse health effects; short-term exposures (lasting for a few hours) can result in breathing pattern changes, reduction of breathing capacity, increased susceptibility to infections, inflammation of the lung tissue, and some immunological changes (EPA 2013, CARB 2019a). These health problems are particularly acute in sensitive receptors such as the sick, the elderly, and young children.

Nitrogen Dioxide

NO_2[3] is a brownish, highly reactive gas that is present in all urban atmospheres. The major mechanism for the formation of NO_2 in the atmosphere is the oxidation of the primary air pollutant nitric oxide, which is a colorless, odorless gas. NO_x plays a major role, together with ROG, in the atmospheric reactions that produce O_3. NO_x is formed from fuel combustion under

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2 The troposphere is the layer of the Earth's atmosphere nearest to the surface of the Earth. The troposphere extends outward about 5 miles at the poles and about 10 miles at the equator.

3 In this section, the term NO_2 will be used with respect to the presence of nitrogen dioxide in the atmosphere. The term NO_x will be used to refer to the *emissions* of oxides of nitrogen from stationary and mobile sources, which are primarily in the form of nitric oxide (NO) and, to a lesser extent, NO_2.

high temperature or pressure. In addition, NO_x is an important precursor to acid rain and may affect both terrestrial and aquatic ecosystems. The two major emissions sources are transportation and stationary fuel combustion sources such as electric utility and industrial boilers. NO_2 can irritate the lungs and may potentially lower resistance to respiratory infections (EPA 2016).

Carbon Monoxide

CO is a colorless, odorless gas formed by the incomplete combustion of hydrocarbon, or fossil fuels. CO is emitted almost exclusively from motor vehicles, power plants, refineries, industrial boilers, ships, aircraft, and trains. In urban areas, automobile exhaust accounts for the majority of CO emissions. CO is a nonreactive air pollutant that dissipates relatively quickly; therefore, ambient CO concentrations generally follow the spatial and temporal distributions of vehicular traffic. CO concentrations are influenced by local meteorological conditions—primarily wind speed, topography, and atmospheric stability. CO from motor vehicle exhaust can become locally concentrated when surface-based temperature inversions are combined with calm atmospheric conditions, which is a typical situation at dusk in urban areas from November to February. The highest levels of CO typically occur during the colder months of the year, when inversion conditions are more frequent.

In terms of adverse health effects, CO competes with oxygen, often replacing it in the blood, reducing the blood's ability to transport oxygen to vital organs. The results of excess CO exposure can include dizziness, fatigue, and impairment of central nervous system functions.

Particulate Matter

Particulate matter pollution consists of very small liquid and solid particles floating in the air, which can include smoke, soot, dust, salts, acids, and metals. Particulate matter can form when gases emitted from industries and motor vehicles undergo chemical reactions in the atmosphere. $PM_{2.5}$ and PM_{10} represent fractions of particulate matter. Coarse particulate matter (PM_{10}) consists of particulate matter that is 10 microns or less in diameter and is about 1/7 the thickness of a human hair. Major sources of PM_{10} include crushing or grinding operations; dust stirred up by vehicles traveling on roads; wood-burning stoves and fireplaces; dust from construction, landfills, and agriculture; wildfires and brush/waste burning; industrial sources; windblown dust from open lands; and atmospheric chemical and photochemical reactions. Fine particulate matter ($PM_{2.5}$) consists of particulate matter that is 2.5 microns or less in diameter and is roughly 1/28 the diameter of a human hair. $PM_{2.5}$ results from fuel combustion (e.g., from motor vehicles and power generation and industrial facilities), residential fireplaces, and woodstoves. In addition, $PM_{2.5}$ can be formed in the atmosphere from gases such as sulfur oxides (SO_x), NO_x, and ROG.

$PM_{2.5}$ and PM_{10} pose a greater health risk than larger-size particles. When inhaled, these tiny particles can penetrate the human respiratory system's natural defenses and damage the respiratory tract. $PM_{2.5}$ and PM_{10} can increase the number and severity of asthma attacks, cause or aggravate bronchitis and other lung diseases, and reduce the body's ability to fight infections. Very small particles of substances such as lead, sulfates, and nitrates can cause lung damage directly or be absorbed into the blood stream, causing damage elsewhere in the body. Additionally, these substances can transport adsorbed gases such as chlorides or ammonium into the lungs, also causing injury. Whereas PM_{10} tends to collect in the upper portion of the respiratory system, $PM_{2.5}$ is so tiny that it can penetrate deeper into the lungs and damage lung tissue. Suspended particulates also damage and discolor surfaces on which they settle and produce haze and reduce regional visibility.

People with influenza, people with chronic respiratory and cardiovascular diseases, and the elderly may suffer worsening illness and premature death as a result of breathing particulate matter. People with bronchitis can expect aggravated symptoms from breathing in particulate matter. Children may experience a decline in lung function due to breathing in PM_{10} and $PM_{2.5}$ (EPA 2009).

Non-Criteria Air Pollutants

Toxic Air Contaminants. A substance is considered toxic if it has the potential to cause adverse health effects in humans, including increasing the risk of cancer upon exposure, or acute and/or chronic noncancer health effects. A toxic substance released into the air is considered a TAC. TACs are identified by federal and state agencies based on a review of available scientific evidence. In the State of California, TACs are identified through a two-step process that was established in 1983 under the Toxic Air Contaminant Identification and Control Act. This two-step process of risk identification and risk management and reduction was designed to protect residents from the health effects of toxic substances in the air. In addition, the California Air Toxics "Hot Spots" Information and Assessment Act, Assembly Bill (AB) 2588, was enacted by the Legislature in 1987 to address public concern over the release of TACs into the atmosphere. The law requires facilities emitting toxic substances to provide local air pollution control districts with information that will allow an assessment of the air toxics problem, identification of air toxics emissions sources, location of resulting hotspots, notification of the public exposed to significant risk, and development of effective strategies to reduce potential risks to the public over 5 years.

Examples include certain aromatic and chlorinated hydrocarbons, certain metals, and asbestos. TACs are generated by a number of sources, including stationary sources, such as dry cleaners, gas stations, combustion sources, and laboratories; mobile sources, such as automobiles; and area sources, such as landfills. Adverse health effects associated with exposure to TACs may include carcinogenic (i.e., cancer-causing) and noncarcinogenic effects. Noncarcinogenic effects typically affect one or more target organ systems and may be experienced on either short-term (acute) or long-term (chronic) exposure to a given TAC.

Diesel Particulate Matter. Diesel particulate matter (DPM) is part of a complex mixture that makes up diesel exhaust. Diesel exhaust is composed of two phases, gas and particle, both of which contribute to health risks. More than 90% of DPM is less than 1 micrometer in diameter (about 1/70 the diameter of a human hair) and, thus, is a subset of $PM_{2.5}$ (CARB 2016b). DPM is typically composed of carbon particles ("soot," also called black carbon) and numerous organic compounds, including over 40 known cancer-causing organic substances. Examples of these chemicals include polycyclic aromatic hydrocarbons, benzene, formaldehyde, acetaldehyde, acrolein, and 1,3-butadiene (CARB 2016b). CARB classified "particulate emissions from diesel-fueled engines" (i.e., DPM; 17 CCR 93000) as a TAC in August 1998. DPM is emitted from a broad range of diesel engines: on-road diesel engines of trucks, buses, and cars and off-road diesel engines, including locomotives, marine vessels, and heavy-duty construction equipment, among others. Approximately 70% of all airborne cancer risk in California is associated with DPM (CARB 2000). To reduce the cancer risk associated with DPM, CARB adopted a diesel risk reduction plan in 2000 (CARB 2000).

Because it is part of $PM_{2.5}$, DPM also contributes to the same noncancer health effects as $PM_{2.5}$ exposure. These effects include premature death; hospitalizations and emergency department visits for exacerbated chronic heart and lung disease, including asthma; increased respiratory symptoms; and decreased lung function in children. Several studies suggest that exposure to DPM may also facilitate development of new allergies (CARB 2016b). Those most vulnerable to noncancer health effects are children whose lungs are still developing and the elderly who often have chronic health problems.

Odorous Compounds. Odors are generally regarded as an annoyance rather than a health hazard. Manifestations of a person's reaction to odors can range from psychological (e.g., irritation, anger, or anxiety) to physiological (e.g., circulatory and respiratory effects, nausea, vomiting, and headache). The ability to detect odors varies considerably among the population and overall is quite subjective. People may have different reactions to the same odor. An odor that is offensive to one person may be perfectly acceptable to another (e.g., coffee roaster). An unfamiliar odor is more easily detected and is more likely to cause complaints than a familiar one. Known as odor fatigue, a person can become desensitized to almost any odor, and recognition may only occur with an alteration in the intensity. The occurrence and severity of odor impacts depend on the nature, frequency, and intensity of the source; wind speed and direction; and the sensitivity of receptors. There are no substantial odor sources in the project vicinity.

Sensitive Receptors

Some land uses are considered more sensitive to changes in air quality than others, depending on the population groups and the activities involved. People most likely to be affected by air pollution include children, the elderly, athletes, and people with cardiovascular and chronic respiratory diseases. Facilities and structures where these air-pollution-sensitive people live or spend considerable amounts of time are known as sensitive receptors. Land uses where air-pollution-sensitive individuals are most likely to spend time include schools and schoolyards, parks and playgrounds, daycare centers, nursing homes, hospitals, and residential communities (sensitive sites or sensitive land uses) (CARB 2005). The residents in the neighborhoods surrounding Castilleja School are considered sensitive receptors.

Local Ambient Air Quality

CARB, air districts, and other agencies monitor ambient air quality at approximately 250 air quality monitoring stations across the state. The BAAQMD monitors local ambient air quality at the project site. Air quality monitoring stations usually measure pollutant concentrations 10 feet above ground level; therefore, air quality is often referred to in terms of ground-level concentrations. A given station may not monitor all air pollutants; thus, data from the closest representative station that monitors a specific pollutant are summarized. The ambient air quality monitoring stations nearest the project site are the Redwood City station, which monitors for O_3 and $PM_{2.5}$, and the Cupertino station, which monitors O_3, PM_{10}, and $PM_{2.5}$. The monitoring data from each station are used to identify the number of days during which air pollutant concentrations exceed the applicable standards. The monitoring data for these stations as well as compiled data for the air basin for the period between 2013 and 2017 are provided in Table 9-1.

Table 9-1
Frequency of Air Quality Standard Violations

Monitoring Site	Year	Number of Days Exceeding Standard					
		State 1-Hour O_3	*State 8-Hour O_3*	*Federal 1-Hour O_3*	*State 24-Hour PM_{10}[1,2]*	*Federal 24-Hour PM_{10}*	*Federal 24-Hour $PM_{2.5}$[1]*
Los Gatos	2013	0	1	0	*	*	*
	2014	0	3	0	*	*	*
	2015	1	5	0	*	*	*
	2016	0	0	0	*	*	*
	2017	0	3	0	*	*	*
Redwood City	2013	0	1	0	*	*	3.2
	2014	0	0	0	*	*	0
	2015	0	1	0	*	*	0
	2016	0	0	0	*	*	0
	2017	2	2	0	*	*	6.3

Table 9-1
Frequency of Air Quality Standard Violations

Monitoring Site	Year	Number of Days Exceeding Standard					
		State 1-Hour O_3	*State 8-Hour O_3*	*Federal 1-Hour O_3*	*State 24-Hour PM_{10}[1,2]*	*Federal 24-Hour PM_{10}*	*Federal 24-Hour $PM_{2.5}$[1]*
San Francisco Bay Area Air Basin	2013	3	2	0	15.2	0	6.0
	2014	1	7	0	12.8	0	2.0
	2015	4	7	0	0	3.0	3.3
	2016	5	15	0	0	0	0
	2017	5	6	2	25.8	0	13.3

Source: CARB 2018.

Health Effects

Air pollution affects everyone to some degree, however pregnant women, children, the elderly, and people with respiratory or cardiovascular disease are more susceptible to experiencing health effects from air pollution. As discussed in Section 9.2 and shown in Table 9-3, the EPA and CARB have set ambient air quality standards (AAQS) for criteria air pollutants at levels that are intended to protect public health. Thus concentrations of criteria air pollutants that are below the AAQS would not result in significant adverse health effects.

Even at low concentrations, ground-level O_3 can adversely affect everyone (EPA 2000a). In relatively low concentrations, O_3 can damage vegetation, crack rubber, and irritate the lungs and respiratory system when inhaled. At higher concentrations, O_3 can impact public health by directly affecting the lungs, causing respiratory irritation and reduction in lung function. Lung flow and air passage through lung tissues can be seriously decreased, resulting in symptoms such as coughs, chest discomfort, headaches, and eye irritation. "Repeated exposure to ozone pollution for several months may cause permanent lung damage" (EPA 2000a). Persons suffering from asthma, bronchitis, other respiratory ailments, and cardiovascular disease are particularly susceptible to O_3, as well as children and persons engaged in heavy exercise, but "even healthy people that are active outdoors can be affected when ozone levels are high" (EPA 2000a). At high concentrations, this pollutant can cause severe damage to the lungs.

A large body of health science literature indicates that exposure to NO_2 can induce adverse health effects. The strongest health evidence, and the health basis for the ambient air quality standards for NO_2, is results from controlled human exposure studies that show that NO_2 exposure can intensify responses to allergens in allergic asthmatics. In addition, a number of epidemiological studies have demonstrated associations between NO_2 exposure and premature death, cardiopulmonary effects, decreased lung function growth in children, respiratory symptoms, emergency room visits for asthma, and intensified allergic responses. Infants and children are particularly at risk because they have disproportionately higher exposure to NO_2 than adults due to their greater breathing rate for their body weight and their typically greater outdoor exposure duration. Several studies have shown that long-term NO_2 exposure during childhood, the period of rapid lung growth, can lead to smaller lungs at maturity in children with higher compared to lower levels of exposure. In addition, children with asthma have a greater degree of airway responsiveness compared with adult asthmatics. In adults, the greatest risk is to people who have chronic respiratory diseases, such as asthma and chronic obstructive pulmonary disease (CARB 2019b).

Inhaled CO passes through the lungs to enter the blood stream, interfering with the transfer of oxygen to the blood. This reduces the amount of oxygen that reaches the muscles, including the heart, brain, and other body tissues – resulting in adverse cardiovascular and central nervous system effects. Even in healthy adults, CO inhalation can result in drowsiness, fatigue, inability to concentrate, nausea, headache, changes in heart function, impairment of vision, and slowed reflexes. At very high concentrations, CO inhalation can be fatal (EPA 2000b).

Particulate matter causes harm when inhaled particulates lodge deep within the lungs, causing health problems as the human immune system reacts to the presence of these foreign particles. Fine particles can lodge deeper within the lungs than coarse particles, posing a more serious health threat. Scientific studies have linked inhaled PM to several significant health problems, including "aggravated asthma, increases in respiratory symptoms like coughing and difficult or painful breathing, chronic bronchitis, decreased lung function, and premature death" (EPA 2000c). Very small particulates of certain substances can cause direct lung damage or can contain absorbed gasses that may be harmful. Populations that are especially sensitive to the health effects of exposure to particulate matter include children, the elderly, exercising adults, individuals with influenza, asthmatics, and those who suffer from chronic obstructive pulmonary disease. "Health problems for sensitive people can get worse if they are exposed to high levels of PM for several days in a row" (EPA 2000c), and "a number of adverse health impacts have been associated with exposure to both PM2.5 and PM10. For PM2.5, short-term exposures (up to 24-hours duration) have been associated with premature mortality, increased hospital admissions for heart or lung causes, acute and chronic bronchitis, asthma attacks, emergency room visits, respiratory symptoms, and restricted activity days" (CARB 2017a). Recent studies suggest that prolonged exposure to PM may affect the growth and functioning of children's lungs; other studies have found an association between fine particle air pollution and premature death related to decreases in cardiopulmonary functions.

9.2 REGULATORY FRAMEWORK

The proposed project is in the SFBAAB, one of 14 air basins in the state. BAAQMD has the primary responsibility for attainment and maintenance of air quality standards within their jurisdiction. The project area is also subject to the regulations of CARB and EPA. Both the State of California and the EPA have established and published air quality standards as shown in Table 9-2. The BAAQMD 2017 *Clean Air Plan* (BAAQMD 2017a) provides guidance for regional efforts to reduce air pollutant emissions while the BAAQMD 2017 CEQA Guidelines (BAAQMD 2017b) establish emission thresholds by which to determine the level of significance of a project's impacts. Additionally, the City will use the policies contained in the Palo Alto Comprehensive Plan related to air quality to evaluate the proposed project. This section provides a list of those policies, ordinances, and regulations that will be used to evaluate and implement this project.

Federal Regulations

Clean Air Act

The federal Clean Air Act, passed in 1970 and last amended in 1990, forms the basis for the national air pollution control effort. The EPA is responsible for implementing most aspects of the Clean Air Act, including setting NAAQS for major air pollutants; setting hazardous air pollutant (HAP) standards; approving state attainment plans; setting motor vehicle emission standards; issuing stationary source emission standards and permits; and establishing acid rain control measures, stratospheric O_3 protection measures, and enforcement provisions. Under the Clean Air Act, NAAQS are established for the following criteria pollutants: O_3, CO, NO_2, SO_2, PM_{10}, $PM_{2.5}$, and lead.

The NAAQS describe acceptable air quality conditions designed to protect the health and welfare of the citizens of the nation by defining the maximum amount of a pollutant averaged over a specified period of time that can be present in outdoor air without harm to the public's health. The NAAQS (other than for O_3, NO_2, SO_2, PM_{10}, $PM_{2.5}$, and those based on annual averages or arithmetic mean) are not to be exceeded more than once per year. NAAQS for O_3, NO_2, SO_2, PM_{10}, and $PM_{2.5}$ are based on statistical calculations over 1- to 3-year periods, depending on the pollutant. The Clean Air Act requires the EPA to reassess the NAAQS at least every 5 years to determine whether adopted standards are adequate to protect public health based on current scientific evidence. States with areas that exceed the NAAQS must prepare a state implementation plan that demonstrates how those areas will attain the standards within mandated time frames.

State Regulations

Criteria Air Pollutants

The federal Clean Air Act delegates the regulation of air pollution control and the enforcement of the NAAQS to the states. In California, the task of air quality management and regulation has been legislatively granted to CARB, with subsidiary responsibilities assigned to air quality management districts and air pollution control districts at the regional and county levels. CARB, which became part of the California Environmental Protection Agency in 1991, is responsible for ensuring implementation of the California Clean Air Act of 1988, responding to the federal Clean Air Act, and regulating emissions from motor vehicles and consumer products.

CARB has established CAAQS, which are generally more restrictive than the NAAQS. As stated previously, an AAQS defines the maximum amount of a pollutant averaged over a specified period of time that can be present in outdoor air without harm to public health. The CAAQS describe adverse conditions; that is, pollution levels must be below these standards before a basin can attain the standard. Air quality is considered “in attainment” if pollutant levels are continuously below the CAAQS and violate the standards no more than once each year. The CAAQS for O_3, CO, SO_2 (1-hour and 24-hour), NO_2, PM_{10}, and $PM_{2.5}$ and visibility-reducing particles are values that are not to be exceeded. All others are not to be equaled or exceeded. The NAAQS and CAAQS are presented in Table 9-2. In air basins where the NAAQS and CAAQS are attained, regional air quality is not expected to lead to adverse public health effects, although localized health effects could occur if conditions and activities result in pockets of high air pollutant concentrations.

Table 9-2
Ambient Air Quality Standards

Pollutant	Averaging Time	California Standards[a]	National Standards[b]	
		Concentration[c]	*Primary*[c,d]	*Secondary*[c,e]
O_3	1 hour	0.09 ppm (180 $\mu g/m^3$)	—	Same as Primary Standard[f]
	8 hours	0.070 ppm (137 $\mu g/m^3$)	0.070 ppm (137 $\mu g/m^3$)[f]	
NO_2[g]	1 hour	0.18 ppm (339 $\mu g/m^3$)	0.100 ppm (188 $\mu g/m^3$)	Same as Primary Standard
	Annual Arithmetic Mean	0.030 ppm (57 $\mu g/m^3$)	0.053 ppm (100 $\mu g/m^3$)	
CO	1 hour	20 ppm (23 mg/m^3)	35 ppm (40 mg/m^3)	None
	8 hours	9.0 ppm (10 mg/m^3)	9 ppm (10 mg/m^3)	
SO_2[h]	1 hour	0.25 ppm (655 $\mu g/m^3$)	0.075 ppm (196 $\mu g/m^3$)	—
	3 hours	—	—	0.5 ppm (1,300 $\mu g/m^3$)
	24 hours	0.04 ppm (105 $\mu g/m^3$)	0.14 ppm (for certain areas)[g]	—
	Annual	—	0.030 ppm (for certain areas)[g]	—
PM_{10}[i]	24 hours	50 $\mu g/m^3$	150 $\mu g/m^3$	Same as Primary Standard
	Annual Arithmetic Mean	20 $\mu g/m^3$	—	

Table 9-2
Ambient Air Quality Standards

Pollutant	Averaging Time	California Standards[a]	National Standards[b]	
		Concentration[c]	*Primary*[c,d]	*Secondary*[c,e]
$PM_{2.5}$[i]	24 hours	—	35 $\mu g/m^3$	Same as Primary Standard
	Annual Arithmetic Mean	12 $\mu g/m^3$	12.0 $\mu g/m^3$	15.0 $\mu g/m^3$
Lead[j,k]	30-day Average	1.5 $\mu g/m^3$	—	—
	Calendar Quarter	—	1.5 $\mu g/m^3$ (for certain areas)[k]	Same as Primary Standard
	Rolling 3-Month Average	—	0.15 $\mu g/m^3$	
Hydrogen sulfide	1 hour	0.03 ppm (42 $\mu g/m^3$)	—	—
Vinyl chloride[j]	24 hours	0.01 ppm (26 $\mu g/m^3$)	—	—
Sulfates	24- hours	25 $\mu g/m^3$	—	—
Visibility reducing particles	8 hour (10:00 a.m. to 6:00 p.m. PST)	Insufficient amount to produce an extinction coefficient of 0.23 per kilometer due to the number of particles when the relative humidity is less than 70%	—	—
Visibility reducing particles	8 hour (10:00 a.m. to 6:00 p.m. PST)	Insufficient amount to produce an extinction coefficient of 0.23 per kilometer due to the number of particles when the relative humidity is less than 70%	—	—

Source: CARB 2016c.

Notes: $\mu g/m^3$ = micrograms per cubic meter; CO = carbon monoxide; mg/m^3= milligrams per cubic meter; NO_2 = nitrogen dioxide; O_3 = ozone; PM_{10} = particulate matter with an aerodynamic diameter less than or equal to 10 microns; $PM_{2.5}$ = particulate matter with an aerodynamic diameter less than or equal to 2.5 microns; ppm = parts per million by volume; SO_2 = sulfur dioxide

a California standards for O_3, CO, SO_2 (1-hour and 24-hour), NO_2, suspended 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. CAAQS are listed in the Table of Standards in Section 70200 of Title 17 of the California Code of Regulations.

b National standards (other than O_3, NO_2, SO_2, particulate matter, and those based on annual averages or annual arithmetic mean) are not to be exceeded more than once per year. The O_3 standard is attained when the fourth highest 8-hour concentration measured at each site in a year, averaged over 3 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 $\mu g/m^3$ is equal to or less than 1. For $PM_{2.5}$, the 24-hour standard is attained when 98% of the daily concentrations, averaged over 3 years, are equal to or less than the standard.

c Concentration expressed first in units in which it was promulgated. Equivalent units given in parentheses are based on a reference temperature of 25°C and a reference pressure of 760 torr. Most measurements of air quality are to be corrected to a reference temperature of 25°C and a reference pressure of 760 torr; ppm in this table refers to ppm by volume, or micromoles of pollutant per mole of gas.

d National Primary Standards: The levels of air quality necessary, with an adequate margin of safety, to protect the public health.

[e] National Secondary Standards: The levels of air quality necessary to protect the public welfare from any known or anticipated adverse effects of a pollutant.

[f] On October 1, 2015, the EPA Administrator signed the notice for the final rule to revise the primary and secondary NAAQS for O_3. The EPA is revising the levels of both standards from 0.075 ppm to 0.070 ppm and retaining their indicators (O_3), forms (fourth-highest daily maximum, averaged across 3 consecutive years) and averaging times (8 hours). The EPA is in the process of submitting the rule for publication in the Federal Register. The final rule will be effective 60 days after the date of publication in the Federal Register. The lowered national 8-hour standards are reflected in the table.

[g] To attain the national 1-hour standard, the 3-year average of the annual 98th percentile of the 1-hour daily maximum concentrations at each site must not exceed 100 parts per billion (ppb). Note that the national 1-hour standard is in units of ppb. California standards are in units of ppm. To directly compare the national 1-hour standard to the California standards, the units can be converted from ppb to ppm. In this case, the national standard of 100 ppb is identical to 0.100 ppm.

[h] On June 2, 2010, a new 1-hour SO_2 standard was established, and the existing 24-hour and annual primary standards were revoked. To attain the national 1-hour standard, the 3-year average of the annual 99th percentile of the 1-hour daily maximum concentrations at each site must not exceed 75 ppb. The 1971 SO_2 national standards (24-hour and annual) remain in effect until 1 year after an area is designated for the 2010 standard, except that in areas designated nonattainment of the 1971 standards, the 1971 standards remain in effect until implementation plans to attain or maintain the 2010 standards are approved.

[i] On December 14, 2012, the national annual $PM_{2.5}$ primary standard was lowered from 15 $\mu g/m^3$ to 12.0 $\mu g/m^3$. The existing national 24-hour $PM_{2.5}$ standards (primary and secondary) were retained at 35 $\mu g/m^3$, as was the annual secondary standard of 15 $\mu g/m^3$. The existing 24-hour PM_{10} standards (primary and secondary) of 150 $\mu g/m^3$ were also retained. The form of the annual primary and secondary standards is the annual mean averaged over 3 years.

[j] CARB has identified lead and vinyl chloride as TACs with no threshold level of exposure for adverse health effects determined. These actions allow for the implementation of control measures at levels below the ambient concentrations specified for these pollutants.

[k] The national standard for lead was revised on October 15, 2008, to a rolling 3-month average. The 1978 lead standard (1.5 $\mu g/m^3$ as a quarterly average) remains in effect until 1 year after an area is designated for the 2008 standard, except that in areas designated nonattainment for the 1978 standard, the 1978 standard remains in effect until implementation plans to attain or maintain the 2008 standard are approved.

In 1988, California passed the California Clean Air Act (California Health and Safety Code Sections 39600 et seq.), which, like its federal counterpart, called for the designation of areas as "attainment" or "nonattainment", but based on CAAQS rather than the NAAQS. Table 9-3 shows the current attainment status of the proposed project area with respect to the NAAQS and CAAQS.

Table 9-3
Project Area Attainment Classification

Pollutant	Designation/Classification	
	Federal Standards	*State Standards*
Ozone (O_3) – 1 hour	No Federal Standard	**Nonattainment**
Ozone (O_3) – 8 hour	**Moderate Nonattainment**	**Nonattainment**
Nitrogen Dioxide (NO_2)	Unclassifiable/Attainment	Attainment
Carbon Monoxide (CO)	Unclassifiable/Attainment	Attainment
Sulfur Dioxide (SO_2)	Unclassifiable/Attainment	Attainment
Coarse Particulate Matter (PM_{10})	Unclassifiable/Attainment	**Nonattainment**
Fine Particulate Matter ($PM_{2.5}$)	**Moderate Nonattainment**	Attainment
Lead (Pb)	Unclassifiable/Attainment	Attainment
Hydrogen Sulfide	No Federal Standard	Unclassified

Table 9-3
Project Area Attainment Classification

Pollutant	Designation/Classification	
	Federal Standards	*State Standards*
Sulfates	No Federal Standard	Attainment
Visibility-Reducing Particles	No Federal Standard	Unclassified
Vinyl Chloride	No Federal Standard	No designation

Sources: EPA 2018 (federal); CARB 2017b (state).
Notes: Attainment = meets the standards; Attainment/Maintenance = achieve the standards after a nonattainment designation; Nonattainment = does not meet the standards; Unclassified or Unclassifiable = insufficient data to classify; Unclassifiable/Attainment = meets the standard or is expected to be meet the standard despite a lack of monitoring data.

Toxic Air Contaminants

The state Air Toxics Program was established in 1983 under AB 1807 (Tanner). The California TAC list identifies more than 700 pollutants, of which carcinogenic and noncarcinogenic toxicity criteria have been established for a subset of these pollutants pursuant to the California Health and Safety Code. In accordance with AB 2728, the state list includes the (federal) HAPs. The Air Toxics "Hot Spots" Information and Assessment Act of 1987 (AB 2588) seeks to identify and evaluate risk from air toxics sources; however, AB 2588 does not regulate air toxics emissions. TAC emissions from individual facilities are quantified and prioritized. "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.

In 2000, CARB approved a comprehensive Diesel Risk Reduction Plan to reduce emissions of diesel particulate matter (DPM) from both new and existing diesel-fueled vehicles and engines (CARB 2000). The regulation is anticipated to result in an 80% decrease in statewide diesel health risk in 2020 compared with the diesel risk in 2000. Additional regulations apply to new trucks and diesel fuel, including the On-Road Heavy Duty Diesel Vehicle (In-Use) Regulation, the On-Road Heavy Duty (New) Vehicle Program, the In-Use Off-Road Diesel Vehicle Regulation, and the New Off-Road Compression-Ignition (Diesel) Engines and Equipment program. All of these regulations and programs have timetables by which manufacturers must comply and existing operators must upgrade their diesel powered equipment. Several Airborne Toxic Control Measures (ATCMs) that reduce diesel emissions include In-Use Off-Road Diesel-Fueled Fleets (13 CCR 2449 et seq.) and In-Use On-Road Diesel-Fueled Vehicles (13 CCR 2025).

Local Regulations

Bay Area Air Quality Management District

The BAAQMD is the primary agency responsible for comprehensive air pollution control in the SFBAAB, including Santa Clara County. The BAAQMD is a regional agency that works directly with the Association of Bay Area Governments, Metropolitan Transportation Commission, and local governments, and it cooperates actively with all federal and state government agencies on air quality issues. The BAAQMD develops rules and regulations, establishes permitting requirements for stationary sources, inspects emissions sources, and enforces such measures through educational programs or fines, when necessary.

The BAAQMD 2017 CEQA Guidelines (BAAQMD 2017b) establish air pollutant emission thresholds that identify whether a project would violate any applicable air quality standards or contribute substantially to an existing or projected air quality violation. In order to evaluate air pollutant emissions from development projects, the BAAQMD recommends significance thresholds for emissions of ROG, NO_x, and PM_{10}. The emissions-based thresholds for O_3 precursors are intended to serve as a surrogate for an "O_3 significance threshold" (i.e., the potential for adverse O_3 impacts to occur). This approach is used because O_3 is not emitted directly (see the discussion of O_3 and its sources in Section 12.1, Pollutants and Effects) and the effects of an individual project's emissions of O_3 precursors (VOC and NO_x) on O_3 levels in ambient air cannot be determined through air quality models or other quantitative methods. The BAAQMD recommends significance thresholds as listed in Table 9-4, expressed in pounds per day, which serve as air quality standards that may be used in the evaluation of air quality impacts associated with development projects.

Table 9-4
BAAQMD Significance Thresholds for Criteria Pollutants

Pollutant	Construction Emissions	Operational Emissions	
	Average Daily Emissions (pounds per day)	Average Daily Emissions (pounds per day)	Maximum Annual Emissions (tons per year)
ROG	54	54	10
NO_X	54	54	10
PM_{10}	82 (exhaust)	82	15
$PM_{2.5}$	54 (exhaust)	54	10
PM10/PM2.5 (fugitive dust)	Best Management Practices	None	
Local CO	None	9.0 ppm (8-hour average), 20.0 ppm (1-hour average)	

Source: BAAQMD 2017b

The BAAQMD is directly responsible for reducing emissions from stationary (area-wide and point) sources and for assuring that state controls on mobile sources are effectively implemented. It has responded to this requirement by preparing a sequence of Ozone Attainment Plans and Clean Air Plans that comply with the federal and California CAAs to accommodate growth, reduce the pollutant levels in the Bay Area, meet federal and state ambient air quality standards, and minimize the fiscal impact that pollution control measures have on the local economy.

BAAQMD established their thresholds of significance for CEQA purposes based on the regional goal to attain the NAAQS and CAAQS (BAAQMD 2017b). Since an AAQS is based on maximum pollutant levels in outdoor air that would not harm the public's health, and air district thresholds pertain to attainment of the AAQS, this means that a project that complies with the thresholds established by a local air district, such as the BAAQMD, would not result in adverse effects to human health.

The BAAQMD adopted the most recent Ozone Attainment Plan in October 2001 and demonstrated attainment of the federal O_3 standard in the Bay Area by 2006. The current regional *Clean Air Plan* was adopted by the BAAQMD Board of Directors in April 2017. It identifies the control measures that would be implemented to reduce major sources of pollutants. These planning efforts have substantially decreased human exposure to unhealthful levels of pollutants in the Bay Area, even while the population has continued to grow. The 2010 Clean Air Plan predicted that regional O_3 concentrations would decrease by 1.2% per year or 9.0% over the 12 years after it was adopted. The 2017 *Clean Air Plan* calls for a wide range of strategies to further reduce emissions of harmful air pollutants and greenhouse gases. These include increasing the efficiency of fossil fuel combustion at industrial facilities; stopping methane leaks; reducing the contribution of motor vehicles to regional air pollution by reducing travel demand, increasing use of electric vehicles, and promoting use of clean fuels; expanding production of low-carbon buildings such as with more rooftop solar and other renewable energy; promoting energy efficiency in new and existing buildings; and switching space and water heating from natural gas to electricity (BAAQMD 2017a).

Plan Bay Area: Strategy for a Sustainable Region

Plan Bay Area is the Bay Area's Regional Transportation Plan (RTP)/Sustainable Community Strategy (SCS). Plan Bay Area was adopted jointly by the Association of Bay Area Governments and Metropolitan Transportation Commission on July 18, 2013. The SCS lays out a development scenario for the region, which, when integrated with the transportation network and other transportation measures and policies, would reduce GHG emissions from transportation (excluding goods movement) beyond the per capita reduction targets identified by CARB. Consistent with SB 375, the Association of Bay Area Governments and Metropolitan Transportation Commission are currently working on a minor update to Plan Bay Area.

City of Palo Alto Comprehensive Plan

Natural Environment, Chapter 5 of the *City of Palo Alto Comprehensive Plan*, describes the City of Palo Alto's (City's) efforts and programs to improve air quality. The plan includes goals and policies focused on supporting alternative modes of transportation to reduce dependence on the automobile (Palo Alto 2017). The Comprehensive Plan notes that "Healthy, breathable air is regional resource, and maintaining air quality is a responsibility shared by each of the local jurisdictions that benefit from it" and under Goal N-5 identifies the City's commitment to "Clean, healthful air for Palo Alto and the San Francisco Bay Area." Relevant policies from the Comprehensive Plan include:

Policy N-5.1: Support regional, State, and federal programs that improve air quality in the Bay Area because of its critical importance to a healthy Palo Alto.

Policy N-5.2: Support behavior changes to reduce emissions of particulates from automobiles.

Policy N-5.3: Reduce emissions of particulates from, manufacturing, dry cleaning, construction activity, grading, wood burning, landscape maintenance, including leaf blowers and other sources.

Policy N-5.4: All potential sources of odor and/or toxic air contaminants shall be adequately buffered, or mechanically or otherwise mitigated to avoid odor and toxic impacts that violate relevant human health standards.

Policy N-5.5: Support the BAAQMD in its efforts to achieve compliance with existing air quality regulations by continuing to require development applicants to comply with BAAQMD construction emissions control measures and health risk assessment requirements.

City of Palo Alto Municipal Code

All development projects in the City are required to comply with Title 16, Chapter 16.14, California Green Building Standards, and Chapter 16.18, Local Energy Efficiency Standards for Certain Buildings and Improvements, contained in the City of Palo Alto Municipal Code (Palo Alto 2018). Compliance with these requirements will help reduce the overall energy demand of the proposed project. The Green Building Ordinance was approved in 2008. In 2010, the City's Green Building Ordinance was amended to reflect the 2010 California Green Building Standards (CALGreen). The City consistently tracks the status and performance of Green Building Program which includes implementation of the Green Building Ordinance, the Climate Protection Plan, and the Zero Waste Program.

9.3 PROJECT IMPACTS

Methods of Analysis

The following assessment of air quality impacts is based on air pollutant emission modeling completed using the CalEEMod modeling software (CAPCOA 2017). The modeling output files are provided in Appendix G.

Air quality and associated public health impacts can result from construction activities and from mobile, stationary, and area sources associated with operation of a given land use. Construction activities would result in criteria pollutant emissions from site grading activities, construction of infrastructure, application of architectural coatings, and vehicle and construction equipment exhaust. Under the proposed project, operation of Castilleja School would not change substantially from existing conditions. Air pollutants are generated off-site associated with the energy, water, and wastewater service demands of the campus. Although the proposed project would increase the number of students at the school, it would also replace existing buildings with new construction that would improve energy and water efficiency, thus the net increase in service demands would be minimal. Thus operation of the project would result in increased criteria pollutant emissions primarily from vehicular sources. The CalEEMod land use and emissions modeling program was used to estimate air pollutant emissions that would be generated during construction and operation of the proposed project. The modeling was based on the trip generation and vehicle miles traveled (VMT) estimates provided in the Traffic Impacts Study. As discussed in Chapter 7, Transportation, this calculated VMT increase is based on the existing daily trip generation rate at the school. While the school is planning to implement an expanded TDM program with the project, no additional trip reductions have been applied. Thus, the impacts identified in this section assume that no increase in the TDM effectiveness is realized.

Significance Criteria

The significance criteria used to evaluate the project impacts to air quality are based on Appendix G of the CEQA Guidelines. According to Appendix G of the CEQA Guidelines, a significant impact related to air quality would occur if the project would:

1. Conflict with or obstruct implementation of the applicable air quality plan.
2. Result in a cumulatively considerable new increase of any criteria pollutant for which the project region is non-attainment under an applicable federal or state ambient air quality standard.
3. Expose sensitive receptors to substantial pollutant concentrations.
4. Result in other emissions (such as those leading to odors) adversely affecting a substantial number of people.

Impact Analysis

IMPACT 9-1:	Conflict with or obstruct implementation of the applicable air quality plan.
SIGNIFICANCE:	Potentially Significant
MITIGATION MEASURES:	Mitigation Measure 9a
SIGNIFICANCE AFTER MITIGATION:	Less than Significant

The Initial Study prepared for the project and circulated with the Notice of Preparation for this EIR found that the proposed project is consistent with the land use and zoning regulations for the project site and therefore would not obstruct implementation of *Plan Bay Area* or the BAAQMD *Clean Air Plan*. These regional plans rely on local land use agency's land use and zoning regulations to develop assumptions regarding future land uses and associated air pollutant emissions. This impact was determined to be less than significant in the Initial Study.

The significance criteria presented in CEQA Guidelines Appendix G have changed since the time that the Initial Study and NOP were circulated. The Initial Study includes an additional criteria – whether the project would violate any air quality standard or contribute substantially to an existing or projected air quality violation. The CEQA Guidelines no longer include this specific criteria, however an EIR must consider whether a project could violate or contribute substantially to any violation of air quality standards because a violation of air quality standards could interfere with implementation of the *Clean Air Plan.* Specifically, the analysis must consider whether construction and/or operation of a project would result in the emissions of criteria air pollutants that may cause exceedances of federal and state ambient air quality standards or contribute to existing nonattainment of ambient air quality standards. Accordingly, the following discussion identifies potential short- and long-term impacts that would result from implementation of the proposed project.

Construction

Emissions from construction activities were estimated using CalEEMod. As stated in Chapter 3, Project Description, implementation of the proposed project is expected to occur in four phases lasting approximately three years. Accordingly, construction emissions were modeled for each of the four phases described in Chapter 3. Specific construction schedules for each phase have not been determined; therefore, a conceptual construction schedule was developed for the purpose of air quality modeling as shown in Table 9-5.

Table 9-5
Castilleja School Project Construction Schedule

Phase Type	Start Date	End Date	Number of Days/Week	Total Days
Phase 1				
Demolition	1/20/2020	1/28/2020	5	20
Site Preparation	1/29/2020	2/4/2020	5	5
Grading and Excavation	2/5/2020	3/24/2020	5	35
Building Construction	3/25/2020	2/23/2021	5	240
Paving	2/24/2021	3/16/2021	5	15
Architectural Coating	3/17/2021	3/30/2021	5	10
Phase 2				
Paving	11/1/2020	11/27/2020	5	20
Modular Building Installation	11/28/2020	3/31/2021	5	88
Phase 3				
Demolition	1/1/2021	1/28/2021	5	20
Site Preparation	1/29/2021	2/4/2021	5	5
Grading and Excavation	2/5/2021	3/4/2021	5	20
Pool and Bicycle Pavilion Construction	3/26/2021	9/23/2021	5	130
Paving	3/5/2021	3/25/2021	5	15
Phase 4				
Demolition	12/1/2020	1/25/2021	5	40
Site Preparation	1/26/2021	2/8/2021	5	10
Grading and Excavation	2/9/2021	3/22/2021	5	30
Building Construction	3/23/2021	5/2/2022	5	290
Paving	5/3/2022	5/23/2022	5	15
Architectural Coating	5/24/2022	6/20/2022	5	20
Removal of Temporary Buildings	6/21/2022	7/18/2022	5	20

Source: Appendix G

The equipment fleet for each construction phase is based on CalEEMod default assumptions (CAPCOA 2017), except that excavators have been added to the fleet for phases 1, 3, and 4 to reflect the excavation necessary to allow construction of the below-grade parking garage, below-grade swimming pool, and below-grade portions of the new Academic building. For the purposes of air quality modeling, it was generally assumed that heavy construction equipment would be operating at the site for approximately 8 hours per day, 5 days per week (22 days per month), during project construction. Default construction worker, vendor trips, haul truck trips, and trip lengths as provided in CalEEMod were utilized. Truck trips necessary to off-haul excavated soil were also included in the modeling. Specific CalEEMod assumptions for each model scenario, including quantity of equipment, are provided in Appendix G.

Construction of the proposed project would generate construction-related air pollutant emissions from entrained dust, equipment and vehicle exhaust emissions, asphalt pavement, and architectural coatings. Exhaust from internal combustion engines used by construction equipment, vendor trucks (delivery trucks), haul trucks, and worker vehicles would result in emissions of ROG, NO_x, and PM_{10}. The estimated average daily emissions during project construction are shown in Table 9-6. Construction of the proposed project would also generate CO, SO_x and $PM_{2.5}$ emissions; however, only the criteria air pollutants that the BAAQMD have adopted thresholds for are presented in Table 9-6, while the data sheets in Appendix G include emissions estimates for all criteria air pollutants. Use of average daily emissions is consistent with the BAAQMD requirements as established in Section 8.1.1 of the BAAQMD CEQA Guidelines.

Entrained dust results from the exposure of earth surfaces to wind from the direct disturbance and movement of soil, resulting in PM_{10} and $PM_{2.5}$ emissions. To account for compliance with BAAQMD Regulation 6 – Particulate Matter, Rule 6 – Prohibition of Trackout, it was assumed that the active sites would be watered at least twice daily, or as necessary depending on weather conditions. The application of architectural coatings, such as exterior/interior paint and other finishes, would also produce VOC (ROG) emissions. The proposed project would comply with the requirements of BAAQMD Regulation 8 – Organic Compounds, Rule 3 - Architectural Coatings, which sets a cap for the VOC content in paint of 100 grams of VOC per liter of coating for non-flat coatings, 150 grams of VOC per liter for flat coatings, and 250 VOC per liter for flat super-gloss coatings.

Table 9-6
Average Daily Unmitigated Construction Emissions

Year	ROG	NO_x	PM_{10} Exhaust	$PM_{2.5}$ Exhaust
	Pounds per Day			
2020-2022 Construction	5.9	25.3	1.1	2.1
BAAQMD Construction Thresholds	*54*	*54*	*82*	*54*
Exceed Threshold?	**No**	**No**	**No**	**No**

Source: See Appendix G for detailed results.
Notes: The values shown are average daily emissions based on total overall tons of construction emissions, converted to pounds, and divided by 664 active work days.
ROG = reactive organic gases; NO_x = oxides of nitrogen; PM_{10} = coarse particulate matter; $PM_{2.5}$ = fine particulate matter

As shown in Table 9-6, construction of the project is not expected to result in average daily emissions of criteria air pollutants that exceed the BAAQMD thresholds. Additionally, the Comprehensive Plan requires that all development projects comply with the current BAAQMD basic control measures for reducing construction emissions of $PM_{10.}$ Mitigation Measure 9a incorporates the requirements identified in BAAQMD CEQA Guidelines Table 8-1, Basic Construction Mitigation Measures Recommended for All Proposed Projects. With implementation of Mitigation Measure 9a, construction of the Castilleja School project would not create criteria air pollutant emissions that would exceed the BAAQMD thresholds and thus project construction would not interfere with implementation of the 2017 *Clean Air Plan* and this impact would be reduced to a less than significant level.

Operation

The proposed project would replace several of the existing buildings at the Castilleja School site with new buildings. The new buildings would be constructed in compliance with the building code in effect at the time that building permits are issued. The new buildings would have increased energy and water use efficiency in comparison to the existing buildings, thus the project would result in a reduction in operational emissions associated with energy consumption.

The project would support an increase in student enrollment, accommodating 106 more students than were enrolled in the 2018-2019 academic year, and 125 more students than allowed under the existing Conditional Use Permit. The additional students would be expected to increase the number of vehicle trips made to and from the project site. As shown in the Traffic Impacts Study for the project (Appendix E), the increased enrollment is expected to generate 279 new daily trips, which correlates to approximately 2,145 daily VMT. With classes typically meeting for 180 days each year, the proposed increase in enrollment would be expected to create 386,100 VMT annually. As noted previously, this VMT estimate does not reflect any trip reductions that would be achieved with implementation of the proposed enhanced TDM plan, thus this analysis provides a conservative projection of the project's air pollutant emissions. The criteria air pollutant emissions associated with this VMT increase are shown in Table 9-7.

Table 9-7
Average Daily Mobile Source Emissions

	ROG	NO_x	PM_{10} Exhaust	$PM_{2.5}$ Exhaust
	Pounds per Day			
Mobile Source Emissions	0.04	1.71	0.33	0.63
BAAQMD Operational Thresholds	*54*	*54*	*82*	*54*
Exceed Threshold?	**No**	**No**	**No**	**No**

Source: Appendix G
Notes: ROG = reactive organic gases; NO_x = oxides of nitrogen; PM_{10} = coarse particulate matter; $PM_{2.5}$ = fine particulate matter

As shown in Table 9-7, the criteria air pollutant emissions associated with the increase in VMT would not exceed the BAAQMD thresholds and thus would not interfere with implementation of the 2017 *Clean Air Plan*. Thus this impact would remain less than significant.

IMPACT 9-2:	Result in a cumulatively considerable new increase of any criteria pollutant for which the project region is non-attainment under an applicable federal or state ambient air quality standard.
SIGNIFICANCE:	Less than Significant
MITIGATION MEASURES:	None
SIGNIFICANCE AFTER MITIGATION:	Less than Significant

The cumulative context of an air pollutant is dependent on the specific pollutant being considered. O_3 precursors are a regional pollutant; this means that O_3 precursors generated in one location do not necessarily have O_3 impacts in that area. Instead, precursors from across the region can combine in the upper atmosphere and be transported by winds to various portions of the air basin. Consequently, all O_3 precursors generated throughout the air basin are part of the cumulative context and the geographic region in which cumulative O_3 impacts are considered is the entire BAAQMD.

For operational cumulative impacts associated with nonattainment pollutants, a project whose operational emissions would not exceed the BAAQMD significance thresholds (shown in Table 9-5) would not be considered cumulatively considerable and would be less than significant. As presented in Table 9-7, the new operational emissions associated with the proposed project would not exceed the BAAQMD cumulative thresholds of significance. Therefore, the proposed project's operational activities would not be cumulatively considerable and the contribution to cumulative impacts would be **less than significant**.

IMPACT 9-3:	Expose sensitive receptors to substantial pollutant concentrations.
SIGNIFICANCE:	Potentially Significant
MITIGATION MEASURES:	Mitigation Measure HAZ-1
SIGNIFICANCE AFTER MITIGATION:	Less than Significant

Health Effects of Toxic Air Contaminants

Construction of the proposed project would involve the use of diesel-fueled vehicles used during site preparation, grading, building construction, paving, and application of architectural coatings. DPM is the primary TAC of concern during these construction activities. Notably, on-road diesel trucks traveling to and from the proposed project would be less of a concern because they would not stay on the site for long durations. The following measures are required by state law to reduce diesel particulate emissions:

- Fleet owners of mobile construction equipment are subject to the CARB Regulation for In-use Off-road Diesel Vehicles (Title 13 California Code of Regulations, Chapter 9, Section 2449), the purpose of which is to reduce DPM and criteria pollutant emissions from in-use (existing) off-road diesel-fueled vehicles.
- All commercial diesel vehicles are subject to Title 13, Section 2485 of the California Code of Regulations, limiting engine idling time. Idling of heavy-duty diesel construction equipment and trucks during loading and unloading shall be limited to five minutes; electric auxiliary power units should be used whenever possible.

According to the Office of Environmental Health Hazard Assessment, health risk assessments, which determine the exposure of sensitive receptors to toxic emissions, should be based on a 30-year exposure period for the maximally exposed individual resident; however, such assessments should be limited to the period/duration of activities associated with the project. Since the proposed project involves phased construction activities in several areas across the site, the project would not require the extensive use of heavy-duty construction equipment or diesel trucks in any one location over the duration of development, which would limit the exposure of any proximate individual sensitive receptor to TACs. Due to the relatively short period of exposure at any individual sensitive receptor and minimal particulate emissions generated on-site, TACs generated during construction would not be expected to result in concentrations causing significant health risks.

As described in the Initial Study (Appendix A), Section 3.8, Hazards and Hazardous Materials, due to the age of some of the existing buildings, demolition activities could result in the release of contaminated materials and hazardous substances such as lead-based paint or asbestos. Demolition activities could result in airborne entrainment of asbestos, particularly where structures built prior to 1980 would be demolished. However, these materials would be removed in accordance with regulatory requirements prior to demolition which establishes survey, notification, and work practice requirements to prevent asbestos emissions during building demolition. Implementation of Mitigation Measure HAZ-1 as identified in the Initial Study and in Table 1-3 in Chapter 1, Executive Summary, would ensure any potential lead-based paint or asbestos materials would be handled appropriately and that potential exposure would be less than significant. Mitigation Measure HAZ-1 requires that prior to issuance of a demolition permit, the project applicant shall retain a qualified professional to complete a survey of the building proposed for demolition to determine if lead-containing materials (LCMs), asbestos containing materials (ACMs), and/or polychlorinated biphenyls (PCBs) are present; retaining a contractor trained and qualified to conduct lead- or asbestos-related construction work to carry out any demolition activities likely to disturb LCMs or ACMs; and following regulatory protocols for handling and disposal of LCMs, ACMs, and/or PCBs.

Carbon Monoxide Hotspots

Mobile source impacts occur basically on two scales of motion. Regionally, project-related travel will add to regional trip generation and increase the VMT within the local airshed and the SFBAAB. Locally, project traffic will be added to the City of Palo Alto roadway system adjacent to and in the vicinity of the proposed project site. If such traffic occurs during periods of poor atmospheric ventilation, is composed of a large number of vehicles "cold-started" and operating at pollution-inefficient speeds, and is substantially contributing to roadway and intersection congestion, there is a potential for the formation of microscale CO hotspots in the area immediately around points of congested traffic. Because of continued improvement in vehicular emissions at a rate faster than the rate of vehicle growth and/or congestion, the potential for CO hotspots in the SFBAAB is steadily decreasing.

CO transport is extremely limited and disperses rapidly with distance from the source. Under certain extreme meteorological conditions, however, CO concentrations near a congested roadway or intersection may reach unhealthy levels, affecting sensitive receptors such as residents, school children, hospital patients, and older adults. Typically, high CO concentrations are associated with roadways or intersections operating at an unacceptable level of service (LOS). Projects contributing to adverse traffic impacts may result in the formation of such CO hotspots.

The project is not expected to create CO hotspots at any of the roadway segments or intersections in the project vicinity. The BAAQMD CEQA Guidelines state that a project may create such hotspots if it would increase traffic volumes at affected intersections to more than 44,000 vehicles per hour. The Traffic Impact Study for the Castilleja School project (Appendix E) finds that total daily traffic volumes on roads in the residential neighborhoods in the project vicinity range from under 100 to approximately 27,000 (see Table 7-7 in Chapter 7, Transportation) while the highest-volume study area intersections carry fewer than 5,000 vehicles in the AM and PM peak hours under existing plus project conditions. Additionally, the traffic associated with the proposed enrollment increase is expected to generate a total of 4.49 pounds per day of CO. This volume of CO emissions, which would be spread throughout the project study area and not concentrated at any one location, would not be sufficient to create CO hotspots.

Substantial CO concentrations are also not expected to result from traffic operations associated with the proposed below-grade parking garage. The BAAQMD CEQA Guidelines state that substantial CO concentrations may occur where vertical and/or horizontal mixing is substantially limited (such as in a tunnel or parking garage) when traffic volumes are at least 24,000 vehicles per hour. As reported in the Traffic Impacts Study (Appendix E), it is expected that 200 vehicles would pass through the garage during drop-off and pick-up periods when the school is operating at full enrollment. This is substantially below the volume at which there is a potential for substantial CO concentrations to occur, thus impacts associated with CO emissions would remain less than significant.

Conclusion

During operation of the project, vehicle traffic is not expected to create any CO hotspots that could expose sensitive receptors to substantial concentrations of hazardous emissions. During project construction, emissions of toxic air contaminants from construction equipment would not expose students, workers, or neighbors to substantial air pollutant concentrations. Demolition of existing buildings could release hazardous emissions; with implementation of Mitigation Measure HAZ-1, the potential for sensitive receptors to be exposed to such hazardous emissions would be reduced to a **less-than-significant** level.

IMPACT 9-4:	Result in other emissions (such as those leading to odors) adversely affecting a substantial number of people.
SIGNIFICANCE:	Less than Significant
MITIGATION MEASURES:	None
SIGNIFICANCE AFTER MITIGATION:	Less than Significant

The occurrence and severity of potential odor impacts depends on numerous factors. The nature, frequency, and intensity of the source; the wind speeds and direction; and the sensitivity of receiving location each contribute to the intensity of the impact. Although offensive odors seldom cause physical harm, they can be annoying and cause distress among the public and generate citizen complaints.

Construction

Potential odors produced during construction would be attributable to concentrations of unburned hydrocarbons from tailpipes of construction equipment, architectural coatings, and asphalt pavement application. In general, odors are highest near the source, but disperse quickly resulting in a reduced offsite exposure. Sensitive receptors located proximate to the proposed construction sites may be affected. However, construction of the proposed project would use typical construction techniques in compliance with BAAQMD rules and any odors associated with project construction activities would be temporary and would cease upon completion of construction. Therefore, impacts associated with odors during construction would be less than significant.

Operation

There are no proposed changes in typical school operations that would increase or decrease the potential for neighbors of the project site to be exposed to other types of emissions, including odors. The school would continue to receive food and material deliveries and solid waste/recycling pick-up; the trucks used for these operations typically generate short-term odors that are common to residential areas. Other typical odors generated from operation of the proposed project would include vehicle exhaust generated by students, their families, and employees traveling to and from the project site and the periodic use of landscaping or maintenance equipment. Therefore, impacts associated with odors generated from operations would be less than significant.

9.4 MITIGATION MEASURES

Mitigation Measure HAZ-1 is required as identified in Chapter 1, Executive Summary and the Initial Study (Appendix A). The following is also required:

Mitigation Measure 9a Prior to issuance of demolition permits, grading permits, or building permits for the proposed project, the City of Palo Alto shall ensure that site plan notes include requirements for the construction contractor to implement the following Basic Construction Emission Control Measures. Visual site inspections shall be conducted throughout construction to ensure these measures are implemented appropriately:

A. All exposed surfaces shall be watered two times daily. Exposed surfaces include, but are not limited to parking and staging areas, soil piles, graded areas, and unpaved access roads.

B. Haul trucks transporting soil, sand, or other loose material off-site shall be covered.

C. Wet power vacuum street sweepers shall be used to remove any visible trackout of mud or dirt onto adjacent public roads at least once a day. Use of dry power sweeping is prohibited.

D. Vehicle speeds on unpaved roads to shall be limited to a maximum of 15 miles per hour.

E. All roadways, driveways, sidewalks, and parking lots to be paved shall be completed as soon as possible. In addition, building pads shall be laid as soon as possible after grading unless seeding or soil binders are used.

F. Idling times shall be minimized either by shutting equipment off when not in use or reducing the maximum idling time to 5 minutes (as required by the California airborne toxics control measure Title 13, Section 2485 of California Code of Regulations [CCR]). Clear signage shall be provided for construction workers at all access points.

G. All construction equipment shall be maintained and properly tuned in accordance with manufacturer's specifications. All equipment shall be checked by a certified mechanic and determined to be running in proper condition prior to operation.

H. The construction contractor shall post a publicly visible sign with the telephone number and person to contact at the City of Palo Alto regarding dust complaints. This person shall respond and take corrective action within 48 hours. The BAAQMD phone number shall also be visible.

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CHAPTER 10
GREENHOUSE GAS EMISSIONS

This section describes the existing setting of the project region related to greenhouse gas emissions (GHG) and climate change, identifies associated regulatory requirements, evaluates potential impacts, and identifies mitigation measures related to implementation of the proposed Castilleja School project (proposed project) The analysis in this chapter is taken from the California Emissions Estimator Model (CalEEMod) (Version 2016.3.2) modeling prepared for the project, provided in Appendix G.

In response to the Notice of Preparation for this Environmental Impact Report (EIR), the City of Palo Alto (City) received comments requesting analysis of the emissions of GHGs during construction and generated by vehicle traffic and garage operations. The Notice of Preparation, Initial Study and comments received are provided in Appendix A.

10.1 EXISTING CONDITIONS

Climate Change Overview

Climate change refers to any significant change in measures of Earth's climate, such as temperature, precipitation, and wind patterns, lasting for an extended period of time (decades or longer). The Earth's temperature depends on the balance between energy entering and leaving the planet's system. Many factors, both natural and human-caused, can cause changes in Earth's energy balance, including variations in the sun's energy reaching Earth, changes in the reflectivity of Earth's atmosphere and surface, and changes in the greenhouse effect, which affects the amount of heat retained by Earth's atmosphere (EPA 2017a).

The greenhouse effect is the trapping and build-up of heat in the atmosphere (troposphere) near the Earth's surface. The greenhouse effect traps heat in the troposphere through a threefold process, as follows: Short-wave radiation emitted by the sun is absorbed by the Earth, the Earth emits a portion of this energy in the form of long-wave radiation, and GHGs in the upper atmosphere absorb this long-wave radiation and emit it into space and toward the Earth. The greenhouse effect is a natural process that contributes to regulating the Earth's temperature and creates a pleasant, livable environment on Earth. Human activities that emit additional GHGs to the atmosphere increase the amount of infrared radiation that gets absorbed before escaping into space, thus enhancing the greenhouse effect and causing the Earth's surface temperature to rise.

The scientific record of the Earth's climate shows that the climate system varies naturally over a wide range of time scales, and that, in general, climate changes prior to the Industrial Revolution in the 1700s can be explained by natural causes, such as changes in solar energy, volcanic eruptions, and natural changes in GHG concentrations. Recent climate changes, in particular the warming observed over the past century, however, cannot be explained by natural causes alone. Rather, it is extremely likely that human activities have been the dominant cause of that warming since the mid-20th century, and is the most significant driver of observed climate change (EPA 2017a; IPCC 2013). Human influence on the climate system is evident from the increasing GHG concentrations in the atmosphere, positive radiative forcing, observed warming, and improved understanding of the climate system (IPCC 2013). The atmospheric concentrations of GHGs have increased to levels unprecedented in the last 800,000 years, primarily from fossil fuel emissions and secondarily from emissions associated with land use changes (IPCC 2013). Continued emissions of GHGs will cause further warming and changes in all components of the climate system, which is discussed further in Potential Effects of Climate Change.

Greenhouse Gases

A GHG is any gas that absorbs infrared radiation in the atmosphere; in other words, GHGs trap heat in the atmosphere. As defined in California Health and Safety Code Section 38505(g) for purposes of administering many of the state's primary GHG emissions reduction programs, GHGs include carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), sulfur hexafluoride (SF_6), and nitrogen trifluoride (NF_3) (see also California Environmental Quality Act (CEQA) Guidelines Section 15364.5).[1] Some GHGs, such as CO_2, CH_4, and N_2O, occur naturally and are emitted into the atmosphere through natural processes and human activities. Of these gases, CO_2 and CH_4 are emitted in the greatest quantities from human activities. Manufactured GHGs, which have a much greater heat-absorption potential than CO_2, include fluorinated gases, such as HFCs, PFCs, and SF_6, which are associated with certain industrial products and processes. The following paragraphs provide a summary of the most common GHGs and their sources.[2]

Carbon Dioxide. CO_2 is a naturally occurring gas and a by-product of human activities, and is the principal anthropogenic GHG that affects the Earth's radiative balance. Natural sources of CO_2 include respiration of bacteria, plants, animals, and fungus; evaporation from oceans; volcanic out-gassing; and decomposition of dead organic matter. Human activities that generate CO_2 are the combustion of fuels such as coal, oil, natural gas, and wood, and changes in land use.

Methane. CH_4 is produced through both natural and human activities. CH_4 is a flammable gas and is the main component of natural gas. Methane is produced through anaerobic (without oxygen) decomposition of waste in landfills, flooded rice fields, animal digestion, decomposition

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1 Climate-forcing substances include GHGs and other substances such as black carbon and aerosols. This discussion focuses on the seven GHGs identified in California Health and Safety Code Section 38505, so impacts associated with other climate-forcing substances are not evaluated herein.

2 The descriptions of GHGs are summarized from the Intergovernmental Panel on Climate Change's (IPCC) Second Assessment Report (1995), IPCC's Fourth Assessment Report (2007), California Air Resources Board's "Glossary of Terms Used in GHG Inventories" (CARB 2017a), and U.S. Environmental Protection Agency's "Glossary of Climate Change Terms" (EPA 2016).

of animal wastes, production and distribution of natural gas and petroleum, coal production, and incomplete fossil fuel combustion.

Nitrous Oxide. N_2O is produced through natural and human activities, mainly through agricultural activities and natural biological processes, although fuel burning and other processes also create N_2O. Sources of N_2O include soil cultivation practices (microbial processes in soil and water), especially the use of commercial and organic fertilizers, manure management, industrial processes (such as in nitric acid production, nylon production, and fossil-fuel-fired power plants), vehicle emissions, and using N_2O as a propellant (such as in rockets, racecars, and aerosol sprays).

Fluorinated Gases. Fluorinated gases (also referred to as F-gases) are powerful synthetic GHGs emitted from many industrial processes. Fluorinated gases are commonly used as substitutes for stratospheric ozone-depleting substances (e.g., chlorofluorocarbons (CFCs), hydrochlorofluorocarbon (HCFCs), and halons). The most prevalent fluorinated gases are the following:

Hydrofluorocarbons: HFCs are compounds containing only hydrogen, fluorine, and carbon atoms. HFCs are synthetic chemicals used as alternatives to ozone-depleting substances for many industrial, commercial, and personal needs. HFCs are emitted as by-products of industrial processes and are used in manufacturing.

Perfluorocarbons: PFCs are a group of human-made chemicals composed of carbon and fluorine only. These chemicals were introduced as alternatives, with HFCs, to the ozone-depleting substances. The two main sources of PFCs are primary aluminum production and semiconductor manufacturing. Since PFCs have stable molecular structures and do not break down through the chemical processes in the lower atmosphere, these chemicals have long lifetimes, ranging between 10,000 and 50,000 years.

Sulfur Hexafluoride: SF_6 is a colorless gas soluble in alcohol and ether and slightly soluble in water. SF_6 is used for insulation in electric power transmission and distribution equipment, semiconductor manufacturing, the magnesium industry, and as a tracer gas for leak detection.

Nitrogen Trifluoride: NF_3 is used in the manufacture of a variety of electronics, including semiconductors and flat-panel displays.

Chlorofluorocarbons. CFCs are synthetic chemicals that have been used as cleaning solvents, refrigerants, and aerosol propellants. CFCs are chemically unreactive in the lower atmosphere (troposphere), and the production of CFCs was prohibited in 1987 due to the chemical destruction of stratospheric ozone.

Hydrochlorofluorocarbons. HCFCs are a large group of compounds whose structure is very close to that of CFCs—containing hydrogen, fluorine, chlorine, and carbon atoms—but including one or more hydrogen atoms. Like HFCs, HCFCs are used in refrigerants and propellants.

HCFCs were also used in place of CFCs for some applications; however, their use in general is being phased out.

Black Carbon. Black carbon is a component of fine particulate matter, which has been identified as a leading environmental risk factor for premature death. It is produced from the incomplete combustion of fossil fuels and biomass burning, particularly from older diesel engines and forest fires. Black carbon warms the atmosphere by absorbing solar radiation, influences cloud formation, and darkens the surface of snow and ice, which accelerates heat absorption and melting. Black carbon is short-lived and varies spatially, which makes it difficult to quantify its global warming potential. Diesel particulate matter emissions are a major source of black carbon and are toxic air contaminants that have been regulated and controlled in California for several decades to protect public health. Because of the California Air Resources Board's (CARB) regulations pertaining to diesel engines, diesel fuels, and burning activities, CARB estimates that annual black carbon emissions in California were reduced by 70% between 1990 and 2010, with 95% control expected by 2020 (CARB 2014).

Water Vapor. The primary source of water vapor is evaporation from the ocean, with additional vapor generated by sublimation (change from solid to gas) from ice and snow, evaporation from other water bodies, and transpiration from plant leaves. Water vapor is the most important, abundant, and variable GHG in the atmosphere, and maintains a climate that is necessary for life.

Ozone. Tropospheric ozone, which is created by photochemical reactions involving gases from both natural sources and human activities, acts as a GHG. Stratospheric ozone, which is created by the interaction between solar ultraviolet radiation and molecular oxygen (O_2), plays a decisive role in the stratospheric radiative balance. Depletion of stratospheric ozone due to chemical reactions that may be enhanced by climate change results in an increased ground-level flux of ultraviolet-B radiation.

Aerosols. Aerosols are suspensions of particulate matter in a gas emitted into the air through burning biomass (plant material) and fossil fuels. Aerosols can warm the atmosphere by absorbing and emitting heat, and can cool the atmosphere by reflecting light.

Global Warming Potential

Gases in the atmosphere can contribute to climate change both directly and indirectly. Direct effects occur when the gas itself absorbs radiation. Indirect radiative forcing occurs when chemical transformations of the substance produce other GHGs, when a gas influences the atmospheric lifetimes of other gases, and/or when a gas affects atmospheric processes that alter the radiative balance of the Earth (e.g., affect cloud formation or albedo (i.e., the reflection of radiation)) (EPA 2016). The Intergovernmental Panel on Climate Change (IPCC) developed the global warming potential (GWP) concept to compare the ability of each GHG to trap heat in the atmosphere relative to another gas. The GWP of a GHG is defined as the ratio of the time-integrated radiative forcing from the instantaneous release of 1 kilogram of a trace substance relative to that of 1 kilogram of a reference gas (IPCC 2014). The reference gas used is CO_2; therefore, GWP-weighted emissions are measured in metric tons (MT) of carbon dioxide equivalent (CO_2e).

The current version of the California Emissions Estimator Model (CalEEMod) (Version 2016.3.2) assumes that the GWP for CH_4 is 25 (so emissions of 1 MT of CH_4 are equivalent to emissions of 25 MT of CO_2), and the GWP for N_2O is 298, based on the IPCC Fourth Assessment Report (IPCC 2007). The GWP values identified in CalEEMod were applied to the proposed project.

GHG Inventories

United States Emissions. Per the U.S. Environmental Protection Agency's (EPA) Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990–2016 (EPA 2018), total U.S. GHG emissions were approximately 6,511.3 million metric tons (MMT) CO_2e in 2016. The primary GHG emitted by human activities in the United States was CO_2, which represented approximately 81.6% of total GHG emissions (5,310.9 MMT CO_2e). The largest source of CO_2, and of overall GHG emissions, was fossil-fuel combustion, which accounted for approximately 93.5% of CO_2 emissions in 2016 (4,966.0 MMT CO_2e). Relative to 1990, gross United States GHG emissions in 2016 are higher by 2.4%, down from a high of 15.7% above 1990 levels in 2007. GHG emissions decreased from 2015 to 2016 by 1.9% (126.8 MMT CO_2e), and, overall, net emissions in 2016 were 11.1% below 2005 levels (EPA 2018).

State of California Emissions. According to California's 2000–2016 GHG emissions inventory (2018 edition), California emitted 429.40 MMT CO_2e in 2016, including emissions resulting from out-of-state electrical generation (CARB 2018). The sources of GHG emissions in California include transportation, industrial uses, electric power production from both in-state and out-of-state sources, commercial and residential uses, agriculture, high GWP substances, and recycling and waste. The California GHG emissions source categories (as defined in CARB's 2008 Climate Change Scoping Plan: A Framework for Change (Scoping Plan) (CARB 2008)) and their relative contributions in 2016 are presented in Table 10-1.

Table 10-1
Greenhouse Gas Emissions Sources in California

Source Category	Annual GHG Emissions (MMT CO_2e)	Percent of Total[a]
Transportation	169.38	39%
Industrial uses[b]	89.61	21%
Electricity generation[c]	68.58	16%
Residential and commercial uses	39.36	9%
Agriculture	33.84	8%
High GWP substances	19.78	5%
Recycling and waste	8.81	2%
Totals	**429.40**	**100%**

Source: CARB 2018.
Notes: GHG = greenhouse gas; MMT CO_2e = million metric tons of carbon dioxide equivalent; GWP = global warming potential.
Emissions reflect 2016 California GHG inventory.
[a] Percentage of total has been rounded and total may not sum due to rounding.
[b] The Aliso Canyon natural gas leak event released 1.96 MMT CO_2e of unanticipated emissions in 2015 and 0.53 MMT CO_2e in 2016. These leak emissions will be fully mitigated according to legal settlement and are tracked separately from routine inventory emissions.
[c] Includes emissions associated with imported electricity, which account for 26.28 MMT CO_2e.

City of Palo Alto GHG Emission Inventory. The City first adopted a Climate Action Plan in 2007, and recently adopted the Sustainability and Climate Action Plan (S/CAP, Palo Alto 2017a). Through preparation and implementation of these plans, the City has tracked GHG emissions from municipal operations and community activities. In 2016, the total citywide GHG emissions were estimated at approximately 479,025 MT CO_2e (Palo Alto 2017b). Transportation emissions constituted 66 percent of the total GHG emissions while natural gas use represents 28 percent. Each other source included in the inventory is responsible for 2 percent or less of the total emissions; these include landfill fugitive emissions, landfilling recyclable material, wastewater process, lifecycle emissions from landfilled waste, and natural gas distribution leakage.

Potential Effects of Climate Change

Globally, climate change has the potential to affect numerous environmental resources through uncertain impacts related to future air temperatures and precipitation patterns. The 2014 Intergovernmental Panel on Climate Change Synthesis Report (IPCC 2014) indicated that warming of the climate system is unequivocal, and since the 1950s, many of the observed changes are unprecedented over decades to millennia. Signs that global climate change has occurred include warming of the atmosphere and ocean, diminished amounts of snow and ice, rising sea levels, and ocean acidification (IPCC 2014).

In California, climate change impacts have the potential to affect sea-level rise, agriculture, snowpack and water supply, forestry, wildfire risk, public health, frequency of severe weather events, and electricity demand and supply. The primary effect of global climate change has been a 0.2°C (0.36°F) rise in average global tropospheric temperature per decade, determined from meteorological measurements worldwide between 1990 and 2005. Scientific modeling predicts that continued emissions of GHGs at or above current rates would induce more extreme climate changes during the 21st century than were observed during the 20th century. A warming of approximately 0.2°C per decade is projected, and there are identifiable signs that global warming could take place.

Although climate change is driven by global atmospheric conditions, climate change impacts are felt locally. A scientific consensus confirms that climate change is already affecting California. The average temperatures in California have increased, leading to more extreme hot days and fewer cold nights. Shifts in the water cycle have been observed, with less winter precipitation falling as snow, and both snowmelt and rainwater running off earlier in the year. Sea levels have risen, and wildland fires are becoming more frequent and intense due to dry seasons that start earlier and end later (CAT 2010).

An increase in annual average temperature is a reasonably foreseeable effect of climate change. Observed changes over the last several decades across the western United States reveal clear signals of climate change. Statewide average temperatures increased by approximately 1.7°F from 1895 to 2011, with warming the greatest in the Sierra Nevada (CCCC 2012). By 2050, California is projected to warm by approximately 2.7°F above 2000 averages, a threefold increase in the rate of warming over the last century. By 2100, average temperatures could increase by 4.1°F to 8.6°F, depending on emissions levels. Springtime warming—a critical influence on snowmelt—will be particularly pronounced. Summer temperatures will rise more than winter temperatures, and the increases will be greater in inland California compared to the coast. Heat waves will be more frequent, hotter, and longer. There will be fewer extremely cold nights (CCCC 2012). A decline in the Sierra Nevada snowpack, which accounts for approximately half of the surface water storage in California, by 30% to as much as 90% is predicted over the next 100 years (CAT 2006).

Model projections for precipitation over California continue to show the Mediterranean pattern of wet winters and dry summers, with seasonal, year-to-year, and decade-to-decade variability. For the first time, however, several of the improved climate models shift toward drier conditions by the mid- to late 21st century in central, and most notably, Southern California. By the late century, all projections show drying, and half of them suggest that 30-year average precipitation will decline by more than 10% below the historical average (CCCC 2012).

A summary of current and future climate change impacts to resource areas in California, as discussed in the California Natural Resources Agency (CNRA) report *Safeguarding California: Reducing Climate Risk* (CNRA 2014), is provided below.

Biodiversity and Habitat. The state's extensive biodiversity stems from its varied climate and assorted landscapes, which have resulted in numerous habitats where species have evolved and adapted over time. Specific climate change challenges to biodiversity and habitat include species migration in response to climatic changes, range shifts, and novel combinations of species; pathogens, parasites, and disease; invasive species; extinction risks; changes in the timing of seasonal life-cycle events; food web disruptions; and threshold effects (i.e., a change in the ecosystem that results in a "tipping point" beyond which irreversible damage or loss can be recouped). Habitat restoration, conservation, and resource management across California and through collaborative efforts among public, private, and nonprofit agencies has assisted in the effort to fight climate change impacts on biodiversity and habitat. One of the key measures in these efforts is ensuring species' ability to relocate as temperature and water availability fluctuate due to of climate change (CNRA 2014).

Energy. The energy sector provides California residents with a supply of reliable and affordable energy through a complex, integrated system. Specific climate change challenges for the energy sector include temperature rise, fluctuating precipitation patterns, increasing extreme weather events, and sea-level rise. Increasing temperatures and reduced snowpack negatively impact the availability of a steady flow of snowmelt to feed hydroelectric reservoirs. Higher temperatures also reduce the capacity of thermal power plants, since power plant cooling is less efficient at higher ambient temperatures. Increased temperatures will also increase electricity demand associated with air conditioning. Natural gas infrastructure in coastal California is threatened by sea-level rise and extreme storm events (CNRA 2014).

Ocean and Coastal Ecosystems and Resources. Sea-level rise, changing ocean conditions, and other climate-change stressors are likely to exacerbate long-standing challenges related to ocean and coastal ecosystems, in addition to threatening people and infrastructure located along the California coastline and in coastal communities. Sea-level rise, in addition to more frequent and severe coastal storms and erosion, are threatening vital infrastructure such as roads, bridges, power plants, ports, airports, gasoline pipes, and emergency facilities, as well as negatively impacting coastal recreational assets such as beaches and tidal wetlands. Water quality and ocean acidification threaten the abundance of seafood and other plant and wildlife habitats throughout California and globally (CNRA 2014).

Public Health. Climate change can impact public health through various environmental changes and is the largest threat to human health in the 21st century. Changes in precipitation patterns affect public health primarily through potential for altered water supplies and extreme events such as heat, floods, droughts, and wildfires. Increased frequency, intensity, and duration of extreme heat and heat waves are likely to increase the risk of mortality due to heat-related illness, and exacerbate existing chronic health conditions. Other extreme weather events are likely to negatively impact air quality and increase or intensify respiratory illness such as asthma and allergies. Additional health effects that may be impacted by climate change include cardiovascular disease, vector-borne diseases, mental health impacts, and malnutrition. Increased frequency of these ailments is likely to subsequently increase the direct risk of injury and/or mortality (CNRA 2014).

Transportation. Residents of California rely on airports, seaports, public transportation, and an extensive roadway network to gain access to destinations, goods, and services. Although the transportation industry is a source of GHG emissions, it is also vulnerable to climate change risks. Particularly, sea-level rise and erosion threaten many coastal California roadways, airports, seaports, transit systems, bridge supports, and energy and fueling infrastructure. Increasing temperatures and extended periods of extreme heat threaten the integrity of the roadways and rail lines. High temperatures cause road surfaces to expand, which leads to increased pressure and pavement buckling. High temperatures can also cause rail breakages, which could lead to train derailment. Other forms of extreme weather events, such as extreme storm events, can negatively impact infrastructure, which can impair movement of people and goods, and potentially block evacuation routes and emergency access roads. Increased wildfires, flooding, erosion, landslides, mudslides, and rockslides can all profoundly impact the transportation system and pose a serious risk to public safety (CNRA 2014).

Water. Water resources in California support residences, plants, wildlife, farmland, landscapes, and ecosystems, and bring trillions of dollars in economic activity. Climate change could seriously impact the timing, form, and amount of precipitation; runoff patterns; and the frequency and severity of precipitation events. Higher temperatures reduce the amount of snowpack and lead to earlier snowmelt, which can impact water supply availability, natural ecosystems, and winter recreation. Water supply availability during the intense dry summer months is heavily dependent on the snowpack accumulated during winter. Increased risk of flooding has a variety of public health concerns, including water quality, public safety, property damage, displacement, and post-disaster mental health problems. Prolonged and intensified droughts can also negatively groundwater reserves and result in increased overdraft and subsidence. Droughts can also negatively impact agriculture and farmland throughout the state. The higher risk of wildfires can lead to increased erosion, which can negatively impact watersheds and result in poor water quality. Water temperatures are also prone to increase, which can negatively impact wildlife that rely on a specific range of temperatures for suitable habitat (CNRA 2014).

In March 2016, CNRA released Safeguarding California: Implementation Action Plans, a document that shows how California is acting to convert the recommendations contained in the

2014 Safeguarding California plan into action (CNRA 2016). Additionally, in May 2017, the CNRA released the draft Safeguarding California Plan: 2017 Update, which is a survey of current programmatic responses for climate change, and contains recommendations for further actions (CNRA 2017). The CNRA released its Safeguarding California Plan: 2018 Update in January 2018, which provides a roadmap for state agencies to protect communities, infrastructure, services, and the natural environment from climate change impacts. The 2018 Safeguarding California Plan includes 69 recommendations across 11 sectors and more than 1,000 ongoing actions and next steps developed by scientific and policy experts across 38 state agencies (CNRA 2018). As with previous state adaptation plans, the 2018 Update addresses acceleration of warming across the state; more intense and frequent heat waves; greater riverine flows; accelerating sea-level rise; more intense and frequent drought; more severe and frequent wildfires; more severe storms and extreme weather events; shrinking snowpack and less overall precipitation; and ocean acidification, hypoxia, and warming.

10.2 REGULATORY FRAMEWORK

Federal Regulations

Massachusetts v. EPA. In Massachusetts v. EPA (April 2007), the U.S. Supreme Court directed the EPA administrator to determine whether GHG emissions from new motor vehicles cause or contribute to air pollution that may reasonably be anticipated to endanger public health or welfare, or whether the science is too uncertain to make a reasoned decision. In December 2009, the administrator signed a final rule with the following two distinct findings regarding GHGs under Section 202(a) of the federal Clean Air Act:

The administrator found that elevated concentrations of GHGs—CO_2, CH_4, N_2O, HFCs, PFCs, and SF_6—in the atmosphere threaten the public health and welfare of current and future generations. This is the “endangerment finding.”

The administrator further found the combined emissions of GHGs—CO_2, CH_4, N_2O, and HFCs—from new motor vehicles and new motor vehicle engines contribute to the GHG air pollution that endangers public health and welfare. This is the “cause or contribute finding.”

These two findings were necessary to establish the foundation for regulation of GHGs from new motor vehicles as air pollutants under the Clean Air Act.

Energy Independence and Security Act of 2007. The Energy Independence and Security Act of 2007 (December 2007), among other key measures, would do the following, which would aid in the reduction of national GHG emissions (EPA 2007):

- Increase the supply of alternative fuel sources by setting a mandatory Renewable Fuel Standard requiring fuel producers to use at least 36 billion gallons of biofuel by 2022.

- Set a target of 35 miles per gallon for the combined fleet of cars and light trucks by model year 2020, and directs the National Highway Traffic Safety Administration (NHTSA) to establish a fuel economy program for medium- and heavy-duty trucks and create a separate fuel economy standard for work trucks.

- Prescribe or revise standards affecting regional efficiency for heating and cooling products and procedures for new or amended standards, energy conservation, energy-efficiency labeling for consumer electronic products, residential boiler efficiency, electric motor efficiency, and home appliances.

Federal Vehicle Standards. In response to the U.S. Supreme Court ruling discussed above, the Bush Administration issued Executive Order (EO) 13432 in 2007 directing the EPA, the Department of Transportation, and the Department of Energy to establish regulations that reduce GHG emissions from motor vehicles, non-road vehicles, and non-road engines by 2008. In 2009, the NHTSA issued a final rule regulating fuel efficiency and GHG emissions from cars and light-duty trucks for model year 2011, and in 2010, the EPA and NHTSA issued a final rule regulating cars and light-duty trucks for model years 2012–2016.

In 2010, President Barack Obama issued a memorandum directing the Department of Transportation, Department of Energy, EPA, and NHTSA to establish additional standards regarding fuel efficiency and GHG reduction, clean fuels, and advanced vehicle infrastructure. In response to this directive, EPA and NHTSA proposed stringent, coordinated federal GHG and fuel economy standards for model years 2017–2025 light-duty vehicles. The proposed standards projected to achieve 163 grams per mile of CO_2 by model year 2025 on an average industry fleet-wide basis, which is equivalent to 54.5 miles per gallon if this level were achieved solely through fuel efficiency. The final rule was adopted in 2012 for model years 2017–2021. On January 12, 2017, the EPA finalized its decision to maintain the current GHG emissions standards for model years 2022–2025 cars and light trucks (EPA 2017b).

In addition to the regulations applicable to cars and light-duty trucks described above, in 2011, the EPA and NHTSA announced fuel economy and GHG standards for medium- and heavy-duty trucks for model years 2014–2018. The standards for CO_2 emissions and fuel consumption are tailored to three main vehicle categories: combination tractors, heavy-duty pickup trucks and vans, and vocational vehicles. According to the EPA, this regulatory program will reduce GHG emissions and fuel consumption for the affected vehicles by 6%–23% over the 2010 baselines.

In August 2016, the EPA and NHTSA announced the adoption of phase two of the program related to the fuel economy and GHG standards for medium- and heavy-duty trucks. The phase two program will apply to vehicles with model years 2018 through 2027 for certain trailers, and model years 2021 through 2027 for semi-trucks, large pickup trucks, vans, and all types and sizes of buses and work trucks. The final standards are expected to lower CO_2 emissions by approximately 1.1 billion MT and reduce oil consumption by up to 2 billion barrels over the lifetime of the vehicles sold under the program (EPA and NHTSA 2016).

State Regulations

The statewide GHG emissions regulatory framework is summarized below by category: state climate change targets, building energy, renewable energy and energy procurement, mobile sources, solid waste, water, and other state regulations and goals. The following text describes executive orders, legislation, regulations, and other plans and policies that would directly or indirectly reduce GHG emissions and/or address climate change issues.

State Climate Change Targets

EO S-3-05. EO S-3-05 (June 2005) established the following statewide goals: GHG emissions should be reduced to 2000 levels by 2010, GHG emissions should be reduced to 1990 levels by 2020, and GHG emissions should be reduced to 80% below 1990 levels by 2050.

AB 32 and CARB's Climate Change Scoping Plan. In furtherance of the goals established in EO S-3-05, the Legislature enacted Assembly Bill (AB) 32, the California Global Warming Solutions Act of 2006. AB 32 requires California to reduce its GHG emissions to 1990 levels by 2020.

Under AB 32, CARB is responsible for and is recognized as having the expertise to carry out and develop the programs and requirements necessary to achieve the GHG emissions reduction mandate of AB 32. Under AB 32, CARB must adopt regulations requiring the reporting and verification of statewide GHG emissions from specified sources. This program is used to monitor and enforce compliance with established standards. CARB also is required to adopt rules and regulations to achieve the maximum technologically feasible and cost-effective GHG emissions reductions. AB 32 relatedly authorized CARB to adopt market-based compliance mechanisms to meet the specified requirements. Finally, CARB is ultimately responsible for monitoring compliance and enforcing any rule, regulation, order, emissions limitation, emissions reduction measure, or market-based compliance mechanism adopted.

In 2007, CARB approved a limit on the statewide GHG emissions level for 2020, consistent with the determined 1990 baseline (427 MMT CO_2e). CARB's adoption of this limit is in accordance with Health and Safety Code Section 38550.

Further, in 2008, CARB adopted the Climate Change Scoping Plan: A Framework for Change (Scoping Plan) in accordance with Health and Safety Code Section 38561. The Scoping Plan establishes an overall framework for the measures that will be adopted to reduce California's GHG emissions for various emission sources/sectors to 1990 levels by 2020. The Scoping Plan evaluates opportunities for sector-specific reductions, integrates all CARB and Climate Action Team (CAT) early actions and additional GHG reduction features by both entities, identifies additional measures to be pursued as regulations, and outlines the role of a cap-and-trade program. The key elements of the Scoping Plan are the following (CARB 2008):

- Expanding and strengthening existing energy efficiency programs and building and appliance standards.
- Achieving a statewide renewable energy mix of 33%.
- Developing a California cap-and-trade program that links with other Western Climate Initiative partner programs to create a regional market system and caps sources contributing 85% of California's GHG emissions.
- Establishing targets for transportation-related GHG emissions for regions throughout California, and pursuing policies and incentives to achieve those targets.
- Adopting and implementing measures pursuant to existing state laws and policies, including California's clean car standards, goods movement measures, and the Low Carbon Fuel Standard.
- Creating targeted fees, including a public goods charge on water use, fees on high GWP gases, and a fee to fund the administrative costs of the state's long-term commitment to AB 32 implementation.

In the Scoping Plan, CARB determined that achieving the 1990 emissions level by 2020 would require a reduction in GHG emissions of approximately 28.5% from the otherwise projected 2020 emissions level (i.e., those emissions that would occur in 2020 absent GHG-reducing laws and regulations, referred to as "business-as-usual"). For purposes of calculating this percent reduction, CARB assumed that all new electricity generation would be supplied by natural gas plants, that no further regulatory action would impact vehicle fuel efficiency, and that building energy efficiency codes would be held at 2005 standards.

In the 2011 Final Supplement to the Scoping Plan's Functional Equivalent Document, CARB revised its estimates of the projected 2020 emissions level in light of the economic recession and the availability of updated information about GHG reduction regulations. Based on the new economic data, CARB determined that achieving the 1990 emissions level by 2020 would require a reduction in GHG emissions of 21.7% (down from 28.5%) from the business-as-usual conditions (CARB 2011). When the 2020 emissions level projection also was updated to account for newly implemented regulatory measures, including Pavley I (model years 2009–2016) and the Renewables Portfolio Standard (RPS) (12% to 20%) (CPUC 2015), CARB determined that achieving the 1990 emissions level in 2020 would require a reduction in GHG emissions of 16% (down from 28.5%) from the business-as-usual conditions.

In 2014, CARB adopted the First Update to the Climate Change Scoping Plan: Building on the Framework (First Update). The stated purpose of the First Update is to "highlight California's success to date in reducing its GHG emissions and lay the foundation for establishing a broad framework for continued emission reductions beyond 2020, on the path to 80% below 1990 levels by 2050" (CARB 2014). The First Update found that California is on track to meet the 2020 emissions reduction mandate established by AB 32, and noted that California could reduce emissions further by 2030 to levels squarely in line with those needed to stay on track to reduce emissions to 80% below 1990 levels by 2050 if the state realizes the expected benefits of existing policy goals.

In conjunction with the First Update, CARB identified "six key focus areas comprising major components of the state's economy to evaluate and describe the larger transformative actions that will be needed to meet the state's more expansive emission reduction needs by 2050" (CARB 2014). Those six areas are energy, transportation (vehicles/equipment, sustainable communities, housing, fuels, and infrastructure), agriculture, water, waste management, natural and working lands. The First Update identifies key recommended actions for each sector that will facilitate achievement of EO S-3-05's 2050 reduction goal.

CARB's research efforts presented in the First Update indicate that it has a "strong sense of the mix of technologies needed to reduce emissions through 2050" (CARB 2014). Those technologies include energy demand reduction through efficiency and activity changes; large-scale electrification of on-road vehicles, buildings, and industrial machinery; decarbonizing electricity and fuel supplies; and the rapid market penetration of efficient and clean energy technologies.

As part of the First Update, CARB recalculated the state's 1990 emissions level using more recent GWPs identified by the IPCC. Using the recalculated 1990 emissions level (431 MMT CO_2e) and the revised 2020 emissions level projection identified in the 2011 Final Supplement (CARB 2011), CARB determined that achieving the 1990 emissions level by 2020 would require a reduction in GHG emissions of approximately 15% (instead of 28.5% or 16%) from the business-as-usual conditions (CARB 2014).

On January 20, 2017, CARB released its 2017 Climate Change Scoping Plan Update (Second Update) for public review and comment (CARB 2017b). This update presents CARB's strategy for achieving the state's 2030 GHG target as established in Senate Bill (SB) 32 (discussed below), including continuing the Cap-and-Trade Program through 2030, and includes a new approach to reduce GHGs from refineries by 20%. The Second Update incorporates approaches to cutting short-lived climate pollutants (SLCPs) under the Short-Lived Climate Pollutant Reduction Strategy (a planning document that was adopted by CARB in March 2017), acknowledges the need for reducing emissions in agriculture, and highlights the work underway to ensure that California's natural and working lands increasingly sequester carbon. During development of the Second Update, CARB held a number of public workshops in the natural and working lands, agriculture, energy, and transportation sectors to inform development of the 2030 Scoping Plan Update (CARB 2016). When discussing project-level GHG emissions reduction actions and thresholds, the Second Update states, "achieving no net increase in GHG emissions is the correct overall objective, but it may not be appropriate or feasible for every development project. An inability to mitigate a project's GHG emissions to zero does not necessarily imply a substantial contribution to the cumulatively significant environmental impact of climate change under CEQA" (CARB 2017b). The Second Update was approved by CARB's Governing Board on December 14, 2017.

EO B-30-15. EO B-30-15 (April 2015) identified an interim GHG reduction target in support of targets previously identified under EO S-3-05 and AB 32. EO B-30-15 set an interim target goal of reducing statewide GHG emissions to 40% below 1990 levels by 2030 to keep California on its trajectory toward meeting or exceeding the long-term goal of reducing statewide GHG emissions to 80% below 1990 levels by 2050, as set forth in EO S-3-05. To facilitate achievement of this goal, EO B-30-15 calls for an update to CARB's Scoping Plan to express the 2030 target in terms of MMT CO_2e. The executive order also calls for state agencies to continue to develop and implement GHG emission reduction programs in support of the reduction targets. EO B-30-15 does not require local agencies to take any action to meet the new interim GHG reduction target.

SB 32 and AB 197. SB 32 and AB 197 (enacted in 2016) are companion bills that set a new statewide GHG reduction targets, make changes to CARB's membership, increase legislative oversight of CARB's climate-change-based activities, and expand dissemination of GHG and other air-quality-related emissions data to enhance transparency and accountability. More specifically, SB 32 codified the 2030 emissions reduction goal of EO B-30-15 by requiring CARB to ensure that statewide GHG emissions are reduced to 40% below 1990 levels by 2030. AB 197 established the Joint Legislative Committee on Climate Change Policies, consisting of at least three members of the Senate and three members of the Assembly, to provide ongoing oversight over implementation of the state's climate policies. AB 197 also added two members of the Legislature to CARB as nonvoting members; requires CARB to make available and update (at least annually via its website) emissions data for GHGs, criteria air pollutants, and toxic air contaminants from reporting facilities; and requires CARB to identify specific information for GHG emissions reduction measures when updating the Scoping Plan.

Building Energy

Title 24, Part 6. Title 24 of the California Code of Regulations was established in 1978 and serves to enhance and regulate California's building standards. Although not initially promulgated to reduce GHG emissions, Part 6 of Title 24 specifically establishes Building Energy Efficiency Standards that are designed to ensure that new and existing buildings in California achieve energy efficiency and preserve outdoor and indoor environmental quality.

These energy efficiency standards are reviewed every few years by the Building Standards Commission and California Energy Commission (CEC) (and revised if necessary) (California Public Resources Code (PRC) Section 25402(b)(1)). The regulations receive input from members of industry and the public, with the goal of "reducing of wasteful, uneconomic, inefficient, or unnecessary consumption of energy" (PRC Section 25402). These regulations are carefully scrutinized and analyzed for technological and economic feasibility (PRC Section 25402(d)) and cost effectiveness (PRC Sections 25402(b)(2) and (b)(3)). These standards are updated to consider and incorporate new energy-efficient technologies and construction methods. As a result, these standards save energy, increase electricity supply reliability, increase indoor comfort, avoid the need to construct new power plants, and help preserve the environment.

The 2016 Title 24 standards are the currently applicable building energy efficiency standards, and became effective on January 1, 2017. In general, single-family homes built to the 2016 standards are anticipated to use about 28% less energy for lighting, heating, cooling, ventilation, and water heating than those built to the 2013 standards, and nonresidential buildings built to the 2016 standards will use an estimated 5% less energy than those built to the 2013 standards (CEC 2015a).

Title 24, Part 11. In addition to CEC's efforts, in 2008, the California Building Standards Commission adopted the nation's first green building standards. The California Green Building Standards Code is commonly referred to as CALGreen, and establishes minimum mandatory standards and voluntary standards pertaining to the planning and design of sustainable site development, energy efficiency (in excess of the California Energy Code requirements), water conservation, Material conservation, and interior air quality (CALGreen 2016). The CALGreen standards took effect in January 2011 and instituted mandatory minimum environmental performance standards for all ground-up, new construction of commercial, low-rise residential, and state-owned buildings, and schools and hospitals. The CALGreen 2016 standards became effective on January 1, 2017. The mandatory standards require the following (CALGreen 2016):

- Mandatory reduction in indoor water use through compliance with specified flow rates for plumbing fixtures and fittings.

- Mandatory reduction in outdoor water use through compliance with a local water efficient landscaping ordinance or the California Department of Water Resources' Model Water Efficient Landscape Ordinance.

- 65% of construction and demolition waste must be diverted from landfills.

- Mandatory inspections of energy systems to ensure optimal working efficiency.

- Inclusion of electric vehicle charging stations or designated spaces capable of supporting future charging stations.

- Low-pollutant-emitting exterior and interior finish materials, such as paints, carpets, vinyl flooring, and particle boards.

The CALGreen standards also include voluntary efficiency measures that are provided at two separate tiers and implemented at the discretion of local agencies and applicants. CALGreen's Tier 1 standards call for a 15% improvement in energy requirements, stricter water conservation, 65% diversion of construction and demolition waste, 10% recycled content in building materials, 20% permeable paving, 20% cement reduction, and cool/solar-reflective roofs. CALGreen's more rigorous Tier 2 standards call for a 30% improvement in energy requirements, stricter water conservation, 75% diversion of construction and demolition waste, 15% recycled content in building materials, 30% permeable paving, 25% cement reduction, and cool/solar-reflective roofs.

The California Public Utilities Commission (CPUC), CEC, and CARB also have a shared, established goal of achieving zero net energy for new construction in California. The key policy timelines are that all new residential construction in California will be zero net energy by 2020, and all new commercial construction in California will be zero net energy by 2030 (CPUC 2013).[3] As most recently defined by CEC in its 2015 Integrated Energy Policy Report, a zero net energy code building is "one where the value of the energy produced by onsite renewable energy resources is equal to the value of the energy consumed annually by the building" using the CEC's time-dependent valuation metric (CEC 2015b).

Mobile Sources

AB 1493. In a response to the transportation sector accounting for more than half of California's CO_2 emissions, AB 1493 was enacted in July 2002. AB 1493 required CARB to set GHG emission standards for passenger vehicles, light-duty trucks, and other vehicles determined by the state board to be vehicles that are primarily used for noncommercial personal transportation in the state. The bill required that CARB set GHG emission standards for motor vehicles manufactured in 2009 and all subsequent model years. CARB adopted the standards in September 2004. In 2009–2012, standards resulted in a reduction of approximately 22% in GHG emissions compared to emissions from the 2002 fleet, and in 2013–2016, standards resulted in a reduction of approximately 30%.

EO S-1-07. Issued on January 18, 2007, EO S-1-07 sets a declining low-carbon fuel standard for GHG emissions measured in CO_2e grams per unit of fuel energy sold in California. The target of the low-carbon fuel standard is to reduce the carbon intensity of California passenger vehicle fuels by at least 10% by 2020. Carbon intensity measures the amount of GHG emissions in the lifecycle of a fuel, including extraction/feedstock production, processing, transportation, and final consumption, per unit of energy delivered. CARB adopted the implementing regulation in

[3] It is expected that achievement of the zero net energy goal will occur via revisions to the Title 24 standards.

April 2009. The regulation is expected to increase the production of biofuels, including those from alternative sources, such as algae, wood, and agricultural waste.

SB 375. SB 375 (2008) addresses GHG emissions associated with the transportation sector through regional transportation and sustainability plans. SB 375 required CARB to adopt regional GHG reduction targets for the automobile and light-truck sector for 2020 and 2035. Regional metropolitan planning organizations (MPO) are then responsible for preparing a Sustainable Communities Strategy (SCS) within their Regional Transportation Plan (RTP). The goal of the SCS is to establish a forecasted development pattern for the region that, after considering transportation measures and policies, will achieve, if feasible, the GHG reduction targets. If an SCS is unable to achieve the GHG reduction target, an MPO must prepare an Alternative Planning Strategy demonstrating how the GHG reduction target would be achieved through alternative development patterns, infrastructure, or additional transportation measures or policies.

Pursuant to Government Code Section 65080(b)(2)(K), an SCS does not regulate the use of land; supersede the land use authority of cities and counties; or require that a city's or county's land use policies and regulations, including those in a general plan, be consistent with it. Nonetheless, SB 375 makes regional and local planning agencies responsible for developing those strategies as part of the federally required metropolitan transportation planning process and the state-mandated housing element process.

SB 350. In 2015, SB 350, the Clean Energy and Pollution Reduction Act, was enacted into law. As one of its elements, SB 350 establishes a statewide policy for widespread electrification of the transportation sector, recognizing that such electrification is required for achievement of the state's 2030 and 2050 reduction targets (see Public Utilities Code Section 740.12).

Water

EO B-29-15. In response to the ongoing drought in California, EO B-29-15 (April 2015) set a goal of achieving a statewide reduction in potable urban water usage of 25% relative to water use in 2013. The term of the executive order extended through February 28, 2016, although many of the directives have since become permanent water-efficiency standards and requirements. The executive order includes specific directives that set strict limits on water usage in the state. In response to EO B-29-15, the California Department of Water Resources modified and adopted a revised version of the Model Water Efficient Landscape Ordinance that, among other changes, significantly increased the requirements for landscape water use efficiency and broadened its applicability to include new development projects with smaller landscape areas.

Local Regulations

Palo Alto Sustainability and Climate Action Plan

The Sustainability and Climate Action Plan Framework found that by 2015, Palo Alto had already reduced GHG emissions an estimated 36% compared to 1990 emission levels. These reductions were the result of the City's commitment to carbon neutral electricity, improved energy efficiency in buildings, and improved energy efficiency of appliances. The S/CAP Framework identifies that "Palo Alto's largest remaining sources of greenhouse gas emissions are road transportation (approximately 65%) followed by natural gas use (approximately 26%)" (Palo Alto 2017a).

The S/CAP also found that over the next 14 years, "the City's GHG emissions are expected to be about 50 percent below the 1990 baseline levels, due to state and federal policies such as new vehicle fuel standards, and existing City initiatives including its Green Building Ordinance and Bicycle and Pedestrian Plan," and that these anticipated GHG emission reductions would be consistent with the state's interim 2030 reduction target of 40 percent (Palo Alto 2017a). To achieve the City's 80 percent reduction target by 2030, the S/CAP found that an additional reduction of 224,600 MT CO_2e would need to be realized.

The S/CAP includes several specific strategies for achieving GHG reductions, such as expanding the city's bike network, increasing ridership on transit and Palo Alto's shuttles, shifting parking incentive programs, expanding charging infrastructure for electric vehicles, improved energy efficiency in buildings, electrification of water and space heating and cooking where cost effective, and emphasizing all-electric services in "zero net energy" new buildings. The mobility-related strategies are projected to result in a reduction in transportation GHG emissions of 117,900 MT CO_2e, or more than half of the needed additional reductions, that improved energy efficiency in buildings and switching from natural gas to electricity would result in a reduction of 97,200 MT CO_2e, and a reduction of 9,500 MT CO_2e would come from continuation and extension of Palo Alto's zero waste initiatives.

City of Palo Alto Comprehensive Plan

Goals and policies related to reducing GHG emissions are found throughout the *City of Palo Alto Comprehensive Plan.* Those goals and policies most relevant to the proposed Castilleja School project include:

- Goal T-1 Create a sustainable transportation system, complemented by a mix of land uses, that emphasizes walking, bicycling, use of public transportation and other methods to reduce GHG emissions and the use of single-occupancy motor vehicles.

- Policy T-1.1 Take a comprehensive approach to reducing single-occupant vehicle trips by involving those who live, work and shop in Palo Alto in developing strategies that make it easier and more convenient not to drive.

- Policy T-1.2 Collaborate with Palo Alto employers and business owners to develop, implement and expand comprehensive programs like the TMA to reduce single-occupant vehicle commute trips, including through incentives.

- Policy T-1.3 Reduce GHG and pollutant emissions associated with transportation by reducing VMT and per-mile emissions through increasing transit options, supporting biking and walking, and the use of zero-emission vehicle technologies to meet City and State goals for GHG reductions by 2030.

- Policy T-1.4 Ensure that electric vehicle charging infrastructure, including infrastructure for charging e-bikes, is available citywide.

- Policy T-1.6 Encourage innovation and expanded transit access to regional destinations, multi-modal transit stations, employment centers and commercial centers, including those within Palo Alto through the use of efficient public and/or private transit options such as rideshare services, on-demand local shuttles and other first/last mile connections.

- Policy T-1.16 Promote personal transportation vehicles an alternative to cars (e.g. bicycles, skateboards, roller blades) to get to work, school, shopping, recreational facilities and transit stops.

- Goal N-7 A clean, efficient energy supply that makes use of cost-effective renewable resources.

  - Policy N-7.3 Prioritize the identification and implementation of cost-effective, reliable and feasible energy efficiency and demand reduction opportunities.

  - Policy N-7.4 Maximize the conservation and efficient use of energy in new and existing residences and other buildings in Palo Alto.

  - Policy N-7.5 Encourage energy efficient lighting that protects dark skies and promotes energy conservation by minimizing light and glare from development while ensuring public health and safety.

- GOAL N-8 Actively support regional efforts to reduce our contribution to climate change while adapting to the effects of climate change on land uses and city services.

- Policy N-8.2 With guidance from the City's Sustainability and Climate Action Plan (S/CAP) and its subsequent updates and other future planning efforts, reduce greenhouse gas emissions from City operations and from the community.

City of Palo Alto Municipal Code

All development projects in the City are required to comply with Title 16, Chapter 16.14, California Green Building Standards, and Chapter 16.18, Local Energy Efficiency Standards for Certain Buildings and Improvements, contained in the City of Palo Alto Municipal Code. Compliance with these requirements will help reduce the overall energy demand of the proposed project.

10.3 PROJECT IMPACTS

Significance Criteria

The following significance criteria, based on Appendix G of the CEQA Guidelines, are used to evaluate the project impacts to greenhouse gases/climate change are based on Appendix G of the CEQA Guidelines. The City of Palo Alto relies on the standards set by the BAAQMD as recommendations for its thresholds.

- Would the project generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment?
- Would the project conflict with an applicable plan, policy, or regulation adopted for the purpose of reducing the emissions of greenhouse gases?

Impact Analysis

IMPACT 10-1:	Generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment
SIGNIFICANCE:	Less than Significant
MITIGATION MEASURES:	None Required
SIGNIFICANCE AFTER MITIGATION:	Less than Significant

Section 15064.7(c) of the CEQA Guidelines specifies that "[w]hen adopting thresholds of significance, a lead agency may consider thresholds of significance previously adopted or recommended by other public agencies, or recommended by experts, provided the decision of the lead agency to adopt such thresholds is supported by substantial evidence" (14 CCR §15064.7(c)). The City of Palo Alto utilizes the most recent recommendations of the BAAQMD to determine the level of significance of a project with respect to greenhouse gas emissions. The BAAQMD CEQA Guidelines (BAAQMD 2017) recommend three separate thresholds of significance to determine whether a project's GHG emissions would result in a significant impact. A project that is found to be compliant with a qualified GHG Reduction Strategy, or would have annual emissions less than 1,100 MT CO_2e, or would have annual emissions of 4.6 MT CO_2e per service population (residents and employees) would be considered to have a less than significant impact.

Construction Impacts

Construction of the proposed project would result in GHG emissions that would primarily be associated with use of off-road construction equipment, on-road hauling and vendor trucks, and worker vehicles. Construction GHG emissions are a one-time release and are typically considered separate from operational emissions, as global climate change is inherently a cumulative effect that occurs over a long period of time and is quantified on a yearly basis. CalEEMod was used to calculate the annual GHG emissions based on the construction schedule described in Chapter 2, Project Description. Construction of the proposed project is anticipated to occur in four overlapping phases over three years. On-site sources of GHG emissions during construction would include off-road equipment and off-site sources including haul trucks, vendor trucks, and worker vehicles. Table 10-2 presents the estimated amount of GHG emissions for each year of construction.

Table 10-2
Estimated Annual Construction Greenhouse Gas Emissions

Emission Source/Year	CO_2e (MT/yr)
2020	452.6
2021	749.2
2022	161.2
Total	**1,363.3**

Source: See Appendix G for detailed results.
Note: Total emissions may not sum due to rounding.
CO_2e = carbon dioxide-equivalent; MT/year = metric tons per year

As shown in Table 10-2, total construction GHG emissions over all three years in which construction occurs would be approximately 1,363.3 MT CO_2e, with the greatest emissions produced during the second construction year. As previously discussed, the BAAQMD identifies a GHG emission threshold of 1,100 MT CO_2e per year. Table 10-2 demonstrates that the proposed project would not exceed the BAAQMD GHG threshold for any construction year. Therefore, the proposed project's construction-related GHG emissions would represent a **less than significant** impact.

Operational Impacts

Long-term operations of the proposed project would result in GHG emissions through area sources (landscape maintenance equipment); energy use (natural gas and generation of electricity consumed by the project); generation of electricity associated with wastewater treatment and with water supply, treatment, and distribution; solid waste disposal; and transportation to and from the project site. As noted in Chapter 9, Air Quality, the project would replace existing buildings with new construction. The new buildings would be subject to the building code in effect at the time that building permits are issued. The new buildings would have much higher energy efficiency than the existing buildings, which would reduce energy consumption within the project site. The need for landscape maintenance would not change substantially as a result of the project and the school would implement a Sustainability Plan to reduce vehicle trips, solid waste generation, and water usage. Thus no new area source GHG emissions would occur. The project would also accommodate an increase in student enrollment which would lead to increases in vehicle miles traveled (VMT) from students' transportation to and from the school. As reported in the Traffic Impact Study in Appendix E, the project would generate 279 vehicle trips per day, for a total of 2,145 VMT daily and 386,100 VMT annually. As discussed in Chapter 7, Transportation, this calculated VMT increase is based on the existing daily trip generation rate at the school. While the school is planning to implement an expanded TDM program with the project, no additional trip reductions have been applied. Thus, the impacts identified in this section assume that no increase in the TDM effectiveness is realized. The CalEEMod output provided in Appendix G shows that this additional VMT would generate 135.73 metric tons of CO_2e annually. This is well-below the BAAQMD threshold of 1,100 MT CO_2e, thus the project would result in a **less than significant** impact from GHG emissions during operation.

IMPACT 10-2:	Conflict with an applicable plan, policy, or regulation adopted for the purpose of reducing the emissions of greenhouse gases
SIGNIFICANCE:	Less than Significant
MITIGATION MEASURES:	None Required
SIGNIFICANCE AFTER MITIGATION:	Less than Significant

As mentioned previously, the City of Palo Alto released a draft Sustainability and Climate Action Plan (S/CAP) in 2016 which is aimed at promoting sustainable development and lowering greenhouse gas emissions. The S/CAP does not contain any quantitative thresholds that apply directly to the proposed project; however, included in the CAP are strategies and goals that the City has designed in order to reach their target of a 40 percent greenhouse gas emission reduction by 2020 and the goal of an 80 percent reduction by 2030. The proposed project has characteristics that are consistent with S/CAP Goal 2.1 to reduce GHG emissions and energy consumption in buildings. Sustainable design measures proposed include features such as: onsite energy generation from roof-mounted photovoltaics, electrical vehicle chargers, drought-tolerant landscaping, and reduced outdoor water use/irrigation. The project would also be required to implement green building requirements in accordance with the City's Green Building Ordinance (Ord. 5393 § 1 (part), 2016). Refer to Chapter 11, Energy Consumption, for additional discussion of the project's proposed Sustainability Road Map (Appendix B) and project features that would reduce energy consumption, including use of photo-voltaic rooftop panels on the proposed Academic building.

The proposed project would meet the City's waste diversion requirements including material reuse and onsite sorting of all remaining demolition materials not suitable for use in constructing the new buildings to ensure architectural salvage material is diverted away from landfills.

The proposed project consists of redevelopment of the project site. The site would be accessible for pedestrians, bicyclists, and public transit users. Although the increase in students enrolled at this site would result in additional vehicle trips to this particular site, because this is in a transit-oriented location and close to residential uses, the project may reduce vehicle trips compared to projects that are not infill development or redevelopment (i.e. the location of a new school or expansion of an existing school in a location less accessible to alternative transit options) thereby reducing mobile-related GHG emissions and contributing to achieving AB 32, SB 32, and other GHG-reduction goals. Additionally, project includes implementation of an expanded TDM program with the goal of reducing the total number of vehicle trips and associated VMT generated by the project.

As previously discussed, project-generated operational GHG emissions would not exceed the BAAQMD threshold of 1,100 MT CO_2e per year. Because the proposed project would result in emissions below the BAAQMD emissions threshold, it would also be consistent with regional and local targets for reducing GHG emissions. Overall, the proposed project would not conflict with any other applicable plans, policies, or regulations adopted for the purpose of reducing GHG emissions.

Based on the above considerations, the proposed project would not conflict with an applicable plan, policy, or regulation adopted for the purpose of reducing the emissions of GHGs, and no mitigation is required. This impact would be **less than significant**.

IMPACT 10-3:	Make a cumulatively considerable contribution to emissions of greenhouse gases in the cumulative scenario
SIGNIFICANCE:	Less than Significant
MITIGATION MEASURES:	None Required
SIGNIFICANCE AFTER MITIGATION:	Less than Significant

The issue of global climate change is inherently a cumulative issue as the GHG emissions of individual projects cannot be shown to have any material effect on the global climate. Thus, the analysis of Impacts 10-1 and 10-2 reflect consideration of the proposed project's contribution to climate change at a cumulative level. The cumulative context for climate change comprises anthropogenic (i.e., human-made) GHG emissions sources across the globe, and no project alone would reasonably be expected to contribute to a noticeable incremental change to the global climate. Subsequently, California has established legislation and regulatory measures providing a statewide context for developing an enforceable statewide cap on GHG emissions with the goal of reducing climate change effects. Given the environmental consequences resulting from GHGs and global climate change, CEQA requires that lead agencies consider evaluating the cumulative impacts of GHGs, even relatively small (on a global basis) contributions.

As previously discussed in Impacts 10-1 and 10-2, the threshold applied in the GHG emissions analysis was the recommended BAAQMD threshold of 1,100 MT CO_2e per year. During each year of construction and throughout project operation following construction, GHG emissions associated with the proposed project would remain below this threshold. Therefore, the proposed project would have a **less than significant** impact with regards to cumulatively considerable GHG emissions.

10.4 MITIGATION MEASURES

All impacts associated with GHG emissions are less than significant. No mitigation measures are required.

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CHAPTER 11
ENERGY CONSERVATION

This section describes the existing energy resources in the City of Palo Alto (City), summarizes regulatory guidance regarding energy consumption and conservation, estimates the energy consumption associated with the proposed Castilleja School project (proposed project), and evaluates whether this consumption would result in adverse environmental effects.

Information in this section is based on the proposed project's Air Pollutant and Greenhouse Gas Emissions modeling provided in Appendix G to this Draft EIR.

11.1 EXISTING CONDITIONS

The environmental setting for the proposed project related to electricity, natural gas, and petroleum, including associated service providers, supply sources, and estimated consumption, is discussed below.

Electricity

Electricity usage in California varies substantially by the types of uses in a building, types of construction materials used in a building, and the efficiency of all electricity-consuming devices within a building. Seasonal changes in weather also result in wide fluctuations in typical daily energy use. Due to the state's energy efficiency building standards and efficiency and conservation programs, California's electricity use per capita has remained stable for more than 30 years, while the national average has steadily increased (California Energy Commission (CEC) 2015). In 2016, California's estimated annual energy use included approximately 256,846 gigawatt hours of electricity (Energy Information Administration (EIA) 2018a).

In Palo Alto, electrical service is provided by the City of Palo Alto Utilities (CPAU). CPAU purchases electric power from hydroelectric resources, including those managed by the Western Area Power Administration and the Calaveras Hydroelectric Project, owned and operated by the Northern California Power Agency. Power from these hydroelectric suppliers is supplemented with energy from other renewable suppliers and supplies from the market in order to meet the customer demand.

The CPAU serves 29,500 electric customers over an area of approximately 26 square miles. The City's maximum demand for electricity in fiscal year 2018 was 183 megawatts (MW) with a total consumption of electricity of 925 million kilowatt hours (kWh). The City's Electric Fund pays for operations and maintenance of the electric system and almost all of the electric power is purchased from outside the City, with the exception of a 4.8 MW back-up generating facility and close to 1,115 local solar photovoltaic installations that meet 1.8 percent of the City's electricity needs (CPAU 2019).

The Comprehensive Plan EIR provided city-wide electricity consumption data from 2011 through 2014, as shown below in Table 11-1. The City found that between 2003 and 2008 electricity consumption increased at an average rate of 1.0 percent per year but then decreased due to a combination of factors, including the economic slowdown and increased energy efficiency. The City projected that energy usage would continue to decline between 2015 and 2018 at a rate of 0.2 percent per year, and then is expected to increase as a result of electrifying transportation and natural gas appliances to meet greenhouse gas (GHG) reduction goals. The City's energy loads have actually declined by 4 percent since 2015 due to customer sited solar generation, efficiency improvements, and customers with energy intensive loads moving out of Palo Alto. Customer loads in the future are anticipated to continue to decline, but as noted previously, these declines are still expected to be partially or fully off-set by electrification of transportation and natural gas appliances to meet the City's GHG reduction goals (CPAU 2019).

Table 11-1
Palo Alto Electricity Consumption

	Annual Electricity Consumption (kilowatt hours)				
Sector	***2011***	***2012***	***2013***	***2014***	***Average***
Single-Family	121,871,934	118,456,458	118,456,458	113,219,501	118,041,466
Multi-Family	38,667,524	39,386,048	39,395,143	36,308,103	38,439,205
Commercial	420,155,466	435,616,568	461,915,062	479,054,920	449,185,504
Industrial	251,541,035	227,281,310	219,218,161	210,241,296	227,070,451
Public Facilities	55,923,659	54,657,391	55,182,913	56,218,434	55,495,599
City Facilities	29,331,131	29,040,538	28,809,795	29,713,565	29,223,757
Commercial Multi-Family	32,025,863	30,420,776	30,257,401	28,629,293	30,333,333
Total	**949,516,612**	**935,020,602**	**953,234,933**	**953,385,112**	**947,789,315**

Source: City of Palo Alto 2017

Natural Gas

Natural gas is used for cooking and space heating as well as for generating electricity and as an alternative transportation fuel. Demand for natural gas can vary depending on factors such as weather, price of electricity, the health of the economy, environmental regulations, energy efficiency programs, and the availability of alternative renewable energy sources.

The majority of California's natural gas customers are residential and small commercial customers (core customers). These customers accounted for approximately 30% of the natural gas delivered by California utilities in 2016. Large consumers, such as electric generators and industrial customers (noncore customers), accounted for approximately 70% of the natural gas delivered by California utilities in 2016 (EIA 2017). In 2016, California's estimated annual energy use included approximately 22 billion therms of natural gas (approximately 6 billion cubic feet of natural gas per day) (EIA 2018b).

The California Public Utilities Commission (CPUC) regulates natural gas utility service for approximately 10.8 million customers who receive natural gas from Pacific Gas & Electric (PG&E) and other natural gas utilities, but not CPAU's natural gas system. Most of the natural gas used in California comes from out-of-state natural gas basins. California gas utilities may soon also begin receiving biogas into their pipeline systems (CPUC 2017a).

Palo Alto has owned and operated a natural gas distribution system since 1917. The system receives natural gas from PG&E's regional transmission system and has an annual natural gas load of approximately three million Btu (3 MMBtu; or about 30 million therms) (Palo Alto 2017).

The Comprehensive Plan EIR provided city-wide natural gas consumption data from 2011 through 2014, as shown below in Table 11-2. During this time period, the average natural gas consumption in the city was nearly 29 million gallons per year. The data demonstrates that natural gas consumption has been decreasing or relatively constant across most sectors. The City Council adopted gas efficiency targets in 2007 and updated these in 2010, establishing a goal of reducing natural gas consumption by 5.5 percent between 2011 and 2020.

Table 11-2
Palo Alto Natural Gas Consumption

Sector	Annual Natural Gas Consumption (Therms)				
	2011	***2012***	***2013***	***2014***	***Average***
Single-Family	10,287,368	9,510,992	9,815,382	7,916,548	9,382,573
Multi-Family	1,450,423	1,431,732	1,471,949	1,207,354	1,390,365
Commercial	7,988,655	8,040,302	8,580,855	8,504,190	8,278,501
Industrial	5,079,522	4,453,603	3,995,267	3,606,115	4,283,627
Public Facilities	2,402,418	2,243,997	2,258,653	2,047,591	2,238,165
City Facilities	996,273	827,300	852,108	881,204	889,221
Commercial Multi-Family	2,691,001	2,635,593	2,550396	2,259,322	2,534,078
Total	**30,895,660**	**29,143,519**	**29,524,610**	**26,422,324**	**28,996,528**

Source: City of Palo Alto 2017

Petroleum

There are more than 35 million registered vehicles in California, and those vehicles consume an estimated 18 billion gallons of fuel each year (CEC 2017a; DMV 2017). Petroleum currently accounts for approximately 92% of California's transportation energy consumption (CEC 2017a). However, technological advances, market trends, consumer behavior, and government policies could result in significant changes in fuel consumption by type and in total. At the federal and state levels, various policies, rules, and regulations have been enacted to improve vehicle fuel efficiency, promote the development and use of alternative fuels, reduce transportation-source air pollutants and GHG emissions, and reduce vehicle miles traveled (VMT). Market forces have driven the price of petroleum products steadily upward over time, and technological advances have made use of other energy resources or alternative transportation modes increasingly feasible.

Largely as a result of and in response to these multiple factors, gasoline consumption within the state has declined in recent years, and availability of other alternative fuels/energy sources has increased. The quantity, availability, and reliability of transportation energy resources have increased in recent years, and this trend may likely continue and accelerate (CEC 2017a). Increasingly available and diversified transportation energy resources act to promote continuing reliable and affordable means to support vehicular transportation within the state.

11.2 REGULATORY FRAMEWORK

Federal, state, and local agencies regulate energy use and consumption through various means and programs. On the federal level, the U.S. Department of Transportation, the U.S. Department of Energy, and the U.S. Environmental Protection Agency are three federal agencies with substantial influence over energy policies and programs. On the state level, CPUC and CEC are two agencies with authority over different aspects of energy. Relevant federal, state, and local energy-related regulations are summarized below.

Federal Regulations

Federal Energy Policy and Conservation Act

In 1975, Congress enacted the Federal Energy Policy and Conservation Act, which established the first fuel economy standards for on-road motor vehicles in the United States. Pursuant to the act, the National Highway Traffic Safety Administration is responsible for establishing additional vehicle standards. In 2012, new fuel economy standards for passenger cars and light trucks were approved for model years 2017 through 2021 (77 FR 62624–63200). Fuel economy is determined based on each manufacturer's average fuel economy for the fleet of vehicles available for sale in the United States.

Energy Independence and Security Act of 2007

On December 19, 2007, the Energy Independence and Security Act of 2007 (EISA) was signed into law. In addition to setting increased Corporate Average Fuel Economy standards for motor vehicles, the EISA includes the following other provisions related to energy efficiency:

- Renewable Fuel Standard (RFS) (Section 202)
- Appliance and Lighting Efficiency Standards (Sections 301–325)
- Building Energy Efficiency (Sections 411–441)

This federal legislation requires ever-increasing levels of renewable fuels (the RFS) to replace petroleum (EPA 2013, 2015). The U.S. Environmental Protection Agency is responsible for developing and implementing regulations to ensure that transportation fuel sold in the United States contains a minimum volume of renewable fuel. The RFS program regulations were developed in collaboration with refiners, renewable fuel producers, and many other stakeholders.

The RFS program was created under the Energy Policy Act of 2005 and established the first renewable fuel volume mandate in the United States. As required under the act, the original RFS program (RFS1) required 7.5 billion gallons of renewable fuel to be blended into gasoline by 2012. Under the EISA, the RFS program was expanded in several key ways that lay the foundation for achieving significant reductions in GHG emissions from the use of renewable fuels, reducing imported petroleum, and encouraging the development and expansion of the renewable fuels sector in the United States. The updated program is referred to as "RFS2." The key changes to the RFS program under EISA include:

- Targets have been established for diesel, in addition to gasoline;
- The volume of renewable fuel required to be blended into transportation fuel was increased from 9 billion gallons in 2008 to 36 billion gallons by 2022;
- New categories of renewable fuel were established, and separate volume requirements set for each category; and
- The U.S. Environmental Protection Agency is required to apply lifecycle GHG performance threshold standards to ensure that each category of renewable fuel emits fewer GHGs than the petroleum fuel it replaces.

Additional provisions of the EISA address energy savings in government and public institutions, research for alternative energy, additional research in carbon capture, international energy programs, and the creation of "green" jobs.

State Regulations

The discussion below focuses primarily on those policies, regulations, and laws that directly pertain to energy-related resources. Also refer to Chapter 13, Greenhouse Gas Emissions, which addresses various policies, regulations, and laws targeted to the reduction of these emissions that are expected to achieve co-benefits in the form of reduced demand for energy-related resources and enhanced efficiencies in the consumption of energy-related resources.

Senate Bill 1078 (2002)

Senate Bill (SB) 1078 (2002) established the California Renewable Portfolio Standard (RPS) Program and required that a retail seller of electricity purchase a specified minimum percentage of electricity generated by eligible renewable energy resources as defined in any given year, culminating in a 20% standard by December 31, 2017. These retail sellers include electrical corporations, community choice aggregators, and electric service providers. The bill relatedly required the CEC to certify eligible renewable energy resources, design and implement an accounting system to verify compliance with the RPS by retail sellers, and allocate and award supplemental energy payments to cover above-market costs of renewable energy.

Senate Bills 107 (2006), X1-2 (2011), and 350 (2015)

SB 107 (2006) accelerated the RPS established by SB 1078 by requiring that 20% of electricity retail sales be served by renewable energy resources by 2010. Additionally, SB X1-2 (2011) requires all California utilities to generate 33% of their electricity from eligible renewable energy resources by 2020. Specifically, SB X1-2 sets a three-stage compliance period: by December 31, 2013, 20% shall come from renewables; by December 31, 2016, 25% shall come from renewables; and by December 31, 2020, 33% shall come from renewables.

SB 350 (2015) requires retail seller and publicly owned utilities to procure 50% of their electricity from eligible renewable energy resources by 2030, with interim goals of 40% by 2024 and 45% by 2027.

Consequently, utility energy generation from non-renewable resources is expected to be reduced based on implementation of the 33% RPS in 2020 and the 50% RPS in 2030 (CPUC 2017b). Therefore, the proposed project's reliance on non-renewable energy sources would also be reduced.

Assembly Bill 1007 (2005)

Assembly Bill (AB) 1007 (2005) required the CEC to prepare a statewide plan to increase the use of alternative fuels in California (State Alternative Fuels Plan). The CEC prepared the plan in partnership with the California Air Resources Board (CARB) and in consultation with the other state, federal, and local agencies. The plan assessed various alternative fuels and developed fuel portfolios to meet California's goals to reduce petroleum consumption, increase alternative fuels use, reduce GHG emissions, and increase in-state production of biofuels without causing a significant degradation of public health and environmental quality.

Assembly Bill 32 (2006) and Senate Bill 32 (2016)

In 2006, the Legislature enacted AB 32, the California Global Warming Solutions Act of 2006. AB 32 requires California to reduce its GHG emissions to 1990 levels by 2020. In 2016, the Legislature enacted SB 32, which extended the horizon year of the state's codified GHG reduction planning targets from 2020 to 2030, requiring California to reduce its GHG emissions to 40% below 1990 levels by 2030. In accordance with AB 32 and SB 32, CARB prepares scoping plans to guide the development of statewide policies and regulations for the reduction of GHG emissions. Many of the policy and regulatory concepts identified in the scoping plans focus on increasing energy efficiencies and the use of renewable resources and reducing the consumption of petroleum-based fuels (such as gasoline and diesel). As such, the state's GHG emissions reduction planning framework creates co-benefits for energy-related resources. Additional information on AB 32 and SB 32 is provided in Chapter 9 of this EIR.

California Building Standards

Part 6 of Title 24 of the California Code of Regulations was established in 1978 and serves to enhance and regulate California's building standards. Part 6 establishes energy efficiency standards for residential and non-residential buildings constructed in California to reduce energy demand and consumption. Part 6 is updated periodically (every 3 years) to incorporate and consider new energy efficiency technologies and methodologies. The 2016 Title 24 building energy efficiency standards, which became effective on January 1, 2017, further reduce energy used in the state. In general, single-family homes built to the 2016 standards are anticipated to use approximately 28% less energy for lighting, heating, cooling, ventilation, and water heating than those built to the 2013 standards, and non-residential buildings built to the 2016 standards will use an estimated 5% less energy than those built to the 2013 standards (CEC 2015).

Title 24 also includes Part 11, the California's Green Building Standards (CALGreen). CALGreen institutes mandatory minimum environmental performance standards for all ground-up, new construction of commercial, low-rise residential, and state-owned buildings, as well as schools and hospitals. The 2016 CALGreen standards became effective on January 1, 2017. The mandatory standards require the following:

- 20% mandatory reduction in indoor water use
- 50% diversion of construction and demolition waste from landfills
- Mandatory inspections of energy systems to ensure optimal working efficiency

Integrated Energy Policy Report

CEC is responsible for preparing integrated energy policy reports, which identify emerging trends related to energy supply, demand, conservation, public health and safety, and maintenance of a healthy economy. The CEC's 2015 Integrated Energy Policy Report discusses the state's policy goal to require that new residential construction be designed to achieve zero net energy (ZNE) standards by 2020 and that new non-residential construction be designed to achieve ZNE standards by 2030, which is relevant to this EIR. Refer to Section 4.8 of this EIR for additional information on the state's ZNE objectives and how the state's achievement of its objectives would serve to beneficially reduce the proposed project's GHG emissions profile and energy consumption.

State Vehicle Standards

In a response to the transportation sector accounting for more than half of California's carbon dioxide (CO_2) emissions, AB 1493 was enacted in 2002. AB 1493 required CARB to set GHG emission standards for passenger vehicles, light-duty trucks, and other vehicles determined by the state board to be vehicles whose primary use is noncommercial personal transportation in the state. The bill required that CARB set GHG emission standards for motor vehicles manufactured in 2009 and all subsequent model years. The 2009–2012 standards resulted in a reduction in approximately 22% GHG emissions compared to emissions from the 2002 fleet, and the 2013–2016 standards resulted in a reduction of approximately 30%.

In 2012, CARB approved a new emissions-control program for model years 2017 through 2025. The program combines the control of smog, soot, and global warming gases and requirements for greater numbers of zero-emission vehicles into a single package of standards called Advanced Clean Cars. By 2025, when the rules would be fully implemented, new automobiles would emit 34% fewer global warming gases and 75% fewer smog-forming emissions (CARB 2011).

Although the focus of the state's vehicle standards is on the reduction of air pollutants and GHG emissions, one co-benefit of implementation of these standards is a reduced demand for petroleum-based fuels.

Sustainable Communities Strategy

The Sustainable Communities and Climate Protection Act of 2008, or SB 375, coordinates land use planning, regional transportation plans, and funding priorities to help California meet its GHG emissions reduction mandates. As codified in California Government Code, Section 65080, SB 375 requires metropolitan planning organizations to include a sustainable communities strategy in each regional transportation plan. The main focus of the sustainable communities strategy is to plan for growth in a fashion that will ultimately reduce GHG emissions, but the strategy is also a part of a bigger effort to address other development issues within the general vicinity, including transit and VMT, which influence the consumption of petroleum-based fuels.

The regional planning organization for the City of Palo Alto is the Metropolitan Transportation Commission (MTC), which has jurisdiction over the nine-county San Francisco Bay Area. The current regional transportation plan is Plan Bay Area 2040. MTC works with the Association of Bay Area Governments (ABAG) to develop the regional transportation plan and sustainable communities strategy.

Local Regulations

Palo Alto Comprehensive Plan

The Comprehensive Plan (Palo Alto 2017) recognizes that the City has a critical role in efforts to reduce energy consumption and improve energy efficiency. The Plan states:

> Palo Alto is regarded as a leader in sustainability, having adopted its first Climate Action Plan in 2007 and continuing through the City's multi-faceted efforts to eliminate the community's dependence on fossil fuels and adapt to the potential effects of climate change. Through the direct provision of public utility services by the City to the community, Palo Alto is able to achieve truly outstanding energy efficiency and water conservation. The City and community also are leaders in promoting non-automobile transportation, waste reduction and diversion and high-quality, low-impact development.

Specific to electrical and natural gas consumption, which is provided through the CPAU, the City has adopted standards that require the CPAU energy portfolio focus on sustainable, carbon-neutral, cost-effective energy supply and decreases reliance on fossil fuels, thus reducing the release of greenhouse gas (GHG) emissions. The Comprehensive Plan notes that "achieving these goals requires carefully balancing the benefits and liabilities of diverse energy sources and strategies, educating the public on home- and business-based renewable energy and energy efficiency strategies and encouraging and incentivizing widespread implementation of those strategies." The Comprehensive Plan includes the following goal and policies in support of the City's targets for energy consumption:

- Goal N-7: A clean, efficient energy supply that makes use of cost-effective renewable resources.
    - Policy N-7.1 Continue to procure carbon neutral energy for both long-term and short-term energy supplies, including renewable and hydroelectric

resources, while investing in cost-effective energy efficiency and energy conservation programs.

- Policy N-7.2 Advance the development of a “smart” energy grid, a diverse energy resource portfolio, and technologically advanced public utilities as a key part of a smart and connected city.
- Policy N-7.3 Prioritize the identification and implementation of cost-effective, reliable and feasible energy efficiency and demand reduction opportunities.
- Policy N-7.4 Maximize the conservation and efficient use of energy in new and existing residences and other buildings in Palo Alto.
- Policy N-7.5 Encourage energy efficient lighting that protects dark skies and promotes energy conservation by minimizing light and glare from development while ensuring public health and safety.
- Policy N-7.6 Support the maximum economic use of solar electric (photovoltaic) and solar thermal energy, both as renewable supply resources for the Electric Utility Portfolio and as alternative forms of local power generation.
- Policy N-7.7 Explore a variety of cost-effective ways to reduce natural gas usage in existing and new buildings in Palo Alto in order to reduce associated greenhouse gas emissions.

Energy Efficiency Strategies and Goals

City Council approved CPAU’s first Ten-Year Energy Efficiency (EE) Portfolio Plan in April 2007, which included annual electric and gas efficiency targets between 2008 and 2017, with a 10-year cumulative savings target of 3.5 percent of the forecasted energy use. As mandated by California law, the electric efficiency targets were updated in 2010, with the 10-year cumulative savings goal doubling to 7.2 percent between 2011 and 2020. Since then, increasingly stringent statewide building codes and appliance standards have resulted in substantial energy savings. However, these “codes and standards” energy savings cannot be counted toward meeting CPAU’s EE program goals. An updated set of Ten-Year Electric Efficiency Goals, adopted by City Council in December 2012, revised the 10-year cumulative electric efficiency savings to 4.8 percent between 2014 and 2023.

Carbon Neutral Electric Resource Plan

In March 2013, the Palo Alto City Council adopted the Carbon Neutral Electric Resource Plan (Carbon Neutral Plan), committing the City to using only using carbon neutral electric resources starting in 2013. The Plan effectively eliminates all GHG emissions from the City's electric supply portfolio.

In March 2013, the City Council of Palo Alto voted to use only carbon neutral sources of electricity in the future, starting in calendar year 2013. The City will focus on energy efficiency and increasing the number of contracts for energy from solar, wind, and landfill gas. To implement the adopted Carbon Neutral Plan, the City will purchase renewable energy under long-term contracts for about half of the City's electric supply needs and rely on existing carbon-free hydroelectric resources for the other half of the City's needs. Until those long-term contracts are in place, the plan achieves carbon neutrality by purchasing short-term renewable resources and/or renewable energy certificates (RECs) to supplement existing and committed long-term renewable and hydroelectric resources. The Carbon Neutral Plan is designed to be transparent, credible, sustainable, inspirational, and repeatable by other communities. It is expected to cost less than $3 a year on the average resident's electric bill.

With the Carbon Neutral Plan in place, the City recognized that replacing gasoline (including natural gas) use with electricity use would result in reduced GHG emissions. Thus the City Council adopted an electrification work plan to shift gasoline-using vehicles to electric vehicles and natural gas-using appliances to electric appliances. The plan has the potential to reduce natural gas loads and increase electrical loads in the 2030 and 2050 timelines.

Local Solar Plan

In 2014, Council adopted the Local Solar Plan with the goal of increasing the share of local solar energy supplies from 0.7 percent in 2013 to four percent by 2023.

City of Palo Alto Municipal Code

Several sections of the City of Palo Alto Municipal Code address energy consumption, conservation, and efficiency (Palo Alto 2018). These include:

- Chapter 16.14, Green Building Standards Code Adopted and Amended: This section adopts the 2013 CALGreen statewide building code as the City's Green Building Ordinance, with limited additions and amendments. It generally provides minimum Green Building Requirements for new construction and renovation and additions.

- Chapter 16.17, California Energy Code Adopted and Amended: This section adopts and amends the 2013 California Energy Code as the City's Energy Code. It requires building design to exceed the minimum State energy code requirements by 15 percent; and that all new residential buildings must include solar-ready infrastructure.

- Chapter 12.20, Utility Rules and Regulations: This section authorizes the Palo Alto City Council to adopt rules and regulations governing utility services other than communications services in the city, and the fees and charges for these services.

11.3 IMPACTS

Methods of Analysis

The following assessment of energy consumption and conservation is based on the air pollutant and greenhouse gas emission modeling completed using the CalEEMod modeling software. The modeling output files are provided in Appendix G to this Draft EIR.

Energy consumption would occur during construction and project operation. Electricity use is generally low during construction, being limited to lighting, electrically powered hand tools, and electronic equipment (such as computers inside temporary construction trailers and heating, ventilation, and air conditioning). Petroleum use is higher during construction, which includes workers traveling to and from the site, materials being delivered or off-hauled from the site, and operation of construction equipment.

During project operation, energy consumption includes electricity for operating the various buildings, such as appliances, lighting, heating/cooling, kitchen operations, and pool maintenance and operation. Natural gas consumption may occur within the kitchen, while petroleum use is associated with all students, staff, and visitors traveling to and from the site.

Significance Criteria

The significance criteria used to evaluate the project impacts associated with energy consumption and conservation are based on Appendix G of the CEQA Guidelines. According to Appendix G of the CEQA Guidelines, a significant impact related to energy would occur if the project would:

- Result in wasteful, inefficient, or unnecessary consumption of energy.
- Conflict with or obstruct a state or local plan for renewable energy or energy efficiency.

Impact Analysis

IMPACT 11-1:	Result in wasteful, inefficient, or unnecessary consumption of energy.
SIGNIFICANCE:	Less than Significant
MITIGATION MEASURES:	None Required
SIGNIFICANCE AFTER MITIGATION:	Less than Significant

Construction

Natural gas is not anticipated to be required during construction of the proposed project. Fuels used for construction would primarily consist of diesel and gasoline, which are discussed under the following subsection, Petroleum. Any minor amounts of natural gas that may be consumed as a result of proposed project construction would be temporary and negligible.

Construction of the proposed project would require minimal use of electric power for as-necessary lighting, electronic equipment (such as computers inside temporary construction trailers and heating, ventilation, and air conditioning), and electrically powered hand tools. These types of equipment would not require use of substantial quantities of electricity and would be in use only temporarily.

Petroleum would be consumed throughout construction of the proposed project. Fuel consumed by construction equipment would be the primary energy resource expended over the course of construction, and VMT associated with the transportation of construction materials and construction worker commutes would also result in petroleum consumption. Heavy-duty construction equipment associated with construction activities, and haul trucks involved in moving dirt around the project site, would rely on diesel fuel. Construction workers would travel to and from the project site throughout the duration of construction. It is assumed that construction workers would travel to and from the project site in gasoline-powered vehicles.

Heavy-duty construction equipment of various types would be used during each phase of construction. CalEEMod was used to estimate construction equipment usage, and results are included in Appendix G. Based on that analysis, over all phases of construction, diesel-fueled construction equipment would operate for an estimated 43,610 hours, as summarized in Table 11-3.

Table 11-3
Hours of Operation for Construction Equipment

Phase	Hours of Equipment Use
Phase 1	14,165
Phase 2	2,040
Phase 3	5,755
Phase 4	21,650
Total	**43,610**

Source: Appendix G

Fuel consumption from construction equipment was estimated by converting the total CO_2 emissions from each construction phase to gallons using conversion factors for CO_2 to gallons of gasoline or diesel. The conversion factor for gasoline is 9.13 kilograms per metric ton CO_2 per gallon, and the conversion factor for diesel is 10.35 kilograms per metric ton CO_2 per gallon (The Climate Registry 2016). The estimated diesel fuel use from construction equipment is shown in Table 11-4.

Table 11-4
Construction Equipment Diesel Demand

Phase	Equipment CO_2 (MT)	kg CO_2/Gallon	Gallons
Phase 1	274.48	10.35	20,332
Phase 2	41.38	10.35	3,065
Phase 3	95.05	10.35	7,041
Phase 4	407.22	10.35	30,164
		Total	**60,602**

Sources: Appendix G (equipment CO_2); The Climate Registry 2016 (kg/CO_2/gallon).
CO_2 = carbon dioxide; kg = kilogram; MT = metric ton

Fuel consumption from worker and vendor trips is estimated by converting the total CO_2 emissions from each construction phase to gallons using the conversion factors for CO_2 to gallons of gasoline or diesel. Worker vehicles are assumed to be gasoline fueled, and vendor/hauling vehicles are assumed to be diesel fueled. Calculations for total worker, vendor, and hauler fuel consumption are provided in Tables 11-5, 11-6, and 11-7, respectively.

Table 11-5
Construction Worker Vehicle Gasoline Demand

Phase	Vehicle CO_2 (MT)	kg CO_2/Gallon	Gallons
Phase 1	21.09	9.13	2,310
Phase 2	5.16	9.13	566
Phase 3	4.61	9.13	505
Phase 4	57.11	9.13	6,255
		Total	**9,635**

Sources: Appendix G (construction worker CO_2); The Climate Registry 2016 (kg/CO_2/gallon).
CO_2 = carbon dioxide; kg = kilogram; MT = metric ton

Table 11-6
Construction Vendor Truck Diesel Demand

Phase	Vehicle CO_2 (MT)	kg/CO_2/Gallon	Gallons
Phase 1	26.01	10.35	1,927
Phase 2	9.30	10.35	689
Phase 3	3.89	10.35	288
Phase 4	115.83	10.35	8,580
		Total	**11,484**

Sources: Appendix G (construction worker CO_2); The Climate Registry 2016 (kg/CO_2/gallon).
CO_2 = carbon dioxide; kg = kilogram; MT = metric ton

Table 11-7
Construction Haul Truck Diesel Demand

Phase	Vehicle CO_2 (MT)	kg CO_2/Gallon	Gallons
Phase 1	125.61	10.35	9,304
Phase 2	0	10.35	0
Phase 3	38.58	10.35	2,858
Phase 4	144.73	10.35	10,721
		Total	**22,883**

Sources: Appendix G (construction worker CO_2); The Climate Registry 2016 (kg/CO_2/gallon).
CO_2 = carbon dioxide; kg = kilogram; MT = metric ton

As shown in Tables 11-6 through 11-9, the proposed project is estimated to consume 104,605 gallons of petroleum during the construction phase. By comparison, approximately 58 billion gallons of petroleum would be consumed in California over the course of the proposed project's construction period (3 years) based on the California daily petroleum consumption estimate of approximately 52.9 million gallons per day (CEC 2016). The proposed project would be required to comply with CARB's Airborne Toxics Control Measure, which restricts heavy-duty diesel vehicle idling time to 5 minutes. This would ensure that petroleum use during construction is not wasteful or inefficient. Therefore, because it is not possible to avoid petroleum use during construction of the proposed project, and all energy consumption would be temporary, minimal, and not be wasteful or inefficient, impacts would be **less than significant**.

Operation

Once the project is constructed, Castilleja would continue to consume electricity onsite for interior and exterior lighting, use of appliances and equipment within each building, operations of heating and cooling systems, and maintenance and operation of the swimming pool. All buildings constructed as part of the proposed project would be required to comply with the City's Green Building Ordinance and the 2016 Title 24 standards or the most recent standards at the time of building issuance. The new 2019 Title 24 standards will go into effect January 1, 2020. Thus the new buildings would be required to achieve a much higher level of energy efficiency and water efficiency than the existing buildings. Although the project would accommodate an increase in total student enrollment at Castilleja, the enrollment increase would not substantially increase the amount of energy consumption at the school. This minor increase would be offset with the decreased energy consumption realized by replacing existing buildings with new construction.

Additionally, the project would implement a Sustainability Road Map (Appendix B) to further reduce energy consumption within the campus. The proposed Sustainability Road Map includes:

- Achieving LEED Platinum rating
- Prohibiting natural gas use for building operations other than for instructional use, such as in science labs,
- Achieving zero-net energy, which is defined as having on-site energy generation sufficient to offset 100% of the campus' energy demand. This would be accomplished by using photovoltaics, solar water heating, and wastewater heat recovery to meet the majority of energy demand and purchasing renewable energy credits to cover any remaining demand that cannot be met by onsite generation;
- Reducing transportation energy consumption by providing electric vehicle charging facilities, increasing the amount of bicycle parking, and implementing an enhanced Transportation Demand Management program; and
- Installing ultra water-efficient bathroom fixtures (that use less water than the State-mandated maximums), constructing an on-site private recycled water system and using recycled water for toilet flushing and irrigation, installing low-water consumption irrigation system, and avoiding use of turf grass except on sports fields.

The increase in the number of students enrolled at the school would increase the amount daily vehicle trips that access the site, which would result in an increase in the total VMT in the project area.

Petroleum fuel consumption is largely associated with motor vehicles traveling to and from the project site and is directly related to VMT. As shown in Appendix G, the daily VMT attributable to the proposed project is expected to be approximately 2,145 miles, with an annual total of

386,100 miles (reflecting 180 days of class). As discussed in Chapter 7, Transportation, this calculated VMT increase is based on the existing daily trip generation rate at the school. While the school is planning to implement an expanded TDM program with the project, no additional trip reductions have been applied. Thus, the impacts identified in this section assume that no increase in the TDM effectiveness is realized.

Similar to construction worker and vendor trips, fuel consumption was estimated by converting the total CO_2 emissions from each land use type to gallons using the conversion factors for CO_2 to gallons of gasoline. Appendix G shows that the total CO2 emissions from this additional VMT is 135.73 MT/year. This correlates to consumption of 14,866 gallons of gasoline. By comparison, California as a whole consumed approximately 16 billion gallons of petroleum in 2016 (CEC 2017b).Thus, the project represents a 0.000093% increase in annual petroleum consumption during operation.

Over the lifetime of the proposed project, the fuel efficiency of the vehicles being used by students, parents and employees is expected to increase and the amount of petroleum consumed as a result of vehicular trips to and from the project site during operation would decrease over time. There are numerous regulations in place that require and encourage increased fuel efficiency. For example, CARB has adopted an approach to passenger vehicles by combining the control of smog-causing pollutants and GHG emissions into a single, coordinated package of standards. The approach also includes efforts to support and accelerate the numbers of plug-in hybrids and zero-emissions vehicles in California (CARB 2018). The proposed project would include implementing a Sustainability Plan and an enhanced TDM program, which would help support the goals of SB 375 to reduce VMT. Inclusion of electric-vehicle charging outlets within the proposed parking garage would result in the potential for reduced petroleum use during operation because students and staff would have the option of charging their electric vehicles.

In summary, although the proposed project would increase petroleum use during operation, the use would be a small fraction of the statewide use and, due to efficiency increases, would diminish over time. Implementation of the proposed enhanced TDM program would help reduce the increase in vehicle trips and associated petroleum-based fuel consumption. Further the proposed project would implement sustainability features in order to reduce direct and indirect energy demand. Therefore, operation of the proposed project would not result in a wasteful, inefficient or unnecessary consumption of energy and impacts would be **less than significant**.

IMPACT 11-2:	Conflict with existing energy standards and regulations
SIGNIFICANCE:	Less than Significant
MITIGATION MEASURES:	None Required
SIGNIFICANCE AFTER MITIGATION:	Less than Significant

As discussed in Impact 11-1, the new buildings constructed under the proposed project would adhere to applicable building code energy standards and regulations and the project includes implementation of a Sustainability Road Map (Appendix B) that identifies strategies to minimize energy consumption, provide for onsite energy generation, avoid use of natural gas for building operations, and reduce water consumption (which reduces the indirect consumption of electricity for water and wastewater treatment and conveyance). The proposed project would be built and operated in accordance with all existing, applicable regulations at the time of construction. For the reasons stated, the proposed project would not conflict with existing energy standards or regulations, and impacts would be **less than significant**.

11.4 MITIGATION MEASURES

All impacts relating to energy consumption and conservation are less than significant. No mitigation measures are required.

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CHAPTER 12
GEOLOGY, SOILS, SEISMICITY AND PALEONTOLOGY

This section addresses the potential impacts of the Castilleja School Project (proposed project) to geologic, soils, and paleontological resources as well as impacts related to seismic safety and soil stability. Site characteristics such as regional and local fault zones and seismic hazards are described based on site-specific information and published technical information. Information in this section is based on a geotechnical investigation prepared for the proposed project by Silicon Valley Soil Engineering, dated January 2017, and peer reviewed by Cornerstone Engineering in February 2017; see Appendix H.

The comments received in response to the Notice of Preparation for this Environmental Impact Report (EIR) identified concerns regarding the adequacy of the geotechnical analysis assessment of the potential for the project to increase seismic hazards in the vicinity, potential for subsidence, the extent of excavation and soil displacement. The Notice of Preparation, Initial Study and comments received are provided in Appendix A.

12.1 EXISTING CONDITIONS

Geology

Regional Setting

The City of Palo Alto lies in the San Francisco Bay Area, which is part of the Coast Ranges geomorphic province. The regional structure is dominated by the northwest-trending Santa Cruz Mountains to the southwest and the Diablo Range across the bay to the northeast. The Santa Cruz Mountains consist of two entirely different, incompatible core complexes, lying side by side and separated from each other by large faults. These two core complexes are Early Cretaceous Granitic intrusions and an Upper Jurassic to Lower Cretaceous eugosynclinal assemblage – the Franciscan formation. These core complexes are blanketed by thick layers of Eocene to Pleistocene marine deposits. Some Miocene volcanic intrusions are also present in the Santa Cruz Mountains southwest of the project site. The core complex of the Diablo Range to the northeast of the project site is comprised of Franciscan formation predominantly covered with Upper Cretaceous and Lower to Middle Pliocene marine deposits. The Quaternary history of the region is recorded by sedimentary marine strata alternating with non-marine strata. The changes of the depositional environment are related to the fluctuation of sea level corresponding to the glacial and interglacial periods. Late Quaternary deposits fill the center of the San Francisco Bay Area and most of the strata are of continental origin characterized as alluvial and fluvial materials.

Project Site Conditions

The project site lies on the east flank of the Santa Cruz Mountains on a thin layer of Holocene alluvial deposits overlying the Merced formation, Lower Pleistocene and Upper Pliocene marine deposits (Appendix H). The site is bounded by Embarcadero Road, Bryant Street, Kellogg Avenue, and Emerson Street. Single-family residences are present to the west, south, and east of the site. The site is irregularly shaped and relatively flat and occupied by the Castilleja School campus.

Soils

Soil type is one criterion used to evaluate potential impacts of development. Soils are typically considered for their resource value in agricultural production or for their potential development characteristics or constraints. Some soils are more stable under varying conditions and are better suited for development, while others are more susceptible to erosion and/or are subject to expansion under certain soil moisture conditions.

Regional Setting

In the City of Palo Alto, the predominant soil types include Urban-Land Stevenscreek, Flaskan, Hangerone, and Clear Lake complexes, and Urban-Land Orthents and Botella soils. Most belong to the Mollisol soil order that is formed on alluvium on slopes of zero to five percent. These soils are typically well to moderately well drained and characterized by low runoff. One exception is the Urban-Land Hangerone complex, which is poorly drained. The Botella complex soils are generally composed of deep or very deep, well-drained clay loams, whereas Urban-Land Orthents are very deep, poorly drained, texturally heterogeneous soils (Palo Alto 2016).

Soils in Palo Alto are known to be expansive in places. A number of widely used treatments are available to mitigate expansive soils, including soil grouting, recompaction, and replacement with a non-expansive material. The California Building Code (CBC) requires that each construction location be evaluated to determine the most appropriate treatment for expansive soils (Palo Alto 2016).

Project Site Conditions

The geotechnical investigation prepared for the project included field investigations and laboratory testing, including exploratory test borings to determine the surface and subsurface soil characteristics at the project site. Based on the laboratory testing results, the native surface soil at the project site has been found to have a moderately high expansion potential when subjected to fluctuations in moisture (Appendix H).

The Standard Penetration Test borings were drilled to a depth of 35 feet below the existing ground surface elevation (bgs). In Boring B-2, from the surface to a depth of 13 feet, a brown, damp, very stiff silty clay layer was encountered. From the depth of 13 feet to the end of the boring at 35 feet, the soil became reddish brown, moist, dense sandy gravel. The gravel was 1.5 inches in maximum diameter, sub-angular, and well graded. Similar soil profiles were encountered in Boring B-5 and Boring B-7. However, in Boring B-5, the sandy gravel layer was encountered from the depths of 16 feet to 30 feet. In Boring B-7, the sandy gravel layer was encountered from the depths of 16 feet to 26 feet.

The Cone Penetration Test (CPT) borings were advanced to the depths of 35 feet and 65 feet bgs. The investigation found sand layers at depths of 23 feet to 30 feet in Boring B-6 and at depths of 23 feet to 41 feet in Boring B-9. In Boring B-1, from the surface to a depth of 14 feet, the CPT sounding interpreted the soil behavior type (SBT) as very dense/stiff sandy silt to silty clay. From the depths of 14 feet to 23 feet, the SBT is silty sand to sand. From the depths of 23 feet to the end of the sounding at 65 feet, the SBT is stiff silty clay. Similar SBT profiles were encountered in other CPTs.

Seismicity

Regional Setting

Palo Alto is located in a seismically active area. The San Andreas Fault—long considered the predominant seismic risk in California—passes through the City. The San Andreas Fault is believed capable of producing a magnitude 8.4 earthquake. This would cause very violent ground shaking in much of Palo Alto, with fault rupture possible along the San Andreas, Monte Vista, and Hermit faults, and other fault traces around the Stanford University campus. The greatest hazards to the City are most likely associated with fault rupture and ground shaking, although liquefaction hazards are significant in the area east of Highway 101 due to the porous nature and high water content of the soil. Liquefaction occurs when ground shaking causes water-saturated soil to become fluid and lose its strength. Settlement and subsidence due to groundwater withdrawal has historically been a problem in the southern and eastern portions of Palo Alto, but more recent groundwater recharge efforts and reduced pumping have reduced these hazards.

Project Site Conditions

There are no known active faults beneath or near the project site. The closest major active faults to the project site are the San Andreas, Hayward, and San Gregorio faults, with main traces mapped approximately 5.2 miles southwest, 13.7 miles northeast, and 15.6 miles southwest, respectively (Appendix H).

Geologic and Seismic Hazards

This section describes the potential for typical geologic and seismic hazards to exist in the vicinity of the project site. According to the State of California Seismic Hazard Zones map, the project site is not located in a liquefaction or earthquake-induced landslide zone (California Department of Conservation 2006). However, the Palo Alto Comprehensive Plan Map S-3 shows the site in an area of moderate liquefaction potential. The site-specific characteristics related to liquefaction potential were evaluated as part of the geotechnical investigation, as discussed in the following liquefaction section.

Landslides

A landslide is the downhill movement of masses of earth material under the force of gravity. The factors contributing to landslide potential are steep slopes, unstable terrain, and proximity to earthquake faults. Landslides may be triggered by oversaturated soils (i.e., after heavy rains) or by earthquakes. Several factors can affect the susceptibility of a slope to failure, including (1) steepness of the slope; (2) strength and bulk density of the soil or bedrock; (3) width, orientation, and pervasiveness of bedrock fractures, faults, or bedding planes; (4) prevailing groundwater conditions; and (5) type and distribution of vegetation. Landslide potential is highest in steeply sloped areas. The project site and surrounding area are relatively flat and do not pose a risk of landslide.

Liquefaction

Liquefaction typically occurs when loose sand and silt that is saturated with water can behave like a liquid when shaken by an earthquake. Earthquake waves cause water pressures to increase in the sediment and the sand grains to lose contact with each other, leading the sediment to lose strength and behave like a liquid. The soil can lose its ability to support structures, flow down even very gentle slopes, and erupt to the ground surface to form sand boils. Many of these phenomena are accompanied by settlement of the ground surface—usually in uneven patterns that damage buildings, roads and pipelines.

Groundwater was encountered at depths between 29 and 31 feet below grade in the geotechnical explorations and rose to static levels ranging of 28 feet to 30 feet at the end of the drilling operation. As described in the geotechnical investigation (Appendix H), based on the California Geological Survey's Seismic Hazard Zone Report 111, the highest expected groundwater level at the project site is approximately 23 feet below ground elevation; therefore, the liquefaction analysis conducted for the project site conservatively used this groundwater level. The geotechnical investigation concluded that the liquefaction potential of the liquefiable soil layers at the project site is low, and there is minimal potential for liquefaction-induced ground surface damage. The liquefaction-induced total maximum settlement at the site is 1.66 inches. The liquefaction-induced maximum differential settlement at the site is 1.098 inches. Conventional foundation systems are expected to tolerate these magnitudes (Appendix H).

Fault Rupture

The Alquist-Priolo Earthquake Fault Zoning Act was passed in 1972 and is intended to mitigate the hazard of surface faulting to structures for human occupancy. The California Geological Survey designates earthquake fault zones around the surface traces of active faults and publishes maps delineating these zones. Each earthquake fault zone extends approximately 200 to 500 feet on either side of the mapped fault trace. Surface rupture during earthquakes is typically limited to those areas immediately adjacent to the fault on which the event is occurring. The project site is not included in an Alquist-Priolo Earthquake Fault zone (Department of Conservation 1974).

Ground Shaking

The most serious direct earthquake hazard is the damage or collapse of buildings caused by ground shaking, which, in addition to property damage, can cause injury or death. Ground shaking is the vibration that radiates from the epicenter of an earthquake. The severity of ground shaking depends on several variables such as earthquake magnitude; hypocenter proximity; local geology, including the properties of unconsolidated sediments; groundwater conditions; and topographic setting. In general, ground-shaking hazards are most pronounced in areas that are underlain by loosely consolidated soil/sediment.

While the project site is not located within a fault zone, it is located in a region with several active faults. The U.S. Geological Survey (USGS) estimates that the Northern San Andreas Fault, which runs west of the cities of San Francisco and Palo Alto, has a 6.4 percent chance of having an earthquake larger than magnitude 6.7 in the next 30 years. However, the San Francisco Bay Area as a whole contains many faults in addition to the San Andreas Fault, including the San Gregorio Fault, the Calaveras Fault, and the Hayward Fault, and has a 72 percent chance of having an earthquake larger than magnitude 6.7 in the next 30 years (USGS 2015).

Earthquakes of this magnitude can create ground accelerations severe enough to cause major damage to structures and foundations not designed to resist the forces generated by earthquakes. In the event of an earthquake on the San Andreas Fault, most parts of Palo Alto southwest of US 101 are expected to experience “very strong” shaking, whereas most parts east of US 101 are expected to experience “violent” shaking (ABAG 2017).

Ground Failure

Seismic related ground failure could include liquefaction and lateral spreading, which occurs in unconsolidated basin deposits (i.e., silt, sand, and gravel) that are under saturated conditions.

Lateral spreading is the most pervasive type of liquefaction-induced ground failure. During lateral spreading, blocks of mostly intact, surficial soil displace downslope or towards a free face along a shear zone that has formed within the liquefied sediment. As described above, the geotechnical investigation (Appendix H) concluded that the liquefaction potential of the liquefiable soil layers at this site is low, and there is minimal potential for liquefaction-induced ground surface damage.

Paleontological Resources

Paleontological resources are the fossilized remains or impressions of prehistoric plants and animals. They are valuable, nonrenewable, scientific resources used to document the existence of extinct life forms and to reconstruct the environments in which they lived. Fossils can be used to determine the relative ages of the depositional layers in which they occur and of the geologic events that created those deposits.

In the context of the California Environmental Quality Act (CEQA), fossils of land-dwelling vertebrates and their environment are considered important (i.e., significant) paleontological resources. Such fossils typically are found in river, lake, and bog deposits, although they can occur in nearly any type of sedimentary deposit. The potential for fossil remains at a location can be predicted based on whether or not previous fossil finds have been made in the vicinity, as well as based on the age of the geologic formations.

The geologic units in the Palo Alto area are part of an alluvial deposit found along the perimeter of the Santa Clara Valley. These units consist of 12 to 15 feet of moderately well sorted, unconsolidated, fine sandy silt and clayey silt overlying at least 6 feet of silty clay. Below that layer, the Santa Clara formation is an older alluvium made up of partially consolidated clay, silt, sand, and gravel deposited more than 11,000 years ago (Palo Alto 2016).

Most of the paleontological resources in the Palo Alto area consist of small marine fossils such as clams and snails. The area also contains old quarries, creek beds, cut slopes and rock outcroppings, which are of geological interest and educational value. Arastradero Road contains good examples of exposed rock formations. The Berkeley Museum has documented four paleontological sites in the area surrounding Stanford University, including the remains of a *Paleoparadoxia* (an extinct marine mammal similar to a hippopotamus), representing the most complete *Paleoparadoxia* found outside of China. The other sites contained *Allodesmus* (an extinct seal-like mammal) remains as well as some parts of other marine mammals. Additionally, fossilized remains of terrestrial fauna from the Pleistocene period were encountered in a deep excavation near the Stanford Medical Center. Finally, various other fossil discoveries have been made in the Palo Alto area including a large mastodon tusk found in the bank of San Francisquito Creek, fragments of petrified mastodon and/or dinosaur bone along Foothill Expressway, and isolated fragments of fossil ribs and lower limbs from late Pleistocene mammals (Palo Alto 2016).

12.2 REGULATORY FRAMEWORK

Federal Regulations

Federal Earthquake Hazards Reduction Act

The Earthquake Hazards Reduction Act was passed by Congress in 1977, and is intended to reduce the risks to life and property from future earthquakes. The act established the National Earthquake Hazards Reduction Program. The goals of National Earthquake Hazards Reduction Program are to educate and improve the knowledge base for predicting seismic hazards, improve land use practices and building codes, and to reduce earthquake hazards through improved design and construction techniques.

Installation of underground infrastructure/utility lines must comply with national industry standards specific to the type of utility (e.g., American Water Works Association for water lines), and the discharge of contaminants must be controlled through the National Pollutant Discharge Elimination System permitting program for management of construction and municipal stormwater runoff. These utility standards contain specifications for installation, design, and maintenance to reflect site-specific geologic and soils conditions.

Clean Water Act

The Clean Water Act, administered by the U.S. Army Corps of Engineers, regulates soil disturbance as it affects wetlands and other waters of the United States. The Clean Water Act prohibits discharges of pollutants, including sedimentation from soil erosion, to waters of the United States unless the discharge is in compliance with a National Pollutant Discharge Elimination System (NPDES) permit. The State Water Resources Control Board (SWRCB) and the Regional Water Quality Control Boards (RWQCBs) issue both general and individual NPDES permits for certain activities that may result in discharges of pollutants to surface waters Construction activities that disturb 1 acre or more of soil must comply with the NPDES Construction General Permit (Order 2009-0009-DWQ) that regulates the flow of stormwater from construction sites. Site owners must notify the State, prepare and implement a Stormwater Pollution Prevention Plan (SWPPP), and monitor the effectiveness of the plan. The SWPPP must include best management practices (BMPs) designed to reduce potential impacts to surface water quality, including erosion and sediment control measures.

State Regulations

Building Codes and Standards

The state regulations protecting structures from geo-seismic hazards are contained in the California Building Code (CBC) (24 CCR, Part 2), which is updated on a triennial basis. The CBC is based on the International Building Code (IBC) used nationwide. The CBC incorporates the IBC and includes numerous more detailed and/or more stringent regulations to reflect conditions specific to the state of California. Where no other building codes apply, the IBC/CBC regulates excavation, foundations, and retaining walls, and regulates grading activities, including drainage and erosion control and construction on expansive soils.

In addition, Section 19100 et seq. of the California Health and Safety Code, State Earthquake Protection Law, requires that structures be designed to resist stresses produced by lateral forces caused by wind and earthquakes. Chapters 16 and 16A of the 2016 CBC include structural design requirements governing seismically resistant construction, including factors and coefficients used to establish seismic site class and seismic occupancy category for the soil/rock at the building location and the proposed building design. Chapters 18 and 18A include (but are not limited to) the requirements for foundation and soil investigations (Sections 1803 and 1803A); excavation, grading, and fill (Sections 1804 and 1804A); damp-proofing and water-proofing (Sections 1805 and 1805A); allowable load-bearing values of soils (Sections 1806 and 1806A); the design of foundation walls, retaining walls, embedded posts and poles (Sections 1807 and 1807A), and foundations (Sections 1808 and 1808A); and design of shallow foundations (Sections 1809 and 1809A) and deep foundations (Sections 1810 and 1810A). Chapter 33 of the 2016 CBC includes (but is not limited to) requirements for safeguards at work sites to ensure stable excavations and cut or fill slopes (Section 3304).

Construction activities are subject to occupational safety standards for excavation and trenching, as specified in the California Safety and Health Administration regulations (Title 8 of the California Code of Regulations) and in Chapter 33 of the CBC. These regulations specify the measures to be used for excavation and trench work where workers could be exposed to unstable soil conditions. The proposed project would be required to employ these safety measures during excavation and trenching.

As indicated previously, the CBC is updated and revised every three years. The 2019 version of the CBC will be effective January 1, 2020. Each individual construction phase of the proposed Castilleja School Master Plan would use the most current CBC at the time of specific project building activity.

Alquist-Priolo Earthquake Fault Zoning Act

The Alquist-Priolo Earthquake Fault Zoning Act, codified in California Public Resources Code, Sections 2621–2630, prohibits construction of buildings used for human occupancy on the surface of active faults. This act also requires the State Geologist to establish regulatory zones, known as Earthquake Fault Zones, around the surface traces of active faults and to issue appropriate maps to be used by local agencies in regulating and planning construction. Earthquake fault zones are designated by the California Geological Survey and are delineated along traces of faults where mapping demonstrates surface fault rupture has occurred within the past 11,000 years.

Seismic Hazards Mapping Act

The Seismic Hazards Mapping Act, codified in California Public Resources Code, Sections 2690–2699.6, addresses non-surface rupture earthquake hazards, including liquefaction, earthquake-induced landslides, and subsidence. The Act requires the California Department of Conservation to identify Seismic Hazard Zones within the state based on the probable seismic shaking exposure and soil conditions in a given area. Areas that may be subject to substantial shaking, or where soil conditions indicate the area may be prone to liquefaction or earthquake-induced landslides, are included in Seismic Hazard Zones. The Act specifies that the lead agency may withhold development permits until geologic or soils investigations are conducted for specific sites and mitigation measures are incorporated into plans to reduce hazards associated with seismicity and unstable soils.

California Public Resources Code

Paleontological resources are afforded protection by environmental legislation set forth under CEQA. Appendix G of the CEQA Guidelines provides guidance relative to significant impacts on paleontological resources, indicating that a project would have a significant impact on paleontological resources if it would disturb or destroy a unique paleontological resource or site. The Guidelines for Implementation of CEQA (California Code of Regulations, Title 14, Chapter 3) defines procedures, types of activities, persons, and public agencies required to comply with CEQA, including potential significant effects to paleontological sites. This code requires mitigation of adverse impacts to a paleontological site from development on public land by construction monitoring.

Section 5097.5 of the California Public Resources Code specifies that a person shall not excavate, remove, or destroy any vertebrate paleontological site, including fossilized footprints, on public lands, except with the express permission of the public agency having jurisdiction over the lands. Public lands include lands owned by, or under the jurisdiction of, the state, or any city, county, district, authority, or public corporation, or any agency thereof.

Local Regulations

Palo Alto Comprehensive Plan

The *City of Palo Alto Comprehensive Plan 2030* (Comprehensive Plan), adopted in November 2017, is the primary tool for guiding the future development of the City by describing long-term goals for the City's future as well as policies to guide day-to-day decisions. Chapter 5, Safety, of the Comprehensive Plan contains goals, policies, and programs to help the City prepare for natural disasters and minimize public exposure to hazards like fire, flood, and earthquake. The following goal, policy, and programs are relevant to geology, soils, and seismicity with respect to the proposed project:

- Goal S-2: Protection of life, ecosystems, and property from natural hazards and disasters, including earthquake, landslide, flooding, and fire.
  - Policy S-2.5: Minimize exposure of people and structures to geologic hazards, including slope stability, subsidence, and expansive soils, and to seismic hazards including ground shaking, fault rupture, liquefaction, and landslides.
    - Program S2.5.1: Periodically review and update the City's Seismic Hazard Ordinance.
    - Program S2.7.1: As part of the construction permitting process for proposed new and redeveloped buildings in areas of identified hazard shown on Map S-2, structures that would affect the most people in a seismic event require submittal to the City of a geotechnical/seismic report that identifies specific risks and appropriate mitigation measures.
    - Program S2.7.2: Review and update, as appropriate, City code requirements for excavation, grading, filling, and construction to ensure that they conform to currently accepted and adopted State standards.

City of Palo Alto Municipal Code

The Palo Alto Municipal Code contains other requirements that pertain to geologic or seismic hazards. Chapter 16.42 describes requirements for buildings that are consistent with California Health and Safety Code Sections 19160 – 19169 and are necessary to implement the Comprehensive Plan's Environmental Resources Policy 14, Program 47. The chapter aims to promote public safety by identifying those buildings in Palo Alto which exhibit structural deficiencies and by accurately determining the severity and extent of those deficiencies in relation to their potential for causing loss of life or injury.

Chapter 16.28 of the City's Municipal Code includes detailed requirements for construction-related grading and erosion and sediment control. The main goal of these requirements is to "provide for safe grading operations, to safeguard life, limb, and property, and to preserve and enhance the natural environment, including, but not limited to, water quality, by regulating clearing and grading on private property." The chapter describes rules and regulations to control land disturbances, land fill, soil storage, and erosion and sedimentation resulting from such activities. It also establishes procedures for issuance, administration, and enforcement of a permit. Per the City's code, each grading permit application shall include a site map and grading plan, interim and final erosion and sediment control and SWPPPs, a soils engineering report, and an engineering geology report.

City of Palo Alto Zoning Ordinance

The City's Zoning Ordinance, Title 18 of the Municipal Code, Chapter 18.40.120, Hazardous Conditions, requires any area within the City identified by the Comprehensive Plan as having high risk due to seismic activity hazard or other geologic hazard to include a geologic report. The building official may require, prior to issuance of a building permit or other permit authorizing new construction, detailed geologic, soils, and engineering data.

12.3 PROJECT IMPACTS

Methods of Analysis

The project setting was developed based on the site-specific geotechnical investigation (Appendix H), and by reviewing available geological documentation for the project area from the California Geological Survey, the USGS, the U.S. Department of Agriculture, the City of Palo Alto Comprehensive Plan, and the Comprehensive Plan EIR. The understanding of potential impacts resulting from the proposed project was based on analysis of these documents.

CEQA requires that the project be analyzed for potential impacts including exposing people or property to risk from seismic events or ground instability, resulting in soil erosion, resulting in the alteration of existing landforms, or destroying paleontological resources. As described in the Initial Study (see Appendix A), the project would not include the use of septic tanks; therefore, no impact would occur with regard to adequate soils to support septic tanks and this criterion is not further evaluated in this EIR.

Significance Criteria

Potential impacts associated with soils, geology, and seismicity have been evaluated using the following criteria, based on Appendix G of the CEQA Guidelines. The proposed project would have a potentially significant impact related to geology, seismicity, and soils if it would:

- Expose people or structures to potential substantial adverse effects, including the risk of loss, injury, or death involving:
  - 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.
  - Strong seismic ground shaking.
  - Seismic-related ground failure, including liquefaction.
  - Landslides.
- 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 on-site or off-site landslide, lateral spreading, excessive expansion, subsidence, liquefaction, or collapse.
- Result in substantial soil erosion or the loss of topsoil
- Result in substantial alterations to existing landforms.
- Directly or indirectly destroy paleontological resources.

Impact Analysis

IMPACT 12-1:	Exposure to hazards involving rupture of a known earthquake fault, strong seismic ground shaking, seismic-related ground failure including liquefaction, or landslides
SIGNIFICANCE:	Potentially Significant
MITIGATION MEASURES:	Mitigation Measure 12a
SIGNIFICANCE AFTER MITIGATION:	Less than Significant

The project site is not located on a known earthquake fault; therefore, no impact would occur with regard to rupture of a known earthquake fault. The project site is not located in a liquefaction zone or earthquake-induced landslide zone. As noted in Section 12.1, the project site and surrounding area are relatively flat and do not pose a risk of landslide; and the liquefaction potential of the liquefiable soil layers at the project site is low. Conventional foundation systems are expected to tolerate maximum liquefaction-induced differential settlement at the site (Appendix H).Therefore, impacts associated with seismic-related ground failure including liquefaction or landslides would be less than significant.

The primary geologic hazard at the project site is seismic ground shaking. Given the proximity of the project site to several active earthquake faults, in the event of an earthquake, the project site would have a high potential to experience strong seismic ground shaking which could have adverse effects to people or structures (Appendix H). The proposed project would increase the school's maximum enrollment cap, resulting in approximately 100 additional students on site, thus the project would have the potential to expose additional people to strong seismic ground shaking. This would be a **potentially significant** impact. However, the project would be required to adhere to standard engineering design and seismic safety techniques specified in the CBC as well as protections specified in the City of Palo Alto Seismic Hazards Identification Program (Municipal Code Chapter 16.42) and Zoning Ordinance (Municipal Code Chapter 18.40). In addition, adherence to Mitigation Measure 12a requiring compliance with recommendations provided in the geotechnical investigation (Appendix H) would reduce the potential impact associated with seismic ground shaking to a less-than-significant level. Therefore, impacts associated with seismic ground shaking would be **less than significant**.

IMPACT 12-2:	Location 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-site or off-site landslide, lateral spreading, excessive expansion, subsidence, liquefaction, or collapse
SIGNIFICANCE:	Potentially Significant
MITIGATION MEASURES:	Mitigation Measure 12a
SIGNIFICANCE AFTER MITIGATION:	Less than Significant

As previously discussed, the project site has minimal potential for liquefaction and landslides. The project site is relatively level, with no free face or sloping ground in the vicinity. Therefore, the potential for lateral spreading would be minimal. Based on the analyses in the geotechnical investigation (Appendix H), the potential for differential seismic settlement would be low. Therefore, the project site is not located on an unstable geologic unit prone to liquefaction, lateral spreading, subsidence, or collapse. However, the project site is known to contain expansive soils, thus the project would have a **potentially significant** impact associated with placing new structures on soil that may be unsuitable to support the structures.

Expansive soils are composed largely of clays, which swell in volume when saturated with water and shrink when dried. Native soils on the project site have a moderately high expansion potential, which would be a potentially significant impact. With proper site preparation, foundation design, and compliance with recommendations from the geotechnical investigation as required by Mitigation Measure 12a, implementation of the project would not create substantial risks to life or property due to expansive soils. Adherence to Mitigation Measure 12a would reduce impacts associated with expansive soil to a **less-than-significant** level.

The Geotechnical Investigation found that the depth to groundwater in the project area is between 23 feet and 31 feet below the ground surface, thus with a maximum depth of excavation of 15 feet it is not expected that groundwater would be encountered during excavation and construction within the project site. In the event that groundwater is encountered during excavation and construction and dewatering becomes necessary, the project would implement the contingency dewatering plan recommended by the Geotechnical Investigation (Appendix H), as required by Mitigation Measure 12a. Further, any dewatering activities would be subject to the City's requirements and standard permit approval conditions. These include requiring that water be collected in trucks for dust suppression on-site, street-sweeping and other city programs. With implementation of Mitigation Measure 12a, if dewatering is necessary during construction, the risks to ground stability would be reduced to a **less-than-significant** level.

IMPACT 12-3:	Substantial erosion or loss of topsoil
SIGNIFICANCE:	Less than Significant
MITIGATION MEASURES:	None Required
SIGNIFICANCE AFTER MITIGATION:	Less than Significant

Soil erosion is a natural process that can be accelerated by construction activities such as grading, vegetation clearing, and earthwork. Project construction would include ground-disturbing activities, including excavation and grading that would expose soils and increase the potential for soil erosion from wind or stormwater runoff. Because the project would disturb more than one acre of soil, the project would be subject to the NPDES Construction General Permit, requiring preparation of a SWPPP including erosion control BMPs, as described above in Section 12.2. Construction activities would also be required to comply with the provisions in CBC Appendix J in regard to grading, excavation, and earthwork construction, as well as the grading and erosion and sediment control measures set forth in the Chapter 16.28 of the Palo Alto Municipal Code. Compliance with these regulations would prevent substantial soil erosion or loss of topsoil and the impact would be **less than significant**.

IMPACT 12-4:	Substantially alter existing landforms
SIGNIFICANCE:	Potentially Significant
MITIGATION MEASURES:	Mitigation Measure 12a
SIGNIFICANCE AFTER MITIGATION:	Less than Significant

The project site is developed with the existing Castilleja School facilities, including above- and below-grade building space, surface parking lots, a pool, the Circle, Spieker Field, two residential buildings, and hardscaped and landscaped areas. The project site is relatively level and, as described in Chapter 3, Project Description, has been developed since the early 1900s and does not contain natural or prominent geologic landforms. As the project site is relatively level, the project would not involve terracing of natural slopes, disturbance to or a change in elevation of steep hillsides, or other major alterations to the existing landform.

The project would involve substantial amounts of excavation to construct the below-grade parking garage, below-grade pool, below-grade areas of the new academic building, and below-grade loading area. Excavation for these features would extend approximately 15 feet below the existing ground surface. In total, approximately 45,800 cubic yards of material would be excavated and exported off site. As noted previously, the Geotechnical Investigation found that the depth to groundwater in the project area is between 23 feet and 31 feet below the ground surface, thus with a maximum depth of excavation of 15 feet it is not expected that groundwater would be encountered during excavation and construction within the project site. In the event that groundwater is encountered during excavation and construction and dewatering becomes necessary, the project would implement the contingency dewatering plan recommended by the Geotechnical Investigation (Appendix H), as required by Mitigation Measure 12a. With implementation of Mitigation Measure 12a, if dewatering is necessary during construction, the potential for dewatering to result in an alteration of landforms would be reduced to a **less-than-significant** level

The proposed construction activities would not alter the existing landform because upon completion of construction, the site would remain relatively flat. The ground surface above the parking garage would be restored to support Spieker Field in its current location and configuration. Therefore, impacts associated with landform alteration would be **less than significant**.

IMPACT 12-5:	Directly or indirectly destroy paleontological resources
SIGNIFICANCE:	Potentially Significant
MITIGATION MEASURES:	Mitigation Measure 12b
SIGNIFICANCE AFTER MITIGATION:	Less than Significant

As described in Section 12.1, there are known paleontological resource sites within the City of Palo Alto. The presence of these known sites indicates that there are likely undiscovered resources within the City. While the entire project area, including the project site, has been heavily disturbed by urban development over the years, intact paleontological resources may be present below ground. If intact paleontological resources are located on site, ground-disturbing activities associated with construction of the proposed project, such as excavation of the below-grade parking garage, pool, and other features, and grading of the site during site preparation would have the potential to destroy undiscovered paleontological resources. This would be a **potentially significant** impact. In the event that paleontological resources are discovered during project construction, implementation of Mitigation Measure 12b, which requires evaluation, protection, and/or documentation of any discovered paleontological resources by a qualified paleontologist, would reduce potential impacts to paleontological resources to **less than significant**.

IMPACT 12-6:	Substantially contribute to cumulative impacts associated with geology, soils, seismicity, and paleontological resources
SIGNIFICANCE:	No Impact
MITIGATION MEASURES:	None Required
SIGNIFICANCE AFTER MITIGATION:	No Impact

Impacts that may result from geologic hazards, potentially unstable soils, and seismic hazards are generally site-specific, rather than cumulative in nature. Each individual project in the cumulative scenario would be subject to uniform site development and construction standards to address the site-specific and project-specific geologic, soil stability, and seismic considerations. In this way, potential cumulative impacts resulting from geological, seismic, and soil conditions would be reduced to less-than-significant levels on a site-by-site basis by modern construction methods and code requirements. As such, there would be no significant cumulative geotechnical impact to which the project could contribute.

It is possible that in a cumulative development scenario there could be a series of impacts to paleontological resources that may be discovered during construction. However, as discussed in Chapter 4, Land Use and Planning, the recently approved and pending projects in the vicinity of the Castilleja School site involve modifications to or demolition and replacement of existing single-family dwelling units. These projects would have similar potential to uncover paleontological resources as the proposed project, and they would be required by State law to evaluate, protect, and/or document any discovered paleontological resources. Thus there would be no cumulative impact to paleontological resources to which the project could contribute.

12.4 MITIGATION MEASURES

Mitigation Measure 12a: Project design and construction shall show compliance with and implement all of the recommendations contained in the geotechnical investigation prepared by Silicon Valley Soil Engineering in January 2017 or provide an acceptable equivalent to these measures to the satisfaction of the Director of Public Works Engineering in order to reduce hazards related to expansive soils and the stability of soil and landforms. These include but are not limited to:

1. the basement foundation system should use a concrete mat slab with a minimum thickness of 12 inches and underlain by 6 inches of ¾-inch clean crushed rock and waterproofed;

2. shoring shall be provided for trenches and excavation in excess of five feet in depth;

3. a geotechnical engineer shall be retained to observe and inspect all earthwork and grading;

4. within construction areas, organic materials shall be stripped from the soil and the soil shall be scarified by machine to a depth of 12 inches and thoroughly cleaned of vegetation and other deleterious matter;

5. soil shall be compacted to not less than 90 percent relative maximum density and moisture conditioned; and

6. a contingency dewatering plan shall be prepared that provides for collection of any surface runoff water and perched groundwater and use of the water as approved by the City and consistent with the City's dewatering requirements, such as for on-site dust suppression, street-sweeping, and other City programs.

Mitigation Measure 12b: A discovery of a paleontological specimen during any phase of the project shall result in a work stoppage in the vicinity of the find until it can be evaluated by a professional paleontologist. Any paleontological resource discovered on site should be either preserved at its location or adequately treated and documented as a condition of removal. Should loss or damage be detected, additional protective measures or further action (e.g., resource removal), as determined by a professional paleontologist, shall be implemented to ensure that the information potential represented by the resource is retained.

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CHAPTER 13
ALTERNATIVES

13.1 INTRODUCTION

Pursuant to the California Environmental Quality Act (CEQA) Guidelines, environmental impact reports (EIRs) are required to "describe a range of reasonable alternatives to the project, or to the location of the project, which would feasibly attain most of the basic objectives of the project but would avoid or substantially lessen any of the significant effects of the project, and evaluate the comparative merits of the alternatives" (14 CCR 15126.6(a)). This alternatives analysis is prepared in support of CEQA's goals to foster informed decision making and public participation (14 CCR 15126.6(a)). An EIR is not required to evaluate the environmental impacts of alternatives at the same level of detail as the proposed project, but it must include enough information to allow meaningful evaluation, analysis, and comparison with the proposed project.

The alternatives analysis is required even if the alternatives "would impede to some degree the attainment of the project objectives, or would be more costly" (14 CCR 15126.6(b)). An EIR must evaluate "only those alternatives necessary to permit a reasoned choice" (14 CCR 15126.6(f)) and does not need to consider "every conceivable alternative" to a project (14 CCR 15126.6(a)). The alternatives evaluated should be "potentially feasible" (14 CCR 15126.6(a)), but inclusion of an alternative in an EIR does not constitute definitive evidence that the alternative is in fact "feasible." The final decision regarding the feasibility of alternatives lies with the decision makers for a given project who must make the necessary findings addressing the feasibility of alternatives for avoiding or substantially reducing a project's significant environmental effects (California Public Resources Code, Section 21081; see also 14 CCR 15091).

This chapter describes the project alternatives selected for analysis, evaluates the environmental impacts associated with them, and compares the impacts with those of Castilleja School Conditional Use Permit Amendment and Master Plan (proposed project). This chapter also identifies those alternatives considered by the City of Palo Alto (City) but not carried forward for detailed analysis and the basis for the City's decision to omit those alternatives from the detailed analysis.

In conformity with CEQA, the purpose of this analysis is to focus on alternatives that are potentially feasible, and that would avoid or substantially lessen any of the significant effects of the project. The analysis in the Environmental Analysis, Chapters 3 through 12, finds that the proposed project would result in three significant and unavoidable impacts:

Impact 4-2: Create land use incompatibility or physically divide an established community

Impact 7-1: Conflict with an applicable plan, ordinance or policy establishing measures of effectiveness for the performance of the circulation system, taking into account all modes of transportation including mass transit and non-motorized travel

Impact 7-7: Contribute to a cumulative increase in traffic that conflicts with adopted policies and plans related to intersection and roadway segment function, including consideration of LOS and ADT

Impact 4-2 is considered significant and unavoidable due to the project's effects on residents in the surrounding neighborhood from substantial increases in traffic volumes on specific roadway segments near the project site. As discussed in Impact 7-1 in Chapter 7, Transportation, the project would add 679 daily vehicles to the segment of Emerson Street between Melville Avenue and Embarcadero Road because the project would re-route existing traffic to using the parking garage and requiring traffic exiting the parking garage to turn right onto Emerson Street. This would result in a significant increase in the Traffic Infusion on Residential Environment (TIRE) index for this segment. A mitigation measure that would modify the project to allow traffic exiting the parking garage to make any movement (left turn, straight, or right turn) was considered. This was found to reduce the traffic volumes on Emerson Street between Melville Avenue and Embarcadero Road, but increase volumes on other segments; thus it would not achieve a substantial reduction in project impacts and is not recommended. The project would result in a significant impact associated with increased traffic volumes on residential streets. Mitigation Measure 7a requires Castilleja School to implement an enhanced Transportation Demand Management (TDM) plan to reduce traffic volumes. However, the TDM measures are not expected reduce the TIRE index rating on the significantly affected segments sufficient to reduce the impact to a less-than-significant level. Thus the project would have a significant and unavoidable impact related to land use compatibility (Impact 4-2) and measures used to evaluate the performance of the circulation system (Impact 7-1).

Additionally, as discussed in Impact 7-7, the project would add traffic to the unsignalized Alma Street/Kingsley Avenue intersection; the overall intersection would operate at LOS E in the AM and PM peak hours in the cumulative scenario. Because the project would cause the LOS to degrade below LOS E in the AM and PM peak hours, the project would have a cumulatively considerable contribution to this impact, which is a significant impact of the project. Mitigation Measure 7c requires the City to consider adding signalization of this intersection to the CIP. However, because the City's determination of which intersections to signalize is based on a variety of factors, it is uncertain that signalization at this intersection would be added to the CIP and thus the impact would remain significant and unavoidable.

The other significant or potentially significant impacts resulting from the project would be reduced to less than significant levels with implementation of the mitigation measures included in this EIR.

13.2 PROJECT OBJECTIVES

The primary objectives of the proposed project as set forth in Chapter 3, Project Description, are to:

1. Maintain a single integrated campus for the middle and upper school in the current location, while providing new structures that integrate state-of-the-art technology and teaching practices and retain flexibility to adapt to unanticipated changes.

2. Achieve better architectural compatibility with adjacent neighborhoods through a well-articulated building and improve site aesthetics and harmony with the surrounding neighborhoods through enhanced landscaping.

3. Increase enrollment to 540 students to allow more young women the unique opportunity to receive an all-girls education.

4. Increase on-site parking via an underground parking garage in order to reduce both parking visibility and surface parking spaces.

5. Improve vehicular, pedestrian, and bicycle access for students and staff through design efficiencies and a robust Transportation Demand Management Plan.

6. Ensure no increase in vehicle trips to and from the campus during AM and PM peak hours relative to recent (baseline) traffic volumes. Reduce the number of service deliveries and relocate deliveries within the campus and below grade, to decrease nuisance effects to neighbors.

7. Improve the campus's sustainability and energy efficiency by developing new facilities.

8. Phased development of the project to allow Castilleja School to continue to operate during construction and to reduce impacts on the neighborhood.

13.3 SUMMARY OF PROJECT ALTERNATIVES

This section evaluates three alternatives to the proposed project, including the No Project alternative, which is a required element of an EIR pursuant to Section 15126.6(e) of the CEQA Guidelines. Consideration of the No Project alternative provides an analysis of the environmental effects that would occur if the project were not to proceed. The two other project alternatives selected for analysis were chosen based on balancing each alternative's ability to best meet the project objectives stated above and to avoid or substantially lessen the significant effects of the proposed project. In addition, this section describes three alternatives that were initially considered but rejected from the full analysis because they were determined to be infeasible and/or incapable of reducing the project's environmental effects. Taken together, all of the alternatives discussed within this chapter constitute "range of reasonable alternatives" to the proposed project and provide the city's decision-makers with the analysis necessary for them to make an informed decision.

The environmental effects of each alternative relative to the environmental effects of the proposed project are evaluated below. These conclusions are also listed in the alternatives summary matrix provided at the end of this discussion.

Development of Project Alternatives

In developing the project alternatives evaluated in this EIR, the EIR preparers worked with city staff to explore various modifications to the project that could reduce environmental effects while responding to the project objectives and reflecting any suggestions for project alternatives that were provided in the public comments received in response to the Notice of Preparation. This effort focused on reducing the project's significant and unavoidable impacts related to traffic volumes and LOS, but also considers whether project alternatives may substantially lessen any of the project's effects that were determined to be less than significant or less than significant with implementation of mitigation measures.

As discussed previously, Impacts 4-2, 7-1, and 7-7 were determined to be significant and unavoidable because the project would substantially increase the traffic volumes the segment of Emerson Street between Melville Avenue and Embarcadero Road and would add traffic to the unsignalized intersection at Kingsley Avenue/Alma Street, which is not planned for signalization. The project would contribute to the intersection operating at an unacceptable LOS in the cumulative condition. Thus, in developing project alternatives, the EIR preparers explored options for reducing the project's contribution to traffic volumes on Emerson Street and through the Kingsley Avenue/Alma Street intersection.

Project Alternatives Selected for Analysis

This section provides an evaluation of the environmental effects of each alternative relative to the environmental effects of the proposed project. These conclusions are listed in the alternatives summary matrix provided at the end of this discussion.

The alternatives addressed in this section are described below while subsequent sections provide analysis comparing the impacts of each alternative to those of the proposed project.

1. **Alternative 1: No Project Alternative.** This alternative assumes no development would occur, and the site would remain in its current condition. All buildings and other site

improvements would be retained at existing locations. The school would continue to operate under the existing Conditional Use Permit (CUP), which would require reducing enrollment to 415 students from the current enrollment of 434 students.

Alternative 2: Moderate Enrollment Increase. This alternative seeks to reduce the impacts of the proposed project associated with traffic by establishing a maximum enrollment of 506 students. This would increase maximum enrollment compared to the existing CUP by 91 students, and increase the enrollment compared to current conditions by 72 students. The enrollment increase under Alternative 2 would be equal to 73 percent of the proposed increase to the CUP enrollment cap. With 506 students, it is expected that the campus would require 30 classrooms, based on the proposed ratio of students to classrooms. The City of Palo Alto Municipal code (Chapter 18.52.040 – Off-Street Parking, Loading and Bicycle Facility) requires that a private school (grades 6-8) provide 2 parking spaces per teaching station and a private high school (grades 9-12) provide 4 spaces per teaching station. For the purposes of this evaluation, a teaching station was defined as a classroom. The campus currently has 12 teaching stations for the middle school and 16 teaching stations for the upper school. On average, there are 15.5 students for each teaching station at the current enrollment level and campus design. Under the proposed project, there would be 16.875 students for each teaching station. The proposed project would create four new classroom for grades 9-12 and no new classrooms for grades 6-8. Thus, the new classrooms included in this alternative are also assumed to be for grades 9-12. As shown in Table 13-1, Alternative Parking Calculations, the proposed project would require a minimum of 104 parking spaces while Alternative 2 would require 96. The proposed project includes 142 parking spaces. To keep the ratio of parking spaces to students the same as proposed, Alternative 2 would include 133 parking spaces.

Table 13-1

Alternative Parking Calculations

	Existing	Proposed Project	Alternative 2
Number of Grade 6-8 classrooms	12	12	12
Number of Grade 9-12 classrooms	16	20	18
Minimum parking spaces required	88	104	96
Number of parking spaces provided	74	142	133

This alternative would require two fewer classrooms and nine fewer parking spaces than the proposed project. It would accommodate a minor reduction in the size of the academic building and removing most of the surface parking lot at Kellogg Avenue and Emerson

Street. The academic building could be slightly reconfigured to reduce the amount of space on the second floor, providing greater setbacks from Kellogg Avenue and thus reducing the building massing along that elevation. Section 13.5 presents analysis comparing the impacts of Alternative 2 to those of the proposed project.

2. **Alternative 3: Moderate Enrollment Increase with Reduced Parking.** This alternative would also attempt to reduce the impacts of the proposed project associated with traffic by establishing a maximum enrollment of 506 students. It would further seek to reduce project effects associated with construction of the parking garage by reducing the on-site parking to the minimum required by code, as shown in Table 13-1, and increasing the surface parking. This alternative would require two fewer classrooms and 46 fewer parking spaces than the proposed project. It would accommodate a minor reduction in the size of the academic building.

   Under this alternative, the surface parking lot at the corner of Kellogg Avenue and Emerson Street would be expanded (from the proposed 13-space lot) to include two rows of 13 parking spaces each (26 spaces). The additional row of parking spaces would be "tuck-under" spaces that would be located at grade level and below the second story of the academic building. The ground level of the academic building would be slightly reduced to accommodate these tuck-under parking spaces, but the second floor would retain the proposed dimensions. By increasing the surface parking by 13 spaces and decreasing the total number of parking spaces needed, the parking garage would need to contain 58 parking spaces, compared with 115 spaces under the proposed design. This would allow for the garage design to be modified to allow retention of the rental housing unit at 1235 Emerson Street, and to reduce encroachment into the special setback from Embarcadero Road. However, based on space needs for vehicle movements into and out of parking spaces, and the two-lane drop-off/pick-up area, it is expected that the garage would require some amount of encroachment into the setbacks. Further, retention of the housing unit at 1235 Emerson Street would reduce the size of the private open space between Speiker Field and Emerson Street.

Alternatives Considered but Rejected

In addition to the alternatives selected for additional analysis, the following alternatives were initially considered but rejected from further consideration. The CEQA Guidelines provide that reasons to eliminate potential alternatives from detailed consideration in an EIR can include (1) failure to meet most of the basic project objectives, (2) infeasibility, and (3) inability to avoid significant environmental impacts. Factors that may be considered to determine if an alternative is feasible include site suitability, economic viability, and general plan consistency. The following alternatives were preliminarily considered but rejected from further evaluation for the reasons described below.

1. **Offsite Alternative – Relocate Full Campus.** This alternative would relocate the entire Castilleja campus to another location. This alternative was rejected from further consideration because it would require substantial speculation to analyze and it is not clear that this alternative would reduce or avoid any of the project's environmental effects. All of the land within the City of Palo Alto that is zoned for developed land uses is already developed. No vacant parcels that could accommodate a school with up to 540 students exist within the City. Castilleja School's ability to acquire a new property would be dependent on the actions of individual land owners and thus it is not possible to identify a specific offsite location to consider in the context of this alternative. It is not possible to determine precisely how the impacts of a relocated campus would compare to the impacts of the proposed project, but general conclusions can be reached. If the campus were relocated to another residential neighborhood, the impacts related to noise and transportation would be similar to or greater than the proposed project. If the campus were relocated to a commercial neighborhood, there could be increased land use and traffic impacts and the potential for students and staff to be exposed to hazardous materials. Further, if the campus were relocated, Castilleja would likely sell the existing campus which could be subdivided and developed with new residences. The 6.58-acre project site could accommodate approximately 28 single-family residential lots with a minimum of 10,000 square feet each. This would involve construction at the project site that could expose neighbors to similar levels of noise as under the proposed project.

   Further, this could involve demolition of the administration building and chapel, which would constitute a significant and unavoidable impact due to the loss of historic resources. It is possible these buildings could be retained onsite and adapted for reuse with a community use that is compatible with the surrounding neighborhood, such as a small community resource center. However, this is considered a speculative alternative because no specific needs for community services have been identified for the project area. It is also potentially possible for these buildings to be relocated to the new campus location, but that would involve substantial additional costs compared to the proposed project and could impair the historic significance of the buildings by changing their location and setting.

2. **Partial Offsite Alternative.** This alternative would relocate a portion of the Castilleja student body to another location. One scenario that could fulfill this concept would be to relocate grades six, seven, and eight to a new location, as suggested in public comments submitted to the City in response to the Notice of Preparation for this EIR. This alternative was rejected from further consideration because it would not be feasible for Castilleja to implement due to the adverse effects it would have on their educational program and would not meet the basic project objective of maintaining a single campus. Providing for a large degree of interaction between students from all grades (6 through 12) on a single campus is a critical component of Castilleja's educational program. The upper grade students are

engaged daily in coaching, directing, tutoring, mentoring, and otherwise supporting the middle school students as part of a formalized leadership curriculum. Additionally, the daily casual interactions between the middle and upper grader students promotes higher degrees of confidence and self-esteem for the middle grade students.

3. **Other offsite options.** This alternative would relocate specialized programs and special events to an offsite, satellite location. This may result in an increase in traffic by resulting in additional trips to and from the main campus and the satellite location. Special events are typically held on evenings and weekends and therefore do not contribute to AM peak hour traffic volumes. Therefore, the alternative would not result in a reduction in the severity of traffic impacts. Thus this alternative was rejected from further consideration because it would not provide a substantive change in environmental effects compared to the proposed project.

4. **Surface Parking.** This alternative would modify the proposed changes to the campus to eliminate the below-grade parking garage. This would require increased surface parking or an above-grade parking structure. This alternative was suggested in public comments submitted to the City in response to the Notice of Preparation for this EIR as an option that would reduce adverse aesthetics impacts associated with the garage driveways and gates and reduce adverse effects associated with excavation. As discussed in Chapter 5, Aesthetics, the garage structure and its driveways and gates would not result in adverse changes in the visual conditions of the project site. As discussed in Chapter 12, Geology, Soils, Seismicity, and Paleontology, implementation of Mitigation Measure 12a would ensure that excavation of the site to allow construction of the garage would not result adverse effects associated with soil and geologic conditions. Thus this alternative would not meet CEQA's requirement that alternatives be expected to reduce a project's significant effects. Further, this alternative could increase impacts compared to the proposed project. The parking garage is proposed to have 115 parking spaces as well as two 200-foot lanes for drop-off/pick-up. Relocating these parking spaces and the drop-off/pick-up zone to the surface of the project site increase neighbor's noise exposure associated with traffic, parking lot activities, and drop-off/pick-up activities. It would also require decreased building footprints to make room for the increased surface parking, which would require additional basement space and/or increased building height. This would increase the scale and massing of the buildings, which would result in a decreased degree of the campus' compatibility with the neighboring residential land uses. Establishing satellite parking lots and a shuttle service could alleviate these effects, but as discussed previously, there are no vacant parcels in the City thus it would require speculation to evaluate this option and depending on location and site-specific conditions, there is a potential for satellite parking lots to create impacts that are greater than those identified for the proposed project.

5. **Modified Circulation Routes.** This alternative considered if there is a design modification that can be made to the parking garage that would allow more options for exiting the parking garage, to reduce traffic impacts on Emerson Street and at the Kingsley /Alma Street intersection. Due to space constraints posed by road alignments and the need to avoid impacts to the historic Gunn Administration Building/ Elizabeth Hughes Chapel Theater building, it is not feasible to design the parking garage to allow both ingress and egress on the Bryant Street side of the parking garage. Additionally, as Bryant Street supports a bicycle boulevard, it is appropriate to minimize vehicle traffic on Bryant Street. Further, with the proposed placement of the below-grade swimming pool and the existing below grade level in the athletic building, there are no options to create a second point of egress from the garage on Emerson Street or Kellogg Avenue. Bringing the pool up to ground level, as it is currently located, would increase noise exposure to the nearest surrounding residents, thus it would increase impacts compared to the proposed project. This alternative was rejected from further consideration because it would not be feasible to implement.
6. **Minimum Enrollment Increase.** This alternative seeks to reduce the impacts of the proposed project associated with traffic by establishing a maximum enrollment of 489 students. This would increase maximum enrollment compared to the existing CUP by 74 students, and increase the enrollment compared to current conditions by 55 students. This would reduce the need for parking and allow construction of a smaller parking garage than proposed.

   With an enrollment of 489 students, this alternative would require only one new teaching station, assuming the proposed ratio of students to teaching stations remains constant. This would reduce the minimum parking requirement to 92 parking spaces and would require 119 parking spaces to maintain the same ratio of parking spaces to students as the proposed project. Further, this alternative would allow for a reduction in the size of the proposed Academic building. However, this alternative was rejected from further consideration because it would not meet most of the basic objectives due to the substantial limitation on the number of new students that would be allowed under this scenario.

13.4 ALTERNATIVE 1: NO PROJECT

Under this alternative, no changes to the existing Conditional Use Permit would be made. Castilleja would be restricted to a maximum enrollment of 415 students each year. No demolition or construction would occur within the campus, and no changes would be made to the school's special event schedule or provisions for student, staff, and visitor parking.

Land Use and Planning

The proposed project would result in a significant and unavoidable impact associated with land use and planning. The project would not physically divide an established community or conflict with the city's plans and policies but would result in a land use compatibility conflict due to the potential to exacerbate existing land use conflicts between the school and its residential neighborhood by increasing the disturbance to neighbors associated with special events, increasing traffic volumes in the project vicinity, and generating noise levels that could exceed the Municipal Code standards. Implementation of Mitigation Measure 4a would reduce the project's significant land use compatibility impacts related to special events and implementation of Mitigation Measures 8a and 8b would reduce the project's significant land use compatibility impacts associated with noise. Implementation of the expanded TDM program required under Mitigation Measure 7a would reduce the project's significant land use compatibility impacts associated with increased traffic volumes on residential streets but would not be sufficient to reduce the impact to a less than significant level. Thus, the project's impacts associated with land use incompatibility would remain **significant and unavoidable.**

Under the No Project Alternative, Castilleja School would continue to operate within the residential neighborhood. Enrollment would be slightly reduced from the current level to be consistent with the enrollment cap in the existing CUP. This would reduce enrollment by 19 students compared to the 2018/2019 academic year. Because no demolition or new construction would occur, there would be no impacts to trees within the project site.

The No Project Alternative would not alter traffic patterns in the project area. Thus it would avoid the project's significant and unavoidable impacts associated with increased traffic volumes on residential streets. The project as proposed would result in a substantial increase in the TIRE index rating on one roadway segment. It would also result in less than significant increases in the TIRE index rating on 13 other segments, and minor decreases in the TIRE index rating on nine segments. Under the No Project Alternative, none of these changes would occur. Further, compared to existing conditions the No Project Alternative would result in a slight improvement with respect to land use and planning issues because it would slightly reduce enrollment, which would correlate to a small reduction in traffic and on-street parking in the surrounding neighborhood.

Under the proposed project, traffic patterns around the school would change because the majority of parking and drop-off/pick-up activities would be relocated to the underground garage. This would lessen some of the land use conflict issues that currently exist between the school and the surrounding neighborhood. For example, the TIRE index rating analysis in Chapter 7, Transportation, shows that the proposed project would reduce traffic volumes on some of the roadway segments in the area. Because the parking garage would not be constructed under the No Project Alternative, the reduction in land use conflicts would not be achieved.

In comparison to the proposed project, the No Project Alternative would avoid the project's significant and unavoidable impact of increased traffic volumes on residential roads, but would result in less than significant land use conflicts persisting throughout a greater portion of the neighborhood. These impacts would be slightly reduced from the existing condition due to the reduced enrollment under this alternative. In conclusion, the No Project Alternative would result in lesser impacts associated with land use and planning than the proposed project.

Aesthetics

The proposed project would result in less than significant impacts to aesthetics and visual resources. It would reduce the number of structures onsite and increase the amount of open space. The majority of the increase in building area would occur below grade and there would be no increase in the gross floor area (above ground building space). The project would improve the visual character of the site and its compatibility with the surrounding residential neighborhood compared to the existing conditions by reducing the amount of at-grade parking, both on-street and off-street, relocating bus loading and unloading to the below-grade parking garage, and creating a private open space area in the northwestern corner of the project site. The proposed building plans use materials, colors, and details that are compatible with the existing structures on the site such that the overall campus would have a unified and coherent design. The project design includes pedestrian scale fencing and gates to provide several paths of ingress and egress for students, staff and visitors, including convenient bicycle parking. The project also incorporates elements that meet the City's sustainability goals, such as rooftop photovoltaics, green roofs, energy efficiency, and water-use efficiency.

The No Project Alternative would not result in any demolition, construction, tree removal or tree relocation within the project site. Therefore, the aesthetic and visual resources onsite would not be affected and there would be no change to the visual conditions within the project site and surrounding area. The No Project Alternative would not achieve the visual benefits of the project associated with relocating parking and drop-off/pick-up activities below grade, increased open space, and enhancing site landscaping and fencing. Thus the No Project Alternative would result in increased impacts to aesthetics compared to the proposed project.

Cultural Resources

The proposed project would have no direct impact to historic resources. The project could disturb archeological resources that may be present below ground and could be encountered during excavation associated with construction of the parking garage, pool, and new classroom building. Similarly, the project's potential to indirectly or accidentally affect the existing historic resources onsite and adjacent to the site. These potential impacts would be reduced to less-than-significant levels with implementation of mitigation measures identified in chapter 6.

The No Project alternative would not involve any changes to the existing buildings and other site improvements within the campus, thus there would be no potential to disturb or otherwise adversely affect historic and archeological resources; thus no mitigation measures would be required. Therefore, the No Project alternative would have reduced impacts to cultural resources compared to the proposed project.

Transportation and Traffic

The proposed project would have potentially significant impacts on transportation and traffic, creating conflict with applicable plans, ordinances or policies that establish measures of effectiveness for the performance of the circulation system. These impacts have the potential to affect intersections, streets, highways and freeways, pedestrian and bicycle paths and mass transit. With the implementation of mitigation measures specified in Chapter 7, most of the project's impacts to transportation would be reduced to less-than-significant levels. The proposed project would result in significant and unavoidable impacts by contributing to a cumulative increase in traffic that conflicts with current policies and plans related to intersection and roadway segment function.

This alternative would accommodate 19 fewer students than are currently enrolled and 125 fewer students than under the proposed project. Additionally, the No Project alternative would not alter the existing traffic patterns associated with school drop-off and pick-up, and therefore would not increase traffic volumes on Emerson Street or Melville Avenue compared to existing conditions. Thus the No Project alternative would result in a decrease in traffic volumes compared to the proposed project and would avoid the project's significant impact associated with increases in the TIRE index and the project's considerable contribution to cumulative traffic volumes. The No Project Alternative would result in reduced transportation impacts compared to the proposed project.

Noise

The proposed project would result in potentially significant impacts associated with noise because it could create a substantial permanent, temporary or periodic increase in ambient noise levels in the project vicinity. With the mitigation measures specified in Chapter 8, these impacts would be reduced to less than significant levels.

Under the No Project Alternative, the pool would be retained in its existing location. Under the proposed project the existing pool would be demolished and a new pool would be constructed at an elevation below the existing ground surface, which would reduce neighbor's exposure to noise associated with pool use. Thus, under the No Project alternative, there would be no reduction in project site neighbors' noise exposure associated with use of the pool compared to existing conditions. The No Project alternative would result in greater impacts than the proposed project because a reduction in noise levels associated with use of the pool would not be achieved.

Air Quality

The proposed project would result in potentially significant impacts to air quality by contributing substantially to direct and/or indirect emissions of criteria air pollutants during construction. With the mitigation measures detailed in Chapter 9, these impacts would be reduced to less than significant.

The No Project alternative would not include any demolition, excavation, or construction and thus would avoid generating air pollutant emissions associated with those activities. Thus the No Project alternative would result in reduced air quality impacts compared to the proposed project.

Greenhouse Gas Emissions

The proposed project would result in less than significant impacts to greenhouse gas emissions. The emissions generated during demolition, construction, and operation would remain below the thresholds established by the Bay Area Air Quality Management District. The project includes implementation of a Sustainability Plan and replacement of old buildings with new buildings that would achieve higher energy-efficiency and water-efficiency standards.

The No Project alternative would not include any demolition, excavation, or construction and thus would avoid generating greenhouse gas emissions associated with those activities. However, under the No Project alternative, no improvements in energy-efficiency and water-efficiency would be achieved. Thus the No Project Alternative would result in greater impacts related to greenhouse gas emissions than the proposed project.

Energy Conservation

The proposed Project would result in less than significant impacts regarding energy consumption during both construction and operation and would not require mitigation. The No Project alternative would not include any demolition, excavation, or construction and thus would avoid energy consumption associated with those activities. However, under the No Project Alternative, the Sustainability Plan would not be implemented and no improvements in energy-efficiency and water-efficiency would be achieved. Thus the No Project alternative would result in greater impacts related to energy conservation than the proposed project.

Geology and Soils

The proposed project would result in potentially significant impacts to geology and soil resources associated with exposing people or structures to seismic activity or related ground shaking or failure, location on a geologic unit or soil that is unsuitable for the project, and the direct or indirect destruction of paleontological resources. With the implementation of mitigation measures detailed in Chapter 12, these impacts would be reduced to less than significant levels.

The No Project Alternative would not include any demolition, excavation, or construction and thus would avoid generating geological impacts associated with those activities. Therefore, the No Project alternative would have reduced impacts to geology and soils compared to the proposed project.

13.5 ALTERNATIVE 2: MODERATE ENROLLMENT INCREASE

This alternative seeks to reduce the impacts of the proposed project associated with traffic by establishing a maximum enrollment of 506 students. This would increase maximum enrollment compared to the existing CUP by 91 students, and increase the enrollment compared to current conditions by 72 students. The Moderate Enrollment Increase Alternative would include construction of the new academic building to include 30 classrooms, construction of the parking garage as proposed, and a reduction in the number of parking spaces in the proposed surface parking lot at Emerson Street and Kellogg Avenue.

Land Use

As discussed previously, the proposed project would result in a significant and unavoidable impact associated with land use and planning because it would substantially increase the daily traffic volume on one residential roadway segment. Mitigation Measure 7a requires implementation of the expanded TDM program proposed as a part of the project, including the additional measures and monitoring and enforcement provisions identified in Mitigation Measure 7a. The expanded TDM program would reduce this effect, but not to a less than significant level.

Under the Moderate Enrollment Increase Alternative, the project site would be redeveloped similarly to the proposed project, but would allow for a slight increase in the amount of open space on the campus due to the reduction in surface parking. This alternative would reduce traffic volumes compared to the project proposed. Based on the trip generation data provided in Table 7-4 in Chapter 7, Transportation, the Moderate Enrollment Increase Alternative would generate 1,384 daily trips, compared to the 1,477 generated by the proposed project. Table 13-2 presents the roadway segment traffic volumes associated with the Moderate Enrollment Increase Alternative. As shown in Table 13-2, the Moderate Enrollment Increase Alternative would slightly reduce the traffic volume on the segment of Emerson Street between Melville Avenue and Embarcadero Road, from 679 new daily trips under the proposed project to 638 new daily trips. This would slightly reduce the magnitude of the significant project impact but would not reduce it to a less than significant level. It would be necessary to reduce the number of new daily trips on this segment to 169 in order to avoid the increase in the TIRE index rating (as shown in Table 13-

2), and thus avoid the significant impact. Mitigation Measure 7a requires Castilleja School to implement an enhanced TDM plan which is expected to reduce trips by between 12 and 22 percent. Table 13-2 shows that the proposed TDM plan would not achieve sufficient daily vehicle trip reductions to avoid the significant impact under either the proposed project or the Moderate Enrollment Increase because this alternative would still add more than 169 new trips to the roadway segment. The land use compatibility impact associated with the increased traffic volumes on this residential street would remain significant and unavoidable, although the magnitude of the increase would be slightly reduced. Thus the Moderate Enrollment Increase Alternative would not substantially reduce the project's significant land use impact and this alternative's impact would be similar to that of the proposed project.

Table 13-2
TIRE Index Analysis Comparison
Emerson Street between Melville Avenue and Embarcadero Road

Existing Conditions		Volume Needed to Increase TIRE Index by 0.10	Additional Daily Trips			
			Proposed Project		*Moderate Enrollment Increase*	
ADT	*TIRE Index*		*Project*	*With MM 7a*	*Alternative*	*With MM 7a*
842	2.9	170	679	529 to 598	638	498 to 561

Notes:
ADT = Average Daily Traffic
Source: Appendix E

Aesthetics

The proposed project would result in less than significant impacts to aesthetics and visual resources. It would reduce the number of structures onsite and increase the amount of open space. The project would improve the visual character of the site and its compatibility with the surrounding residential neighborhood compared to the existing conditions by reducing the amount of at-grade parking, both on-street and off-street, relocating bus loading and unloading to the below-grade parking garage, and creating a private open space area in the northwestern corner of the project site.

Under the Moderate Enrollment Increase, the project site would be redeveloped similarly to the proposed project. Building scale, massing, materials, colors, and details as well as landscaping and fencing would be generally the same as the proposed project. The Moderate Enrollment Increase Alternative would have the same aesthetic impacts as the proposed project.

Cultural Resources

The proposed project would have no direct impact to historic resources. The project could disturb archeological resources that may be present below ground and could be encountered during excavation associated with construction of the parking garage, pool, and new classroom building. Similarly, the project's potential to indirectly or accidentally affect the existing historic resources onsite and adjacent to the site. These potential impacts would be reduced to less-than-significant levels with implementation of mitigation measures identified in chapter 6.

The Moderate Enrollment Increase Alternative would involve generally the same changes to the existing buildings and other site improvements within the campus as the proposed project except that the size of the classroom building would be slightly smaller. This would not change the amount or extent of grading and excavation necessary to construct the project, thus the Moderate Enrollment Increase Alternative would have the same potential to disturb archeological and historic resources as the proposed project and would have the same impacts to cultural resources as the proposed project.

Transportation and Traffic

The proposed project would have potentially significant impacts on transportation and traffic, creating conflict with applicable plans, ordinances or policies that establish measures of effectiveness for the performance of the circulation system. These impacts have the potential to affect intersections, streets, highways and freeways, pedestrian and bicycle paths and mass transit. With the implementation of mitigation measures specified in Chapter 7, most of the project's impacts to transportation would be reduced to less-than-significant levels. The proposed project would result in significant and unavoidable impacts by contributing to a cumulative increase in traffic that conflicts with current policies and plans related to intersection and roadway segment function.

The Moderate Enrollment Increase Alternative would accommodate 34 fewer students than the proposed project, and 72 students more than are currently enrolled. This alternative would have similar affects associated with altering traffic patterns associated with school drop-off and pick-up. As discussed in the previous Land Use and Planning section, and shown in Table 13-2, the Moderate Enrollment Increase Alternative would substantially increase traffic volumes on Emerson Street between Melville Avenue and Embarcadero Road.

Under Mitigation Measure 7a, Castilleja School would implement the proposed enhanced TDM plan, including the additional measures and monitoring and enforcement provisions identified in Mitigation Measure 7a. The expanded TDM program would minimize the number of new vehicle trips to and from the school. However, the trip reductions anticipated under the TDM plan would not be sufficient to avoid this significant impact or the project's substantial contribution to cumulative traffic volumes at the Alma Street/Kingsley Avenue intersection. Thus, the Moderate Enrollment Increase Alternative would not substantially reduce the project's significant transportation impacts and the impacts would be similar to those of the proposed project.

Noise

The proposed project would result in potentially significant impacts associated with noise because it could create a substantial permanent, temporary or periodic increase in ambient noise levels in the project vicinity. With the mitigation measures specified in Chapter 8, these impacts would be reduced to less than significant levels.

Under the Moderate Enrollment Increase Alternative, the project site would be redeveloped similarly to the proposed project. The slight reduction in the maximum enrollment at the school would not change the project's potential noise impacts or required mitigation measures. Thus, the Moderate Enrollment Increase Alternative would result in similar noise impacts as the proposed project.

Air Quality

The proposed project would result in potentially significant impacts to air quality by contributing substantially to direct and/or indirect emissions of criteria air pollutants during construction. With the mitigation measures detailed in Chapter 9, these impacts would be reduced to less than significant.

The Moderate Enrollment Increase Alternative would involve substantially the same amount of construction as the proposed project and thus would result in similar emissions of air pollutants and require implementation of the same mitigation measures. Thus the air quality impacts of the Moderate Enrollment Increase Alternative would be similar to those of the proposed project.

Greenhouse Gas Emissions

The proposed project would result in less than significant impacts to greenhouse gas emissions. The emissions generated during demolition, construction, and operation would remain below the thresholds established by the Bay Area Air Quality Management District. The project includes implementation of a Sustainability Plan and replacement of old buildings with new buildings that would achieve higher energy-efficiency and water-efficiency standards.

The Moderate Enrollment Increase Alternative would involve substantially the same amount of construction as the proposed project and thus would result in similar emissions of greenhouse gases. The Moderate Enrollment Increase Alternative would include implementation of the Sustainability Plan and would replace old buildings with more energy- and water-efficient buildings. Thus the greenhouse gas impacts of the Moderate Enrollment Increase Alternative would be similar to those of the proposed project.

Energy Conservation

The proposed Project would result in less than significant impacts regarding energy consumption during both construction and operation and would not require mitigation. The Moderate Enrollment Increase Alternative would involve substantially the same amount of construction as the proposed project and thus would result in similar energy consumption during construction and operation. The Moderate Enrollment Increase Alternative would include implementation of the Sustainability Plan and would replace old buildings with more energy- and water-efficient buildings. Thus the energy consumption impacts of the Moderate Enrollment Increase Alternative would be similar to those of the proposed project.

Geology and Soils

The proposed project would result in potentially significant impacts to geology and soil resources associated with exposing people or structures to seismic activity or related ground shaking or failure, location on a geologic unit or soil that is unsuitable for the project, and the direct or indirect destruction of paleontological resources. With the implementation of mitigation measures detailed in Chapter 12, these impacts would be reduced to less than significant levels.

Under the Moderate Enrollment Increase Alternative, the project site would be redeveloped similarly to the proposed project. This alternative would require grading and excavation on the same site in a similar footprint; therefore, the Moderate Enrollment Increase Alternative would result in similar geology and soils impacts compared to the proposed project.

13.6 ALTERNATIVE 3: MODERATE ENROLLMENT INCREASE WITH REDUCED PARKING

This alternative would also attempt to reduce the impacts of the proposed project associated with traffic by establishing a maximum enrollment of 506 students. It would further seek to reduce project effects associated with construction of the parking garage by reducing the on-site parking to the minimum required by code, as shown in Table 13-1, and increasing the surface parking. This alternative would require two fewer classrooms and 46 fewer parking spaces than the proposed project. It would accommodate a minor reduction in the size of the academic building. School drop-off and pick-up would occur in the parking garage.

Land Use

The proposed project would result in a significant and unavoidable impact associated with land use and planning because it would substantially increase the daily traffic volume on one residential roadway segment. Mitigation Measure 7a requires implementation of the expanded TDM program proposed as a part of the project, including the additional measures and monitoring and enforcement provisions identified in Mitigation Measure 7a. The expanded TDM program would reduce this effect, but not to a less than significant level.

Under the Moderate Enrollment Increase with Reduced Parking Alternative, the project site would be redeveloped similarly to the proposed project, but would slightly reduce the amount of open space on the campus due to the increase in surface parking. This alternative would reduce traffic volumes compared to the project proposed. Based on the trip generation data provided in Table 7-4 in Chapter 7, Transportation, the Moderate Enrollment Increase with Reduced Parking Alternative would generate 1,384 daily trips, compared to the 1,477 generated by the proposed project. With a portion of the parking relocated from the garage to surface parking lots, there would be a shift in traffic patterns and a minor reduction in the amount of traffic exiting the parking garage. Under this alternative, the parking garage would provide approximately 50% of the parking spaces compared to the proposed project (58 spaces compared to 115). This would slightly reduce the traffic volume exiting the garage. However, as the majority of the trips affecting the residential roadways are associated with drop-off and pick-up, there would not be a substantial reduction in the land use conflict impacts associated with increased traffic volumes. With the reduction in the number of parking spaces in the garage, it is expected that this alternative would result in approximately 581 daily trips exiting the garage. This would be reduced to between 453 and 511 daily trips with implementation of the enhanced TDM plan required under Mitigation Measure 7a. This would slightly reduce the magnitude of the significant project impact but would not reduce it to a less than significant level. It would be necessary to reduce the number of new daily trips on this segment to 169 in order to avoid the increase in the TIRE index rating (as shown in Table 13-2), and thus avoid the significant impact. Additionally, there would be an increased amount of on-street parking compared to the proposed project. The land use compatibility impact associated with these increased traffic volumes on residential streets would remain significant and unavoidable, although the magnitude of the increases would be somewhat reduced. Thus the Moderate Enrollment Increase with Reduced Parking Alternative would not substantially reduce the project's significant land use impact and impacts would be similar to that of the proposed project.

Aesthetics

The proposed project would result in less than significant impacts to aesthetics and visual resources. It would reduce the number of structures onsite and increase the amount of open space. The project would improve the visual character of the site and its compatibility with the surrounding residential neighborhood compared to the existing conditions by reducing the amount of at-grade parking, both on-street and off-street, relocating bus loading and unloading to the below-grade parking garage, and creating a private open space area in the northwestern corner of the project site.

Under the Moderate Enrollment Increase with Reduced Parking Alternative, the project site would be redeveloped similarly to the proposed project, with a slight increase in the size of the surface parking lot located at the corner of Emerson Street and Kellogg Avenue. Building scale, massing, materials, colors, and details as well as landscaping and fencing would be generally the same as the proposed project. There would be a minor increase in the amount of on-street parking compared to the proposed project because there would be 57 fewer parking spaces within the parking garage. The Moderate Enrollment Increase with Reduced Parking Alternative would have the same aesthetic impacts as the proposed project.

Cultural Resources

The proposed project would have no direct impact to historic resources. The project could disturb archeological resources that may be present below ground and could be encountered during excavation associated with construction of the parking garage, pool, and new classroom building. Similarly, the project's potential to indirectly or accidentally affect the existing historic resources onsite and adjacent to the site. These potential impacts would be reduced to less-than-significant levels with implementation of mitigation measures identified in Chapter 6.

The Moderate Enrollment Increase with Reduced Parking Alternative would involve generally the same changes to the existing buildings and other site improvements within the campus as the proposed project except that the below-grade parking garage and the size of the classroom building would be reduced. The amount of excavation necessary to construct the garage would be reduced but the potential to disturb archeological resources would remain. Thus the Moderate Enrollment Increase with Reduced Parking Alternative would have the same potential to disturb archeological and historic resources as the proposed project and would have the same impacts to cultural resources as the proposed project.

Transportation and Traffic

The proposed project would have potentially significant impacts on transportation and traffic, creating conflict with applicable plans, ordinances or policies that establish measures of effectiveness for the performance of the circulation system. These impacts have the potential to affect intersections, streets, highways and freeways, pedestrian and bicycle paths and mass transit. With the implementation of mitigation measures specified in Chapter 7, most of the project's impacts to transportation would be reduced to less-than-significant levels. The proposed project would result in significant and unavoidable impacts by contributing to a cumulative increase in traffic that conflicts with current policies and plans related to intersection and roadway segment function.

The Moderate Enrollment Increase with Reduced Parking Alternative would accommodate 34 fewer students than the proposed project, and 72 students more than are currently enrolled. All of the drop-off/pick-up activity would occur in the parking garage, but there would be a minor increase in on-street parking and associated traffic volumes on neighborhood streets compared to the proposed project. Thus, this alternative would have similar affects associated with altering traffic patterns associated with school drop-off and pick-up.

Under Mitigation Measure 7a, Castilleja School would implement the proposed enhanced TDM plan, including additional measures and monitoring and enforcement provisions identified in Mitigation Measure 7a, to minimize the number of new vehicle trips to and from the school. However, the trip reductions anticipated under the TDM plan would not be sufficient to avoid this significant impact or the project's substantial contribution to cumulative traffic volumes at the Alma Street/Kingsley Avenue intersection. Thus, the Moderate Enrollment Increase with Reduced Parking Alternative would not substantially reduce the project's significant transportation impacts and the impacts would be similar to those of the proposed project.

Noise

The proposed project would result in potentially significant impacts associated with noise because it could create a substantial permanent, temporary or periodic increase in ambient noise levels in the project vicinity. With the mitigation measures specified in Chapter 8, these impacts would be reduced to less than significant levels.

Under the Moderate Enrollment Increase with Reduced Parking Alternative, the project site would be redeveloped similarly to the proposed project. The slight reduction in the maximum enrollment at the school, reduction in the size of the parking garage, and increase in surface parking would not change the project's potential noise impacts or required mitigation measures. Thus, the Moderate Enrollment Increase with Reduced Parking Alternative would result in similar noise impacts as the proposed project.

Air Quality

The proposed project would result in potentially significant impacts to air quality by contributing substantially to direct and/or indirect emissions of criteria air pollutants during construction. With the mitigation measures detailed in Chapter 9, these impacts would be reduced to less than significant.

The Moderate Enrollment Increase with Reduced Parking Alternative would involve substantially the same amount of construction as the proposed project, although the amount of excavation and associated truck trips to off-haul excavated soils and other materials would be somewhat reduced. The Moderate Enrollment Increase with Reduced Parking Alternative would slightly reduce emissions of air pollutants, but would require implementation of the same mitigation measures.

Thus the air quality impacts of the Moderate Enrollment Increase with Reduced Parking Alternative would be similar to those of the proposed project.

Greenhouse Gas Emissions

The proposed project would result in less than significant impacts to greenhouse gas emissions. The emissions generated during demolition, construction, and operation would remain below the thresholds established by the Bay Area Air Quality Management District. The project includes implementation of a Sustainability Plan and replacement of old buildings with new buildings that would achieve higher energy-efficiency and water-efficiency standards.

The Moderate Enrollment Increase with Reduced Parking Alternative would involve substantially the same amount of construction as the proposed project but would reduce emissions associated with truck trips to off-haul excavated soils and other materials. The Moderate Enrollment Increase with Reduced Parking Alternative would slightly reduce emissions of greenhouse gases. The Moderate Enrollment Increase with Reduced Parking Alternative would include implementation of the Sustainability Plan and would replace old buildings with more energy- and water-efficient buildings. Thus the greenhouse gas impacts of the Moderate Enrollment Increase with Reduced Parking Alternative would be similar to those of the proposed project.

Energy Conservation

The proposed project would result in less than significant impacts regarding energy consumption during both construction and operation and would not require mitigation. The Moderate Enrollment Increase with Reduced Parking Alternative would involve substantially the same amount of construction as the proposed project and thus would result in similar energy consumption during construction and operation. The Moderate Enrollment Increase with Reduced Parking Alternative would include implementation of the Sustainability Plan and would replace old buildings with more energy- and water-efficient buildings. Thus the energy consumption impacts of the Moderate Enrollment Increase with Reduced Parking Alternative would be similar to those of the proposed project.

Geology and Soils

The proposed project would result in potentially significant impacts to geology and soil resources associated with exposing people or structures to seismic activity or related ground shaking or failure, location on a geologic unit or soil that is unsuitable for the project, and the direct or indirect destruction of paleontological resources. With the implementation of mitigation measures detailed in Chapter 12, these impacts would be reduced to less than significant levels.

Under the Moderate Enrollment Increase with Reduced Parking Alternative, the project site would be redeveloped similarly to the proposed project, but the size of the garage would be reduced which would require less excavation. However there are no significant impacts associated with excavation, thus the Moderate Enrollment Increase with Reduced Parking Alternative would result in similar geology and soils impacts compared to the proposed project.

13.7 SUMMARY MATRIX

A matrix displaying the major characteristics and significant environmental effects of each alternative is provided in Table 13-3 to summarize the comparison with the proposed project.

Table 13-3
Project Alternatives Impacts Summary

Environmental Issue	Proposed Project Impacts	Alternative 1: No Project/No Build	Alternative 2: Moderate Enrollment Increase	Alternative 3: Moderate Enrollment Increase with Reduced Parking
Land Use	SU	▼	— (slightly reduced but remains SU)	— (slightly reduced but remains SU)
Aesthetics	LTS	▲	—	—
Cultural Resources	LTS	▼	—	—
Transportation and Circulation	SU	▼	— (slightly reduced but remains SU)	— (slightly reduced but remains SU)
Noise	LTS	▲	—	—
Air Quality	LTS	▼	—	—
Greenhouse Gases	LTS	▲	—	—
Energy	LTS	▲	—	—
Geology and Soils	LTS	▼	—	—

▲ Alternative is likely to result in greater impacts to issue when compared to proposed project.
— Alternative is likely to result in similar impacts to issue when compared to proposed project.
▼ Alternative is likely to result in reduced impacts to issue when compared to proposed project.
LTS = Less-than-significant impact.
SU= Significant and Unavoidable impact

13.8 ENVIRONMENTALLY SUPERIOR ALTERNATIVE

As indicated in Table 13-3, the No Project/No Build Alternative would result in the least environmental impacts and would be the environmentally superior alternative because it would avoid all of the project's significant and unavoidable impacts. It would increase impacts compared to the proposed project in relation to aesthetics, noise, greenhouse gases, and energy consumption but the impacts would remain less than significant.

Section 15126.6(e)(2) of the CEQA Guidelines states that if the environmentally superior alternative is the No Project Alternative, the EIR shall also identify an environmentally superior alternative among the other alternatives. In this case, the environmental effects of the Moderate Enrollment Increase Alternative and the Moderate Enrollment Increase with Reduced Parking Alternative would be generally the same as those of the proposed project. However, there are trade-offs between the specific extent of each impact, particularly with respect to the amount of surface parking within the project site and on neighborhood streets. Selection of the Moderate Enrollment Increase Alternative or the Moderate Enrollment Increase with Reduced Parking Alternative would not be capable of avoiding any of the project's significant impacts and would not substantially reduce any of the project's significant impacts.

CHAPTER 14
ADDITIONAL CEQA ANALYSIS

This chapter includes the following other considerations that are required to be discussed in an environmental impact report (EIR):

- Effects Not Found to be Significant (Section 14.1)
- Significant and Unavoidable Environmental Impacts (Section 14.2)
- Significant and Irreversible Environmental Changes (Section 14.3)
- Growth Inducement (Section 14.4)

14.1 EFFECTS NOT FOUND TO BE SIGNIFICANT

This section discusses California Environmental Quality Act (CEQA) environmental issue areas in which the analysis in the Initial Study found that the impacts from the proposed improvements to Castilleja Master Plan and Conditional Use Permit project (proposed project) would not be significant. The Initial Study analysis is briefly summarized in the following text. Additional information and discussion regarding the effects found not to be significant can be found in the Initial Study, which is provided in Appendix A of this EIR. The Initial Study found that the proposed project would result in less-than-significant impacts or no impacts in the following areas:

As documented in the Initial Study circulated with the NOP for this EIR and summarized here, there are several environmental resource areas for which the project is expected to have no impacts or impacts that would be reduced to less than significant levels with implementation of mitigation. The mitigation measures identified in the Initial Study are identified in Table 1-2 in Chapter 1, Executive Summary, and would be incorporated in the Mitigation Monitoring and Reporting Program for the project if it is approved.

- There are no agricultural or forestry resources located on or adjacent to the site. There are no known mineral resources located on or adjacent to the site and the site is not zoned for mineral extraction. The project would have no impacts associated with these resources and these topics are not addressed in this EIR.

- Impacts to biological resources would remain less than significant with implementation of Mitigation Measures BIO-1 and BIO-2 as identified in the Initial Study and presented in Table 1-2, and thus, this topic is not addressed in this EIR. The project site does not contain any habitats or biological resources with the potential to support any plant or wildlife species that are designated as threatened or endangered; however, there is potential for nesting birds to be present in trees on site that are proposed for removal or may be trimmed or otherwise affected by construction and there is potential for roosting bats to be present within the existing buildings proposed to be demolished. Mitigation Measures BIO-1 and BIO-2 would ensure that impacts remain less than significant by requiring the project applicant to conduct surveys and follow bird and/or bat protection protocols. The project site does not contain any riparian habitat, sensitive natural community, or federally protected wetlands, does not function as a potential wildlife movement corridor or habitat linkage, and is not subject to a Habitat Conservation Plan or Natural Community Conservation Plan. The project would have no impacts associated with these types of biological resources or regulatory guidance. The project would require removal of trees regulated under the City's Tree Ordinance; these impacts are evaluated in Chapter 4, Land Use.

- Impacts associated with hazards and hazardous materials would remain less than significant with implementation of Mitigation Measure HAZ-1 as identified in the Initial Study and presented in Table 1-2, and thus, this topic is not addressed in this EIR. The project site is not identified as a site where previous releases of hazardous materials have occurred. The project would involve the use of hazardous materials during construction and as part of routine property maintenance. Use, transportation and disposal of these materials would be required to comply with all local, state and federal regulations, which would ensure that potential impacts associated with their use would remain less than significant. The buildings proposed to be demolished may contain asbestos, lead-based paints or other hazardous building materials that could be released into the environment during demolition. Mitigation Measure HAZ-1, as identified in the Initial Study, would reduce the impact to a less than significant level by requiring that a building survey be completed to identify any hazardous materials and that recommendations for the containment and safe handling of such materials are implemented into construction plans.

- No significant impacts to hydrology and water quality would occur, and thus, this topic is not addressed in this EIR. The project would result in a slight increase in impervious surface at the project site. The project would be required to comply with all city, state and federal standards pertaining to stormwater runoff and water quality, including the requirements of the Regional Municipal Stormwater Permit and the City's standard conditions of approval regarding the use of best management practices.

- The project site is developed and located in an urban area. There are no known mineral resources on site or in the project vicinity. The proposed project would have no impact on these resources.

- No significant impacts to population and housing would occur, and thus, this topic is not addressed in this EIR. The Initial Study incorrectly stated that the project would not demolish any residential units. The project would demolish the Lockey House, which was originally in residential use but is currently used to support school functions and programming. The project would also demolish a single-family residence that is currently used as rental housing. This loss of a single residential unit is not considered to be a significant environmental effect and would not conflict with City policies and standards. The Initial Study has been revised for accuracy. The revisions are shown in redline/strikethrough format in Appendix A. The project would not construct new housing, would not generate a substantial number of new jobs, and would not induce population growth in the area.

- No significant impacts to public services, recreation, or utilities and service systems would occur, and thus, these topics are not addressed in this EIR. The project would not construct new housing, would not generate a substantial number of new jobs, and would not induce population growth in the area, thus it is not expected to increase the demand for public services and utilities. As noted in Chapter 3 Project Description, the project proposes to relocate an existing utilities easement (formerly Melville Street right-of-way) to accommodate construction of the below-grade parking garage and construct a pedestrian tunnel between the garage and the interior of the campus. This is not expected to result in any environmental effects.

In addition to the impacts determined in the Initial Study to be less than significant, the analysis in EIR chapters 4 through 12 find an additional 10 potential effects where the project would have no impact (in the areas of land use and planning, aesthetics, cultural resources, transportation, noise, and geology, soils, seismicity and paleontology) and another 10 effects where the project impacts would be less than significant with no requirement to implement mitigation measures (in the areas of aesthetics, cultural resources, air quality, greenhouse gas emissions, energy consumption and conservation, and geology, soils, seismicity and paleontology.

14.2 SIGNIFICANT AND UNAVOIDABLE ENVIRONMENTAL IMPACTS

The proposed project would result in three significant and unavoidable impacts. Two of these impacts (Impact 4-2 and 7-1) are related to increases in traffic volumes on residential streets. The third significant and unavoidable impact is related to the project's contribution to cumulative traffic volumes and associated level of service at the Alma Street/Kingsley Avenue intersection. All of the other significant and potentially significant impacts of the proposed project would be reduced to less-than-significant levels with implementation of the project-specific mitigation measures identified in Chapters 4 through 12.

Impact 4-2 is considered significant and unavoidable due to the project's effects on residents in the surrounding neighborhood from substantial increases in traffic volumes on specific roadway segments near the project site. As discussed in Impact 7-1 in Chapter 7, Transportation, the project would add traffic to the segment of Emerson Street between Melville Avenue and Embarcadero Road because the project would re-route existing traffic to using the parking garage and requiring traffic exiting the parking garage to turn right onto Emerson Street. This would result in a significant increase in the Traffic Infusion on Residential Environment (TIRE) index for this segment. As discussed in Chapter 4, Land Use and Planning, and Chapter 7, Transportation, there is no mitigation that would reduce this significant impact associated with increased traffic volumes on residential streets and the impact would remain significant and unavoidable. Mitigation Measure 7a requires Castilleja School to implement the enhanced Transportation Demand Management (TDM) plan, which is proposed as part of the project (Appendix B3) to reduce traffic volumes, including additional measures and monitoring and enforcement provisions identified in Mitigation Measure 7a. However, the TDM measures are not expected reduce the TIRE index rating on the significantly affected segments sufficient to reduce the impact to a less-than-significant level. Thus the project would have a significant and unavoidable impact related to land use compatibility (Impact 4-2) and measures used to evaluate the performance of the circulation system (Impact 7-1).

Additionally, as discussed in Impact 7-7, the project would add traffic to the unsignalized Alma Street/Kingsley Avenue intersection; the overall intersection would operate at LOS E in the AM and PM peak hours in the cumulative scenario. Because the project would cause the LOS to degrade below LOS E in the AM and PM peak hours, the project would have a cumulatively considerable contribution to this impact, which is a significant impact of the project. Mitigation Measure 7c requires the City to consider adding signalization of this intersection to the CIP. However, because the City's determination of which intersections to signalize is based on a variety of factors, it is uncertain that signalization at this intersection would be added to the CIP and thus the impact would remain significant and unavoidable.

14.3 SIGNIFICANT AND IRREVERSIBLE ENVIRONMENTAL CHANGES

The CEQA Guidelines mandate that an EIR address any significant irreversible environmental changes that would be involved in a proposed project (14 CCR 15126(c)). An impact would fall into this category if any of the following would occur:

- The project would involve a large commitment of nonrenewable resources.
- The primary and secondary impacts of the project would generally commit future generations of people to similar uses.
- The project involves uses in which irreversible damage could result from any potential environmental incidents associated with the project.
- The proposed consumption of resources is not justified (e.g., the project results in wasteful use of energy).

Determining whether the proposed project may result in significant irreversible changes requires a determination of whether key resources would be degraded or destroyed in such a way that there would be little possibility of restoring them. The project site is currently developed and is located within an urbanized area; therefore, as determined in the Initial Study, impacts to mineral resources would be less than significant, and no significant impacts related to these issues would result from development of the project site. Natural resources in the form of building materials would be used in the construction of the proposed project; however, their use is not expected to negatively impact the availability of these resources. The use of construction materials and nonrenewable resources is not unusual or extraordinary, and, as a result, there would be no significant irreversible environmental effects related to resource consumption during construction. On a permanent, long-term basis, the proposed project would consume energy; however, energy-saving measures are included as part of the proposed project, as described in Chapter 3, Project Description. Therefore, this would not be considered a significant irreversible environmental change. A detailed analysis of energy consumption associated with the proposed project is provided in Chapter 11, Energy Consumption.

14.4 GROWTH INDUCEMENT

CEQA requires a discussion of ways in which a proposed project could be growth inducing. The CEQA Guidelines identify a project as growth inducing if it fosters economic or population growth, or the construction of additional housing either directly or indirectly in the surrounding environment (14 CCR 15126.2(d)). New employees from commercial or industrial development and new population from residential development represent direct forms of growth. These direct forms of growth have a secondary effect of expanding the size of local markets and inducing additional economic activity in the area. A project could indirectly induce growth by reducing or removing barriers to growth, or by creating a condition that attracts additional population or new economic activity.

Construction of the proposed project would be temporary, and the short-term construction jobs are anticipated to be filled by workers who, for the most part, reside in the surrounding area. Therefore, project construction is not expected to induce other growth in the City or region.

The proposed increase in student enrollment would require add an additional 10 employees at full project buildout. The existing school currently employs 122 full time employees. These new employees could indirectly induce a small amount of economic growth in the City to the extent that the employees might seek housing and would be expected to purchase food and services in the area. However, the potential for growth inducement due to the increase in employees is not considered substantial because the scale of the expected increase in employment is insufficient to trigger noticeable changes in the housing market or demand for local goods and services. According to the State Department of Finance, the population in the City was estimated at 68,134 as of January 2016 (DOF 2016). The proposed project would demolish one residence and would add approximately 10 new jobs to the City. However, this is not a substantial change due to the fact that there are 28,546 housing units in the City and approximately 33,284 existing jobs (Palo Alto 2016). The increase in employment and associated economic activity resulting from the proposed project would be consistent with the growth projections for the City.

14.5 REFERENCES CITED

Department of Finance 2016. Cities, Counties and the State Population Estimates with Annual Percent Change. January 2016.

City of Palo Alto 2016, Comprehensive Plan Draft EIR.

CHAPTER 15
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