MITIGATED NEGATIVE DECLARATION AND INITIAL STUDY FOR:

DANA HILLS

HIGH SCHOOL

PERFORMING ARTS

FACILITY

prepared for:

CAPISTRANO UNIFIED SCHOOL DISTRICT

Contact:
Mr. Cary Brockman
Director, Facilities

prepared by:

THE PLANNING CENTER

Contact:
Dwayne Mears, AICP
Principal, School Facilities Planning

AUGUST 2009

MITIGATED NEGATIVE DECLARATION

Pursuant to the procedures of the Capistrano Unified School District for the implementation of the California Environmental Quality Act, the District has completed an Initial Study for the project described below:

Project Information

Project:	Dana Hills High School Performing Arts Facility
Project Location:	The project site is a portion (3.42 acres or 149,017 square feet) of the existing Dana Hills High School (DHHS) campus at 33333 Street of the Golden Lantern, City of Dana Point, County of Orange. Dana Hills High School is bounded by Golden Lantern Street to the east, Stone Hill Drive to the south, Acapulco Drive to the north, and residential units and open space to the west. The project site is bounded by the parking lot to the north, turf-covered playfield to the east, existing classroom building to the west, and portable classrooms and hardcourts to the south.
Project Proponent:	Capistrano Unified School District 33122 Valle Road San Juan Capistrano, California 92675
Project Description:	The District is proposing to construct and operate a new performing arts facility within the existing high school campus. The new 470-person-capacity performing arts building would contain spaces for the stage, seating area, lobby, storage, dressing room, staff office, control room, practice room, scenery shop, black box theater, and other ancillary areas, totaling 30,560 square feet (28,247 square feet for the first floor and 2,313 square feet for the second floor). The new theater would have tiered rooflines. The maximum height would be 54 feet 8 inches high for the stage area, 42 feet high for the house seating area, and 14 feet to 24 feet high for various rooms and offices. The proposed project would require removal of 5 portable classrooms and 52 parking spaces. The portable classrooms would be removed to make space for theater and the removed parking spaces would be replaced with 54 new parking spaces. The proposed project would also remove the existing racquetball court and relocate the tennis courts to south of the athletic field.
Existing Conditions:	The project site covers 3.42 acres (149,017 square feet) of the existing DHHS campus. The project site is developed with a parking lot, tennis courts, racquetball courts, and turf-covered athletic field. The parking lot area is generally flat but the tennis courts and the athletic field are at a higher elevations toward the west.

Summary of Impacts: Attached is the Initial Study prepared for the Dana Hills High School Performing Arts Facility. The Initial Study reviewed potential environmental effects associated with the proposed building construction. Please review the Initial Study for more information.

Availability of Documents

Complete copies of the Mitigated Negative Declaration and Initial Study are on file at the Capistrano Unified School District, Facilities Planning Department at 33122 Valle Road, San Juan Capistrano, CA 92675.

Mitigation Measures

Aesthetics

1. Exterior lighting shall be energy efficient and shielded or recessed so that direct glare and reflections are contained within the boundaries of the parcel, and shall be directed downward and away from adjoining properties and public rights-of-way. No lighting shall blink, flash, or be of unusually high intensity or brightness. All lighting fixtures shall be appropriate in scale, intensity, and height to the use they are serving. Security lighting shall be provided at all entrances/exits. During installation, luminaries shall be aimed and corrected by a field crew to aim the light only to the intended areas.

Cultural Resources

2. In the event that a potential archaeological find is discovered during construction activities, construction shall cease or be temporarily diverted in the vicinity of the find until a qualified archaeologist can analyze the find. If artifacts are uncovered and determined to be significant, the archaeological observer shall determine appropriate actions in cooperation with the property owner/developer for exploration and/or salvage. Specimens that are collected prior to or during the grading process shall be donated to an appropriate educational or research institution or museum. Any archaeological work at the site shall be conducted under the direction of the certified archaeologist. If any artifacts are discovered during grading operations when the archaeological monitor is not present, grading shall be diverted around the area until the monitor can survey the area.

3. In the event that a potential paleontological find is discovered during construction activities, construction shall cease or be temporarily diverted in the vicinity of the find until a qualified paleontologist can analyze the find. If artifacts are uncovered and determined to be significant, the paleontological observer shall determine appropriate actions in cooperation with the property owner/developer for exploration and/or salvage. Specimens that are collected prior to or during the grading process shall be donated to an appropriate educational or research institution or museum. Any paleontological work at the site shall be conducted under the direction of the certified paleontologist. If any fossils are discovered during grading operations when the paleontological monitor is not present, grading shall be diverted around the area until the monitor can survey the area.

Noise

4. The project contractor shall properly maintain and tune all construction equipment in accordance with the manufacture's recommendations to minimize noise emissions.

5. The contractor shall fit all equipment with properly operating mufflers, air intake silencers, and engine shrouds no less effective than as originally equipped by the manufacturer.

6. The construction contractor shall locate all stationary noise sources (e.g., generators, compressors, staging areas) as far from noise-sensitive classrooms as is feasible.

7. The construction contractor shall install temporary sound blankets surrounding the areas of construction during the ground clearing, grading, and building foundation construction phase to reduce noise levels at the classrooms approximately 40 feet from construction activities. The temporary sound blankets shall have a minimum height of six feet.

8. Prior to construction, the construction contractor shall coordinate with the school administrator(s) for Dana Hills High School to discuss construction activities that generate high noise and vibration levels. Coordination between the school administrator(s) and the construction contractor shall continue on an as-needed basis throughout the construction phase of the project to avoid potential disruption of classroom activities as feasible.

Traffic and Transportation

9. Prior to approval of the final site plan, the District shall demonstrate adequate access for emergency services, trash services, and performing arts theater equipment deliveries by verifying truck turning movements on the new performing arts theater portion of the site.

10. During construction, the District shall maintain the existing number of available parking spaces, which may include temporary parking on a designated area of the field or the future location of the tennis courts.

Lead Agency Determination:

On the basis of this initial evaluation:

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

☒ I find that although the proposed project could have a significant effect on the environment, there will not be a significant effect in this case because revisions in the project have been made by or agreed to by the project proponent. A MITIGATED NEGATIVE DECLARATION will be prepared.

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

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

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

C. Brockman — 8-11-09

Signature — ***Date***

Cary Brockman

Printed Name — ***For***

INITIAL STUDY FOR:

DANA HILLS

HIGH SCHOOL

PERFORMING ARTS

FACILITY

prepared for:

CAPISTRANO UNIFIED SCHOOL DISTRICT

33122 Valle Road
San Juan Capistrano, CA 92675
Tel: 949.234.9449
Fax: 949.493.8729

Contact:
Cary Brockman
Director, Facilities

prepared by:

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Contact:
Dwayne Mears, AICP
Principal, School Facilities Planning

CVS-04.0E

AUGUST 2009

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APPENDICES

List of Figures

List of Tables

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AAQS	Ambient Air Quality Standards
AB	Assembly Bill
AQMD	Air Quality Management Districts
AQMP	Air Quality Management Plan
AST	aboveground storage tank
BMP	Best Management Practice
CAAQS	California Ambient Air Quality Standards
Caltrans	California Department of Transportation
CARB	California Air Resources Board
CBC	California Building Code
CCAA	California Clean Air Act
CCR	California Code of Regulations
CDE	California Department of Education
CEQA	California Environmental Quality Act
CH_4	methane
CNEL	Community Noise Equivalent Level
CO	carbon monoxide
CSFM	California Office of the State Fire Marshal
CWA	Clean Water Act
dB	decibel
dBA	A-weighted decibel
DSA	Department of the State Architect
DTSC	Department of Substances Control
Ed. Code	Code of Education
EIR	Environmental Impact Report
FCAA	Federal Clean Air Act
FIRM	Flood Insurance Map
FTA	Federal Transit Administration
GHG	greenhouse gases
HRA	Health Risk Assessment
Hz	Hertz
IPCC	Intergovernmental Panel on Climate Change
IS/MND	Initial Study/Mitigated Negative Declaration
kV	kilovolt

Abbreviations and Acronyms

L_{dn}	day/night noise level
L_{eq}	equivalent noise level
LST	Localized Significance Threshold
NAAQS	National Ambient Air Quality Standards
N_2O	nitrous oxide
NO_2	nitrogen dioxide
NO_X	nitrogen oxides
NPDES	National Pollutant Discharge Elimination System
O_3	ozone
Pb	lead
PM	particulate matter
PM_{10}	particulates less than 10 microns
$PM_{2.5}$	particulates less than 2.5 microns
ppm	parts per million
ppv	peak particle velocity
OPSC	Office of Public School Construction
PRC	Public Resources Code
PSD	Prevention of Significant Deterioration
psi	pounds per square inch
ROG	Reactive Organic Gases
RWQCB	California Regional Water Quality Control Board
SAB	State Allocation Board
SCAG	Southern California Association of Governments
SCAQMD	South Coast Air Quality Management District
SCE	Southern California Edison
SCGC	Southern California Gas Company
SF_6	sulfur hexafluoride
SO_2	sulfur dioxide
SO_X	sulfur oxides
SRA	Source Receptor Area
USEPA	U.S. Environmental Protection Agency
VdB	vibration velocity
WQMP	Water Quality Management Plan

1.1 OVERVIEW

The Capistrano Unified School District (CUSD or District) prepared this Initial Study and proposed Mitigated Negative Declaration (IS/MND) to evaluate the potential environmental consequences associated with the construction of a new 470-person seating capacity performing arts facility at the existing Dana Hills High School at 33333 Golden Lantern Street, City of Dana Point, County of Orange.

As part of the CUSD's permitting process, the proposed project is required to undergo an environmental review pursuant to the California Environmental Quality Act (CEQA). The IS is a preliminary analysis prepared by the lead agency to determine whether an environmental impact report (EIR) or a negative declaration is required. If the Initial Study concludes that the project may have a significant effect on the environment, an EIR must be prepared. Otherwise, a negative declaration or MND is prepared. The information in the initial study-related special studies supports the conclusions made in the MND.

1.2 AUTHORITY

The preparation of an IS/MND is governed by two principal sets of documents: CEQA (Public Resources Code Sections 21000 et seq.) and the State CEQA Guidelines (California Code of Regulations Sections 15000 et seq.). Specifically, Section 15063 of the State CEQA Guidelines and Sections 15070–15075 of Article 6 guide the process for the preparation of a negative declaration or MND. Where appropriate and supportive to an understanding of the issues, reference will be made to the statute, the State CEQA Guidelines, or appropriate case law.

This IS/MND, as required by CEQA, contains a project description, a description of the environmental setting, potential environmental impacts, mitigation measures for any significant effects, consistency with plans and policies, and names of preparers.

The mitigation measures included in this IS/MND are designed to reduce or eliminate the potentially significant environmental impacts described herein. Where a mitigation measure described in this document has been previously incorporated into the project, either as a specific feature of a design or as a mitigation measure, this is noted in the discussion. Mitigation measures are structured in accordance with the criteria in Section 15370 of the State CEQA Guidelines.

1.3 IMPACT TERMINOLOGY

The following terminology is used to describe the level of significance of impacts.

- A finding of ***no impact*** is appropriate if the analysis concludes that the project would not affect the particular topic area in any way.

- An impact is considered ***less than significant*** if the analysis concludes that it would cause no substantial adverse change to the environment and requires no mitigation.

- An impact is considered ***less than significant with mitigation incorporated*** if the analysis concludes that it would cause no substantial adverse change to the environment with the inclusion of environmental commitments or other enforceable measures that have been agreed to by the applicant.

- An impact is considered ***potentially significant*** if the analysis concludes that it could have a substantial adverse effect on the environment. If any impact is identified as potentially significant, an EIR would needs to be prepared.

1.4 ORGANIZATION OF THE IS/MND

The content and format of this report are designed to meet the requirements of CEQA. The IS/MND consists of the proposed findings that the project, as mitigated, would have no significant impacts. The bulk of this IS/MND consists of the Initial Study and supporting studies. The report contains the following sections:

- Chapter 1, *Introduction*, identifies the purpose and scope of the IS/MND and the terminology used in the report.

- Chapter 2, *Project Description*, identifies the location, background, and planning objectives of the project and describes the proposed project in detail.

- Chapter 3, *Environmental Setting*, describes the existing conditions, surrounding land use, general plan, and existing zoning in the proposed project area.

- Chapter 4, *Environmental Checklist*, presents the checklist responses for each resource topic. This section includes a brief setting section for each resource topic and identifies the impacts of implementing the proposed project.

- Chapter 5, *Environmental Analysis,* provides an evaluation of the impact categories and questions contained in the checklist and identifies mitigation measures, if applicable.

- Chapter 6, *References*, identifies all printed references and individuals cited in this IS/MND.

- Chapter 7, *List of Preparers*, identifies the individuals who prepared this report and their areas of technical specialty.

- Appendices present data supporting the analysis or contents of this IS/MND.

    - Appendix A, Air Quality Modeling Output
    - Appendix B, Cultural Resources Records Search Result
    - Appendix C, Geotechnical Report
    - Appendix D, Phase I Environmental Site Assessment
    - Appendix E, Noise Data
    - Appendix F, Traffic Study

2.1 PROJECT LOCATION

The project site is a portion (3.42 acres or 149,017 square feet) of the existing Dana Hills High School (DHHS) campus at 33333 Street of the Golden Lantern, City of Dana Point, County of Orange. As shown in Figure 1, *Regional Location*, the City of Dana Point is situated in south Orange County and bordered by the cities of Laguna Niguel, San Juan Capistrano, and San Clemente to the north, east, and south, and the Pacific Ocean to the west. Dana Hills High School is bounded by Golden Lantern Street to the east, Stone Hill Drive to the south, Acapulco Drive to the north, and residential units and open space to the west (see Figure 2, *Local Vicinity*). The project site is bounded by the parking lot to the north, turf-covered playfield to the east, existing classroom building to the west, and portable classrooms and hardcourts to the south, as shown in Figure 3, *Aerial Photograph*.

2.2 PROPOSED PROJECT

The District is proposing to construct and operate a new performing arts facility within the existing high school campus (see Figure 4, *Proposed Site Plan*). As shown in Figure 5, the new 470-person-capacity performing arts building would contain spaces for the stage, seating area, lobby, storage, dressing room, staff office, control room, practice room, scenery shop, black box theater, and other ancillary areas totaling 30,560 square feet (28,247 square feet for the first floor and 2,313 square feet for the second floor). The new theater would have tiered rooflines. The maximum height would be 54 feet 8 inches high for the stage area, 42 feet high for the house seating area, and 14 feet to 24 feet high for various rooms and offices (see Figures 6 and 7). The proposed project would require removal of 5 portable classrooms and 52 parking spaces. The portable classrooms would be removed make space for the theater and the removed parking spaces would be replaced with 54 new parking spaces. The proposed project would also remove the existing racquetball court and relocate the tennis courts to south of the athletic field.

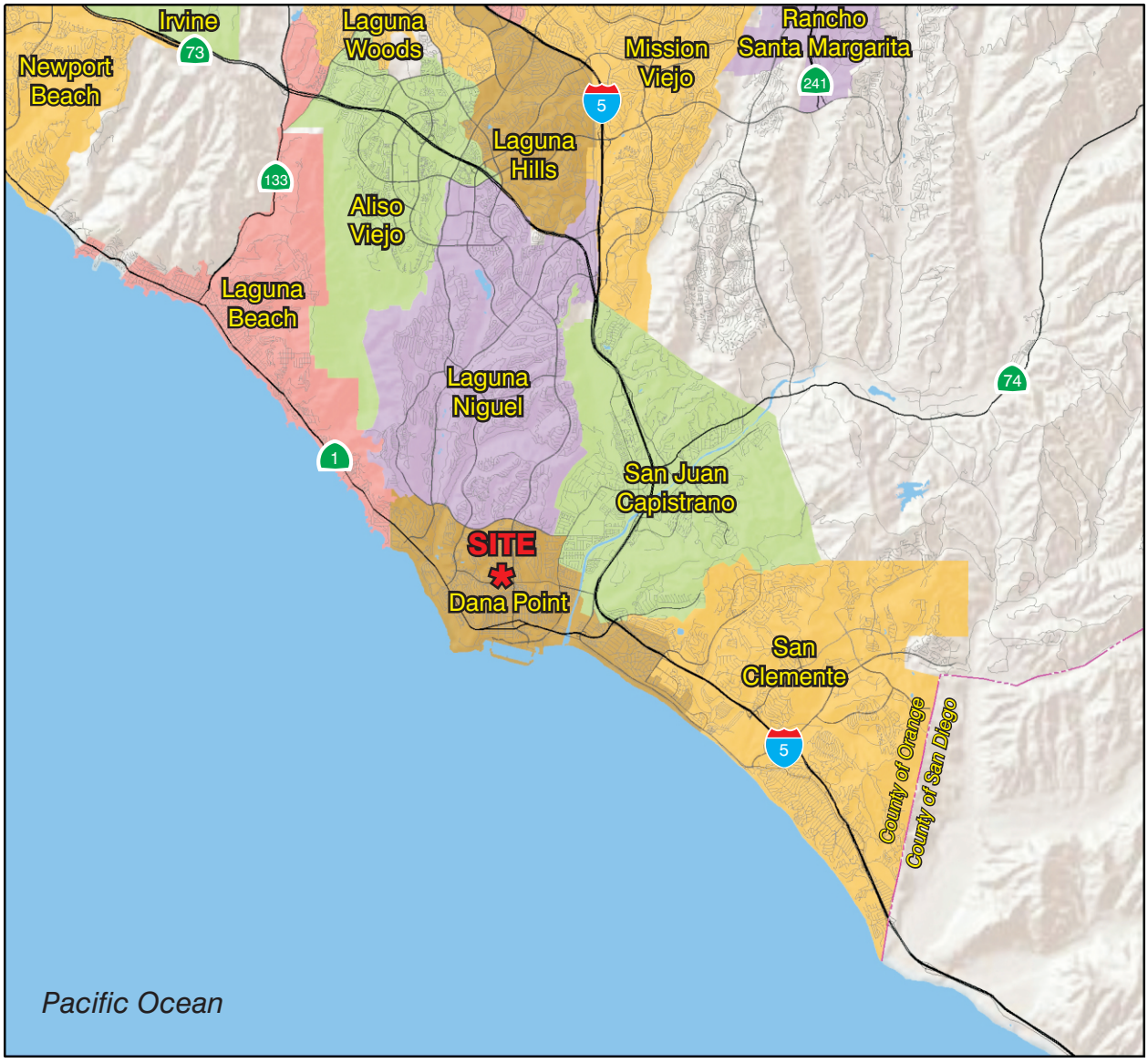
2.3 DISCRETIONARY ACTIONS

- Capistrano Unified School District Board of Education – Approval of the project
- California Department of Education – Approval of the site and the final site plan
- State Allocation Board – Approval of state funding if the District is eligible for such funding
- Division of the State Architect – Approval of construction drawings
- Department of Toxic Substances Control – Determination of No Further Action
- Regional Water Quality Control Board – National Pollution Discharge Elimination System Permit
- County of Orange – Municipal Stormwater Permit and best management practices
- Orange County Fire Authority – Approval of fire access and safety standards (emergency access, exit routes, and adequate fire hydrant flow)

2.4 SCHOOL BOARD REQUESTED ACTIONS

- Approval of the project
- Adoption of the Mitigated Negative Declaration
- Adoption of the Mitigation Monitoring Program

Regional Location



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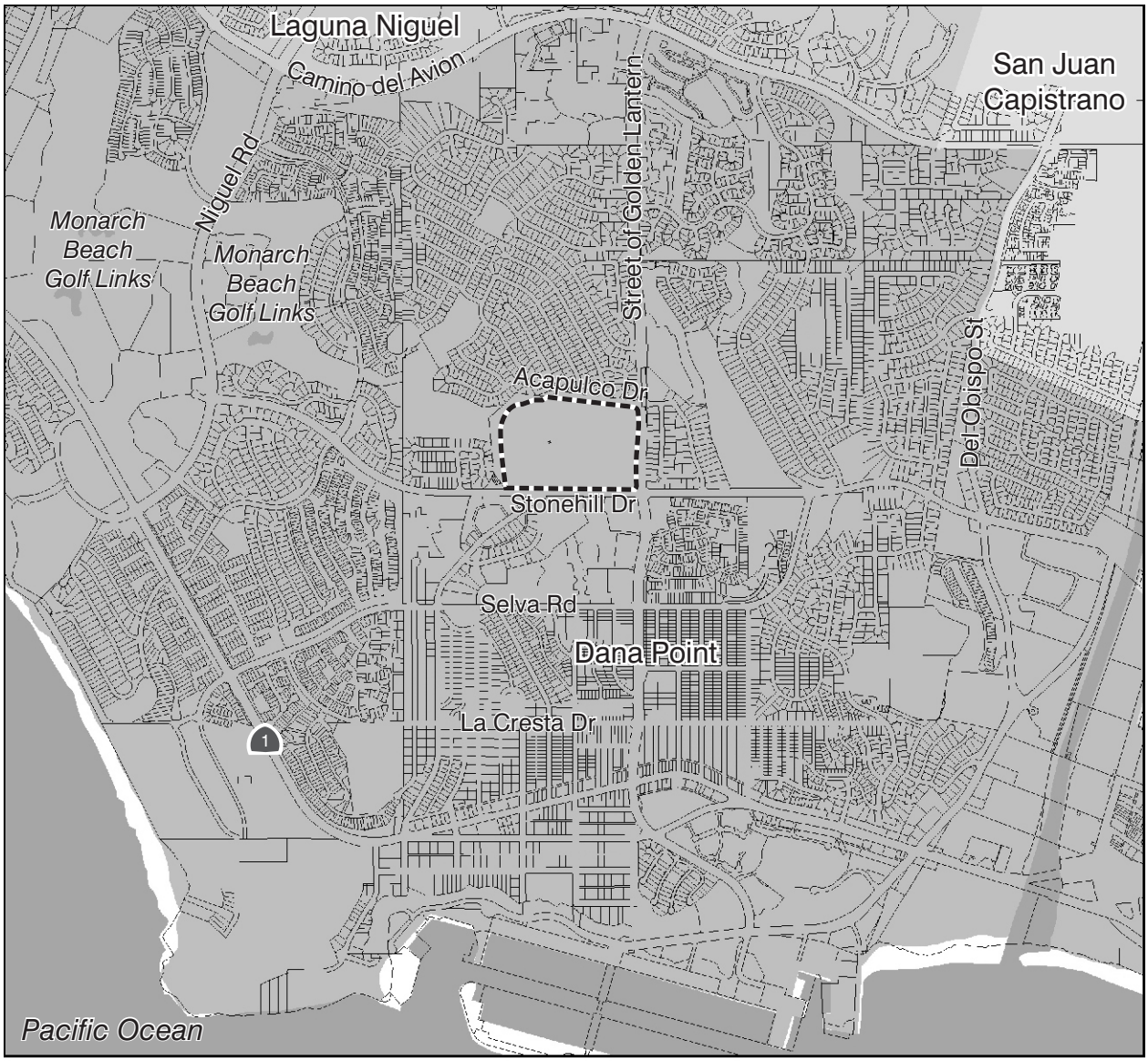
Local Vicinity



----- High School Boundary

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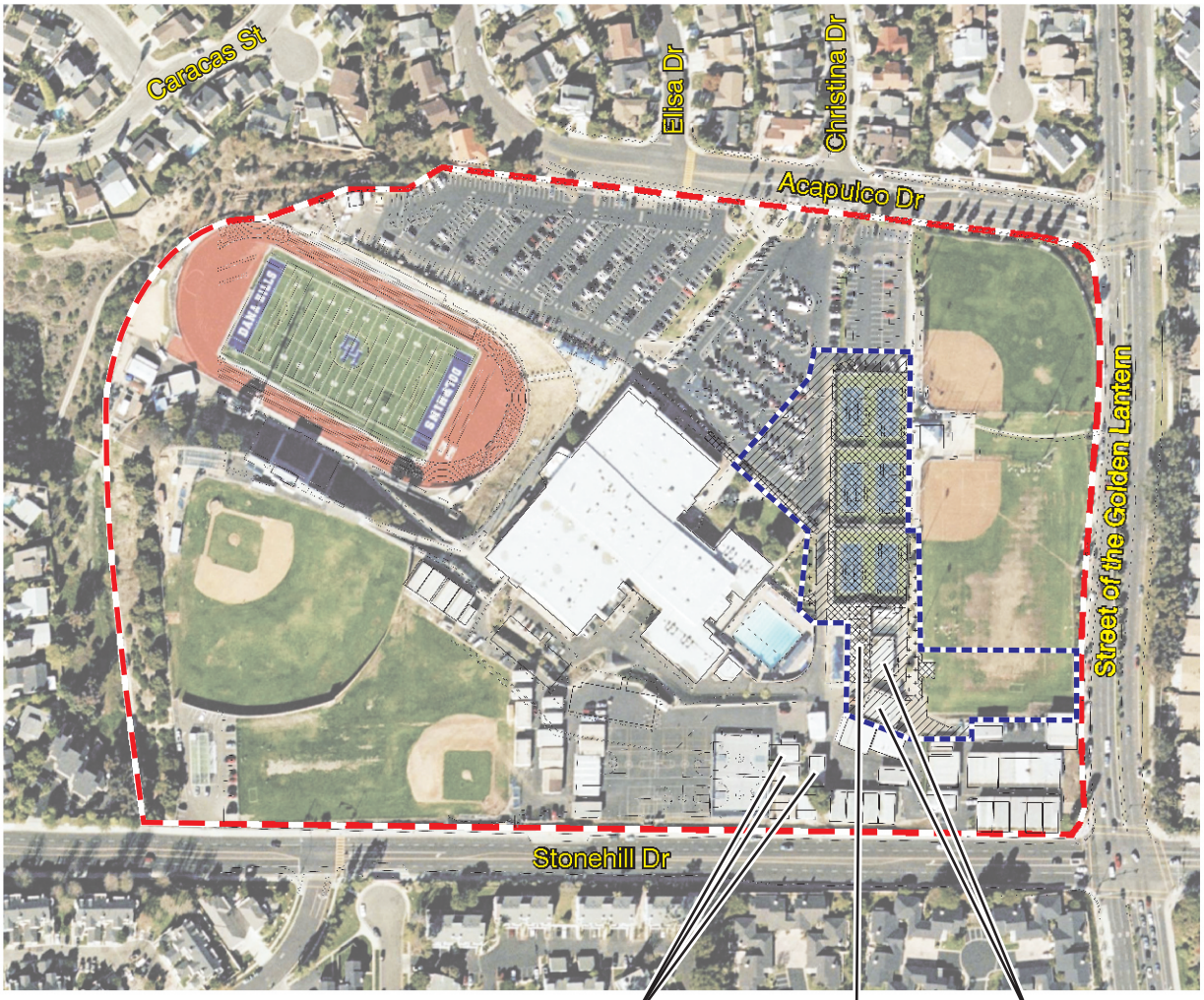
Aerial Photograph



Dana Hills HS Boundary

Project Site

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Scale (Feet)

Source: Google Earth Pro 2008, WLC Architects 2008

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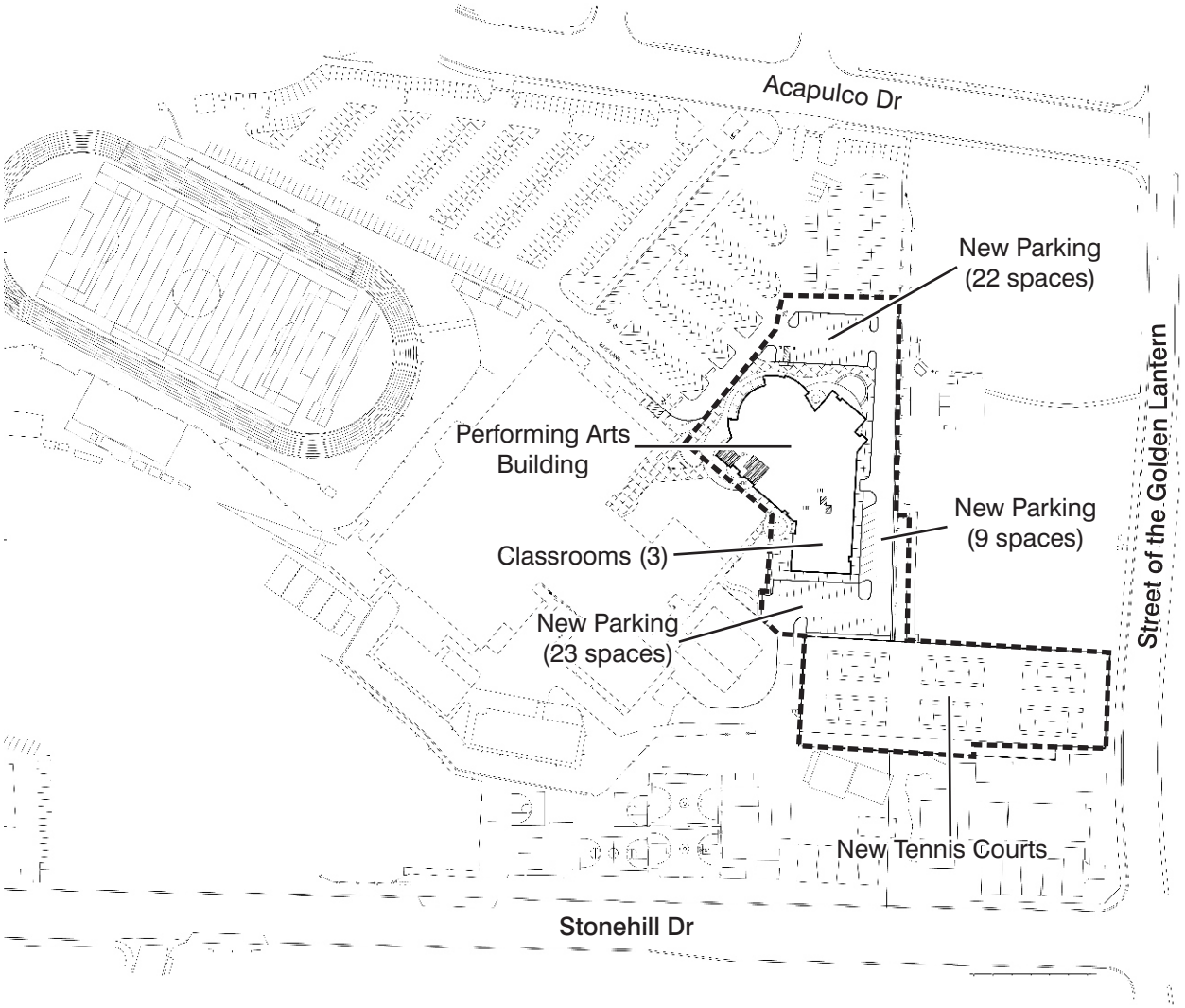
Proposed Site Plan



----- Project Site

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Source: WLC Architects 2008

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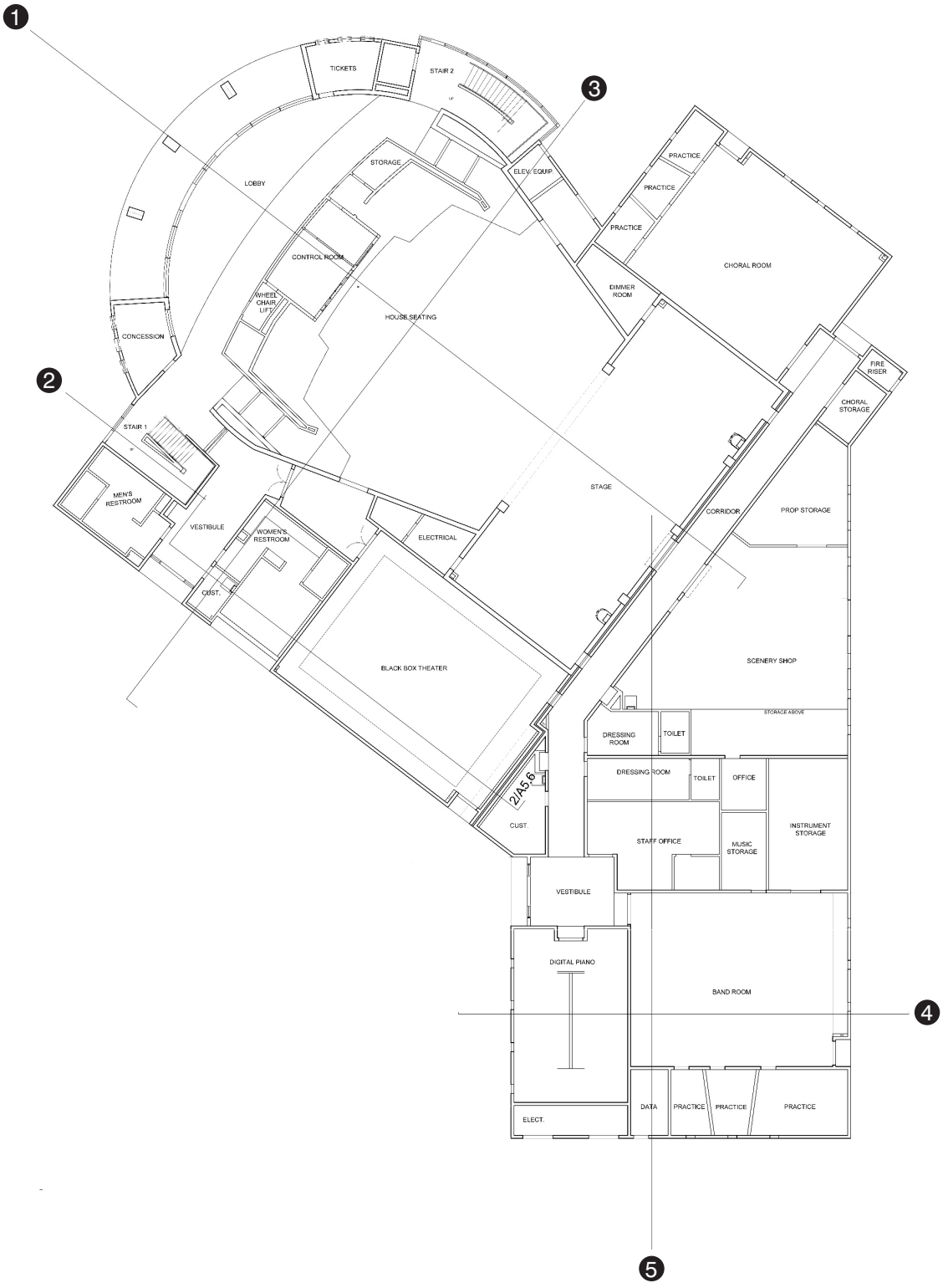
Proposed Floor Plan and Elevation Location Map



Source: WLC Architects 2008

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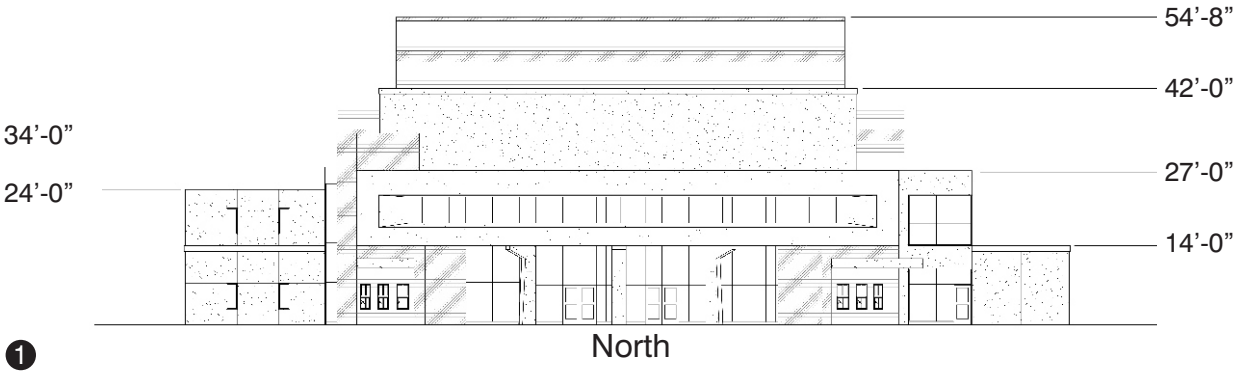
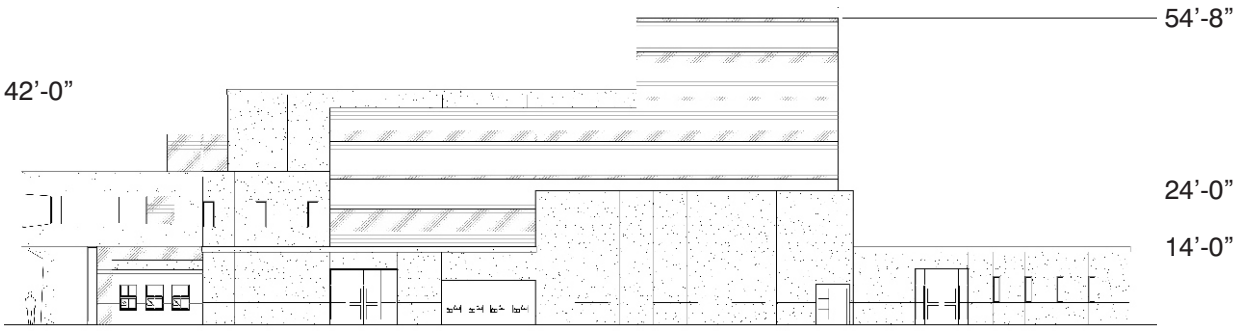
Building Elevations



1 North



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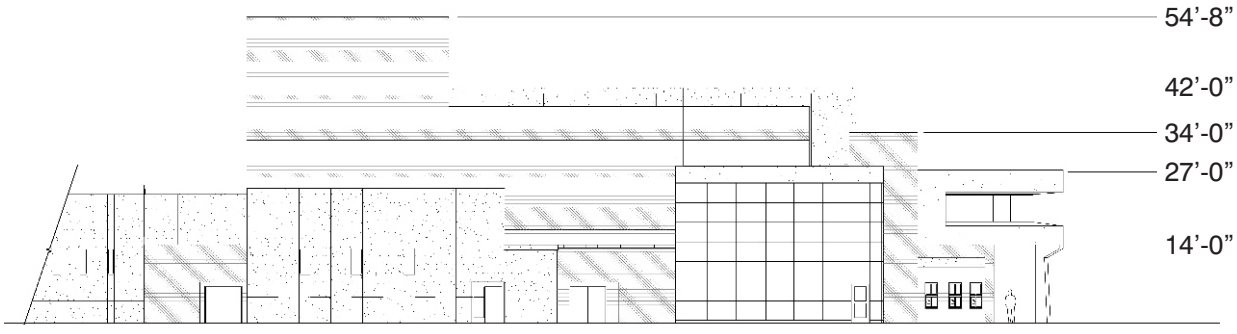

3 Northeast

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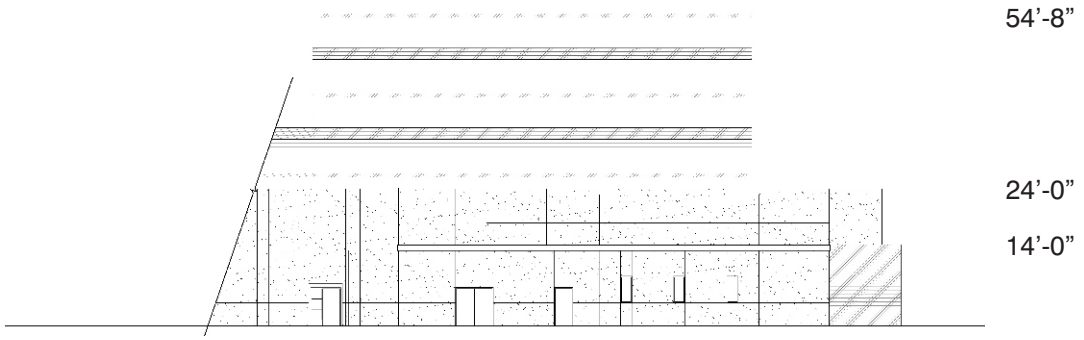
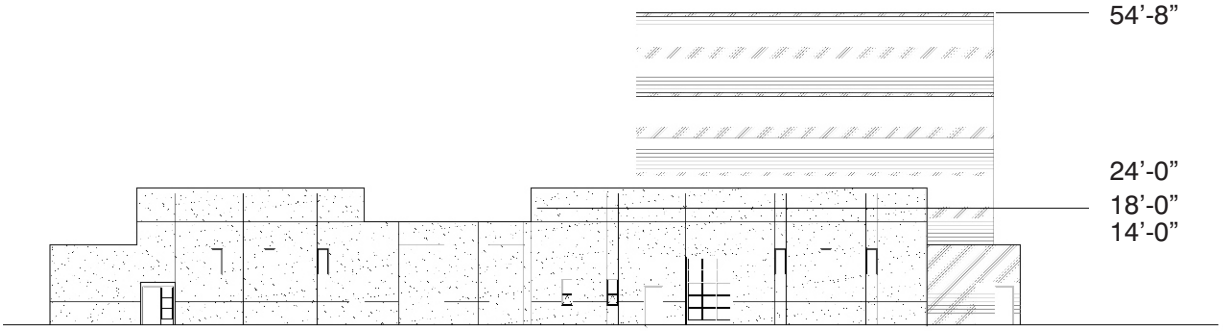
Building Elevations



❹ South



❺ East

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Scale (Feet)

Source: WLC Architects 2008

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3.1 EXISTING CONDITIONS

The project site covers 3.42 acres (149,017 square feet) of the existing DHHS campus (see Figure 3, *Aerial Photograph*). The project site is developed with a parking lot, tennis courts, racquetball courts, and turf-covered athletic field. The parking lot area is generally flat but the tennis courts and the athletic field are at a higher elevations toward the west.

3.2 SURROUNDING LAND USE

The project site is surrounded by the existing DHHS campus facilities. The DHHS is a 36-acre comprehensive high school developed with the main classroom building, portable classrooms, a football/track and field stadium, swimming pool, tennis courts, hardcourts, athletic fields, and parking lots. The project site is surrounded by the main classroom building to the west, surface parking lot to the north, turf-covered athletic field and Street of the Golden Lantern to the east, and portable classrooms to the south. The main access to the school is provided via Acapulco Drive, with a service vehicle access on Stonehill Drive.

The DHHS is generally surrounded by single-family units to the north and west, multifamily residential units to the south and east, and Community Garden Park at the southeast corner of Stonehill Drive and Golden Lantern Street. There is a pedestrian trail that links Sea Canyon Park to the high school and Stonehill Selva Park is approximately 1,000 feet east of the high school.

3.3 GENERAL PLAN AND EXISTING ZONING

The General Plan and Zoning designations for the site are CF (Community Facilities).

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4.1 BACKGROUND

Project Title: Dana Hills High School Performing Arts Facility

Lead Agency Name and Address:
Capistrano Unified School District
33122 Valle Road
San Juan Capistrano, California 92675

Contact Person and Phone Number:
Cary Brockman
949.234.9449

Project Location: Dana Hills High School, 33333 Golden Lantern Street, Dana Point, CA

Project Sponsor's Name and Address:
Capistrano Unified School District
33122 Valle Road
San Juan Capistrano, California, 92675

General Plan Designation: CF (Community Facilities)

Zoning: CF (Community Facilities)

Description of Project:
The District is proposing to construct and operate a new performing arts facility within the existing high school campus. The new 470-person-capacity performing arts building would contain spaces for the stage, seating area, lobby, storage, dressing room, staff office, control room, practice room, scenery shop, black box theater, and other ancillary areas, totaling 30,560 square feet (28,247 square feet for the first floor and 2,313 square feet for the second floor). The new theater would have tiered rooflines. The maximum height would be 54 feet 8 inches high for the stage area, 42 feet high for the house seating area, and 14 feet to 24 feet high for various rooms and offices. The proposed project would require removal of 5 portable classrooms and 52 parking spaces. The portable classrooms would be removed to make space for theater and the removed parking spaces would be replaced with 54 new parking spaces. The proposed project would also remove the existing racquetball court and relocate the tennis courts to south of the athletic field.

Surrounding Land Uses and Setting:
The project site is surrounded by the existing DHHS campus facilities. The DHHS is a 36-acre comprehensive high school developed with the main classroom building, portable classrooms, a football/track and field stadium, swimming pool, tennis courts, hardcourts, athletic fields, and parking lots. The project site is surrounded by the main classroom building to the west, surface parking lot to the north, turf-covered athletic field and Street of the Golden Lantern to the east, and portable classrooms to the south. The main access to the school is provided via Acapulco Drive with a service vehicle access on Stonehill Drive.

The DHHS is generally surrounded by single-family units to the north and west, multifamily residential units to the south and east, and Community Garden Park at the southeast corner of Stonehill Drive and Street of the Golden Lantern. There is a pedestrian trail that links Sea Canyon

Park to the high school, and Stonehill Selva Park is approximately 1,000 feet east of the high school.

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

- Capistrano Unified School District Board of Education – Approval of the project
- California Department of Education – Approval of the site and the final site plan
- State Allocation Board – Approval of state funding if the District is eligible for such funding
- Division of the State Architect – Approval of construction drawings
- Department of Toxic Substances Control – Determination of No Further Action
- Regional Water Quality Control Board – National Pollution Discharge Elimination System Permit
- County of Orange – Municipal Stormwater Permit and best management practices
- Orange County Fire Authority – Approval of fire access and safety standards (emergency access, exit routes, and adequate fire hydrant flow)

4.2 ENVIRONMENTAL FACTORS POTENTIALLY AFFECTED

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

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

4.3 DETERMINATION (TO BE COMPLETED BY THE LEAD AGENCY)

On the basis of this initial evaluation:

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

☒ I find that although the proposed project could have a significant effect on the environment, there will not be a significant effect in this case because revisions in the project have been made by or agreed to by the project proponent. A MITIGATED NEGATIVE DECLARATION will be prepared.

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

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

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

Signature — Date: 8-11-09

Printed Name: Cary Brockman — For

4.4 SPECIAL REQUIREMENTS UNDER THE STATE SCHOOL FACILITY PROGRAM

In addition to general CEQA requirements, projects involving primary and secondary public schools have several additional requirements established by the California Education Code, California Code of Regulations, and CEQA. These requirements vary by type of school project and whether state funds are involved. The following table identifies the specific requirements for a state-funded new school or a state-funded addition to an existing school site.

SPECIAL REQUIREMENTS FOR STATE-FUNDED NEW SCHOOL AND STATE-FUNDED ADDITION TO EXISTING SCHOOL

Topic	*Applicable Code*	*Environmental Checklist (See Table in Section 4.4)*
Air Quality		
Is the boundary of the proposed school site within 500 feet of the edge of the closest traffic lane of a freeway or busy traffic corridor? If yes, would the project create an air quality health risk due to the placement of the School?	PRC §21151.8(a)(1)(D); Ed. Code §17213(c)(1)(C)	Section III, Air Quality, Question (e)
Geology and Soils		
Does the site contain an active earthquake fault or fault trace, or is the site located within the boundaries of any special studies zone or within an area designated as geologically hazardous in the safety element of the local general plan?	Ed. Code, §17212; CCR Title 5 §14010(f)	Section VI, Geology and Soils, Question (a)(ii)
Would the project involve the construction, reconstruction, or relocation of any school building on the trace of a geological fault along which surface rupture can reasonably be expected to occur within the life of the school building?	Ed. Code §17212; CCR, Title 5 §14010(f)	Section VI, Geology and Soils, Question (a)(iii)
Would the project involve the construction, reconstruction, or relocation of any school building on a site subject to moderate-to-high liquefaction?	CCR, Title 5 §14010(i)	Section VI, Geology and Soils, Question (a)(v)
Would the project involve the construction, reconstruction, or relocation of any school building on a site subject to landslides?	CCR, Title 5 §14010(i)	Section VI, Geology and Soils, Question (a)(vi)
Hazards and Hazardous Materials		
Does the proposed school site contain one or more pipelines, situated underground or aboveground, which carry hazardous substances, acutely hazardous materials, or hazardous wastes, unless the pipeline is a natural gas line that is used only to supply natural gas to that school or neighborhood?	PRC § 21151.8 (a)(1)(C)	Section VII, Hazards and Hazardous Materials, Question (c)
Is the proposed school site located near an aboveground water or fuel storage tank or within 1,500 feet of an easement of an aboveground or underground pipeline that can pose a safety hazard to the site?	CCR, Title 5 § 14010 (h)	Section VII, Hazards and Hazardous Materials, Question (d)
Would the project create an air quality hazard due to the placement of a school within one-quarter mile of: (a) permitted and nonpermitted facilities identified by the jurisdictional air quality control board or air pollution control district; (b) freeways and other busy traffic corridors; (c) large agricultural operations; and/or (d) a rail yard, which might reasonably be anticipated to emit hazardous air emissions, or handle hazardous or acutely hazardous material, substances, or waste?	PRC § 21151.8 (a)(2); Ed. Code § 17213 (b)	Section VII, Hazards and Hazardous Materials, Question (f)

SPECIAL REQUIREMENTS FOR STATE-FUNDED NEW SCHOOL AND STATE-FUNDED ADDITION TO EXISTING SCHOOL		
Topic	***Applicable Code***	***Environmental Checklist (See Table in Section 4.4)***
Is the school site in an area designated in a city, county, or city and county general plan for agricultural use and zoned for agricultural production, and if so, do neighboring agricultural uses have the potential to result in any public health and safety issues that may affect the pupils and employees at the school site? *(Does not apply to school sites approved by CDE prior to January 1, 1997.)*	Ed. Code § 17215.5 (a)	Section VII, Hazards and Hazardous Materials, Question (g)
Is the property line of the proposed school site less than the following distances from the edge of respective power line easements: (1) 100 feet of a 50–133 kV line; (2) 150 feet of a 220–230 kV line; or (3) 350 feet of a 500–550 kV line?	CCR, Title 5 § 14010 (c)	Section VII, Hazards and Hazardous Materials, Question (h)
Does the project site contain a current or former hazardous waste disposal site or solid waste disposal site and, if so, have the wastes been removed?	PRC § 21151.8 (a)(1)(A)	Section VII, Hazards and Hazardous Materials, Question (j)
Is the project site a hazardous substance release site identified by the state Department of Health Services in a current list adopted pursuant to §25356 for removal or remedial action pursuant to Chapter 6.8 of Division 20 of the Health and Safety Code?	PRC § 21151.8 (a)(1)(B)	Section VII, Hazards and Hazardous Materials, Question (i)
If prepared, has the risk assessment been performed with a focus on children's health posed by a hazardous materials release or threatened release, or the presence of naturally occurring hazardous materials on the schoolsite?	Ed. Code § 17210.1 (a)(3)	Section VII, Hazards and Hazardous Materials, Questions (b), (f), and (k)
If a response action is necessary and proposed as part of this project, has it been developed to be protective of children's health, with an ample margin of safety?	Ed. Code § 17210.1 (a)(4)	Section VII, Hazards and Hazardous Materials, Question (b)
Is the proposed school site situated within 2,000 feet of a significant disposal of hazardous waste?	CCR, Title 5 § 14010 (t)	Section VII, Hazards and Hazardous Materials, Question (l)
Is the proposed school site within two miles, measured by air line, of that point on an airport runway or potential runway included in an airport master plan that is nearest to the site? *(Does not apply to school sites acquired prior to January 1, 1966.)*	Ed. Code § 17215 (a)&(b)	Section VII, Hazards and Hazardous Materials, Question (m)
Hydrology and Water Quality		
Is the project site subject to flooding or dam inundation?	Ed. Code § 17212; CCR, Title 5 § 14010 (g)	Section VIII, Hydrology and Water Quality, Question (j)
Land Use and Planning		
Would the proposed school conflict with any existing or proposed land uses, such that a potential health or safety risk to students would be created?	CCR, Title 5 § 14010 (m)	Section IX, Land Use and Planning, Question (c)
Noise		
Is the proposed school site located adjacent to or near a major arterial roadway or freeway whose noise generation may adversely affect the educational program?	CCR, Title 5 § 14010 (e)	Section XI, Noise, Question (b)
Public Services		
Does the site promote joint use of parks, libraries, museums, and other public services?	CCR, Title 5, § 14010 (o)	Section XIII, Public Services, Question (f)

SPECIAL REQUIREMENTS FOR STATE-FUNDED NEW SCHOOL AND STATE-FUNDED ADDITION TO EXISTING SCHOOL		
Topic	***Applicable Code***	***Environmental Checklist (See Table in Section 4.4)***
Transportation/Traffic		
Are traffic and pedestrian hazards mitigated per Caltrans' *School Area Pedestrian Safety* manual?	CCR, Title 5 § 14010 (l)	Section XV, Transportation/Traffic, Question (e)
Is the site easily accessible from arterials and is the minimum peripheral visibility maintained for driveways per Caltrans' *Highway Design Manual*?	CCR, Title 5 § 14010 (k)	Section XV, Transportation/Traffic, Question (f)
Is the proposed school site within 1,500 feet of a railroad track easement?	CCR, Title 5 § 14010 (d)	Section XV, Transportation/Traffic, Question (g)

4.5 EVALUATION OF ENVIRONMENTAL IMPACTS

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

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

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

4) "Negative Declaration: Less Than Significant With Mitigation Incorporated" applies where the incorporation of mitigation measures has reduced an effect from "Potentially Significant Impact" to a "Less Than Significant Impact." The lead agency must describe the mitigation measures, and briefly explain how they reduce the effect to a less than significant level.

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

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

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

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

6) Lead agencies are encouraged to incorporate into the checklist references to information sources for potential impacts (e.g., general plans, zoning ordinances). Reference to a previously prepared or outside document should, where appropriate, include a reference to the page or pages where the statement is substantiated. A source list should be attached and other sources used or individuals contacted should be cited in the discussion.

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

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

9) The explanation of each issue should identify:

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

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

Issues	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
I. AESTHETICS. Would the project:				
a) Have a substantial adverse effect on a scenic vista?				X
b) Substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings within a state scenic highway?				X
c) Substantially degrade the existing visual character or quality of the site and its surroundings?			X	
d) Create a new source of substantial light or glare which would adversely affect day or nighttime views in the area?		X		
II. AGRICULTURE RESOURCES. In determining whether impacts to agricultural resources are significant environmental effects, lead agencies may refer to the California Agricultural Land Evaluation and Site Assessment Model (1997) prepared by the California Dept. of Conservation as an optional model to use in assessing impacts on agriculture and farmland. Would the project:				
a) Convert Prime Farmland, Unique Farmland, or Farmland of Statewide Importance (Farmland), as shown on the maps prepared pursuant to the Farmland Mapping and Monitoring Program of the California Resources Agency, to nonagricultural use?				X
b) Conflict with existing zoning for agricultural use, or a Williamson Act contract?				X
c) Involve other changes in the existing environment which, due to their location or nature, could result in conversion of Farmland to nonagricultural use?				X
III. AIR QUALITY. Where available, the significance criteria established by the applicable air quality management or air pollution control district may be relied upon to make the following determinations. Would the project:				
a) Conflict with or obstruct implementation of the applicable air quality plan?			X	
b) Violate any air quality standard or contribute substantially to an existing or projected air quality violation?			X	
c) Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is nonattainment under an applicable federal or state ambient air quality standard (including releasing emissions which exceed quantitative thresholds for ozone precursors)?			X	
d) Expose sensitive receptors to substantial pollutant concentrations?			X	
e) Is the boundary of the proposed school site within 500 feet of the edge of the closest traffic lane of a freeway or busy traffic corridor? If yes, would the project create an air quality health risk due to the placement of the School? [PRC § 21151.8 (a)(1)(D); Ed. Code § 17213 (c)(1)(C)]			X	
f) Create objectionable odors affecting a substantial number of people?			X	

Issues	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
IV. BIOLOGICAL RESOURCES. Would the project:				
a) Have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special status species in local or regional plans, policies, or regulations, or by the California Department of Fish and Game or U.S. Fish and Wildlife Service?				X
b) Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, or regulations, or by the California Department of Fish and Game or U.S. Fish and Wildlife Service?				X
c) Have a substantial adverse effect on federally protected wetlands as defined by Section 404 of the Clean Water Act (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means?				X
d) Interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites?				X
e) Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance?				X
f) Conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state habitat conservation plan?				X
V. CULTURAL RESOURCES. Would the project:				
a) Cause a substantial adverse change in the significance of a historical resource as defined in CCR § 15064.5?				X
b) Cause a substantial adverse change in the significance of an archaeological resource pursuant to CCR § 15064.5?		X		
c) Directly or indirectly destroy a unique paleontological resource or site or unique geologic feature?		X		
d) Disturb any human remains, including those interred outside of formal cemeteries?			X	
VI. GEOLOGY AND SOILS. Would the project:				
a) Expose people or structures to potential substantial adverse effects, including the risk of loss, injury, or death involving:				
i) Rupture of a known earthquake fault, as delineated on the most recent Alquist-Priolo Earthquake Fault Zoning Map, issued by the State Geologist for the area or based on other substantial evidence of a known fault? Refer to Division of Mines and Geology Special Publication 42.			X	

Issues	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
ii) An active earthquake fault or fault trace, or is it located within the boundaries of any special studies zone or within an area designated as geologically hazardous in the safety element of the local general plan? [Ed. Code, § 17212; CCR Title 5 § 14010 (f)]			X	
iii) The construction, reconstruction, or relocation of any school building on the trace of a geological fault along which surface rupture can reasonably be expected to occur within the life of the school building? [Ed. Code § 17212; CCR, Title 5 § 14010 (f)]			X	
iv) Strong seismic ground shaking?			X	
v) The construction, reconstruction, or relocation of any school building on a site subject to moderate-to-high liquefaction?				X
vi) The construction, reconstruction, or relocation of any school building on a site subject to landslides?				X
b) Result in substantial soil erosion or the loss of topsoil?			X	
c) Be located on a geologic unit or soil that is unstable, or that would become unstable as a result of the project, and potentially result in on- or off-site landslide, lateral spreading, subsidence, liquefaction or collapse?			X	
d) Be located on expansive soil, as defined in Table 18-1-B of the Uniform Building Code (1994), creating substantial risks to life or property?			X	
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?				X
VII. HAZARDS AND HAZARDOUS MATERIALS. Would the project:				
a) Create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials?			X	
b) Create a significant hazard to the public or the environment through reasonable foreseeable upset and accident conditions involving the release of hazardous materials into the environment?			X	
c) Does the proposed school site contain one or more pipelines, situated underground or aboveground, which carry hazardous substances, acutely hazardous materials or hazardous wastes, unless the pipeline is a natural gas line that is used only to supply natural gas to that school or neighborhood? [PRC § 21151.8 (a)(1)(C)]			X	
d) Is the proposed school site located near an aboveground water or fuel storage tank or within 1,500 feet of an easement of an aboveground or underground pipeline that can pose a safety hazard to the site? [CCR, Title 5 § 14010 (h)]			X	

	Issues	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
e)	Emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school?			X	
f)	Create an air quality hazard due to the placement of a school within one-quarter mile of: (a) permitted and nonpermitted facilities identified by the jurisdictional air quality control board or air pollution control district; (b) freeways and other busy traffic corridors; (c) large agricultural operations; and/or (d) a rail yard, which might reasonably be anticipated to emit hazardous air emissions, or handle hazardous or acutely hazardous material, substances, or waste? [PRC § 21151.8 (a)(2), Ed. Code § 17213 (b)]			X	
g)	Is the school site in an area designated in a city, county, or city and county general plan for agricultural use and zoned for agricultural production, and if so, do neighboring agricultural uses have the potential to result in any public health and safety issues that may affect the pupils and employees at the school site? [Ed. Code § 17215.5 (a)] (*Does not apply to schoolsites approved by CDE prior to January 1, 1997*).				X
h)	Is the property proposed school site less than the following distances from the edge of respective power line easements: (1) 100 feet of a 50–133 kV line; (2) 150 feet of a 220–230 kV line; or (3) 350 feet of a 500–550 kV line? [CCR, Title 5 § 14010 (c)]				X
i)	Be located on a site which is included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5 [inclusive of Section 25356 of the Health & Safety Code] and, as a result, would it create a significant hazard to the public or the environment?			X	
j)	Does the project site contain a current or former hazardous waste disposal site or solid waste disposal site and, if so, have the wastes been removed? [PRC § 21151.8 (a)(1)(A)]				X
k)	Is the proposed school site located on a site containing or underlain by naturally occurring hazardous materials?				X
l)	Is the proposed school site situated within 2,000 feet of a significant disposal of hazardous waste? [CCR, Title 5 § 14010 (t)]				X
m)	Is the proposed school site within two miles, measured by air line, of that point on an airport runway or potential runway included in an airport master plan that is nearest to the site? [Ed. Code § 17215 (a)&(b)] (Two nautical miles = 12,152 feet) *(Does not apply to schoolsites acquired prior to January 1, 1996.)*				X
n)	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?				X

Issues	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
o) Impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan?			X	
p) Expose people or structures to a significant risk of loss, injury or death involving wildland fires, including where wildlands are adjacent to urbanized areas or where residences are intermixed with wildlands?				X
VIII. HYDROLOGY AND WATER QUALITY. Would the project:				
a) Violate any water quality standards or waste discharge requirements?			X	
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)?			X	
c) Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, in a manner which would result in substantial erosion or siltation on- or off-site?			X	
d) Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, or substantially increase the rate or amount of surface runoff in a manner which would result in flooding on- or off-site?			X	
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?			X	
f) Otherwise substantially degrade water quality?			X	
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?			X	
h) Place within a 100-year flood hazard area structures which would impede or redirect flood flows?			X	
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?			X	
j) Is the project site subject to flooding or dam inundation? [Ed. Code § 17212; CCR, Title 5 § 14010 (g)]			X	
k) Inundation by seiche, tsunami, or mudflow?			X	

Issues	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
IX. LAND USE AND PLANNING. Would the project:				
a) Physically divide an established community?				X
b) Conflict with any applicable land use plan, policy, or regulation of an agency with jurisdiction over the project (including, but not limited to the general plan, specific plan, local coastal program, or zoning ordinance) adopted for the purpose of avoiding or mitigating an environmental effect?			X	
c) Would the proposed school conflict with any existing or proposed land uses, such that a potential health or safety risk to students would be created? [CCR, Title 5 §14010 (m)]			X	
d) Conflict with any applicable habitat conservation plan or natural community conservation plan?			X	
X. MINERAL RESOURCES. Would the project:				
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?				X
b) Result in the loss of availability of a locally important mineral resource recovery site delineated on a local general plan, specific plan, or other land use plan?				X
XI. NOISE. Would the project result in:				
a) Exposure of persons to or generation of noise levels in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies?			X	
b) Is the proposed school site located adjacent to or near a major arterial roadway or freeway whose noise generation may adversely affect the educational program? [CCR, Title 5 § 14010 (e)]			X	
c) Exposure of persons to or generation of excessive groundborne vibration or groundborne noise levels?			X	
d) A substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project?			X	
e) A substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project?		X		
f) 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?				X
g) 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?				X

Issues	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
XII. POPULATION AND HOUSING. Would the project:				
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)?			X	
b) Displace substantial numbers of existing housing, necessitating the construction of replacement housing elsewhere?				X
c) Displace substantial numbers of people, necessitating the construction of replacement housing elsewhere?				X
XIII. PUBLIC SERVICES. Would the project result in substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities, need for new or physically altered governmental facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times or other performance objectives for any of the public services:				
a) Fire protection?			X	
b) Police protection?			X	
c) Schools?				X
d) Parks?				X
e) Other public facilities?			X	
f) Does the site promote joint use of parks, libraries, museums, and other public services? [CCR, Title 5, § 14010 (o)]			X	
XIV. RECREATION.				
a) Would the project increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated?			X	
b) Does the project include recreational facilities or require the construction or expansion of recreational facilities which might have an adverse physical effect on the environment?			X	
XV. TRANSPORTATION/TRAFFIC. Would the project:				
a) Cause an increase in traffic which is substantial in relation to the existing traffic load and capacity of the street system (i.e., result in a substantial increase in either the number of vehicle trips, the volume to capacity ratio on roads, or congestion at intersections)?			X	
b) Exceed, either individually or cumulatively, a level of service standard established by the county congestion management agency for designated roads or highways?			X	
c) Result in a change in air traffic patterns, including either an increase in traffic levels or a change in location that results in substantial safety risks?				X

Issues	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
d) Substantially increase hazards due to a design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment)?		X		
e) Are traffic and pedestrian hazards mitigated per Caltrans' *School Area Pedestrian Safety* manual? [CCR, Title 5 § 14010 (l)]			X	
f) Is the site easily accessible from arterials and is the minimum peripheral visibility maintained for driveways per Caltrans' *Highway Design Manual*? [CCR, Title 5 § 14010(k)]				X
g) Is the proposed school site within 1,500 feet of a railroad track easement? [CCR, Title 5 § 14010(d)]				X
h) Result in inadequate emergency access?			X	
i) Result in inadequate parking capacity?			X	
j) Conflict with adopted policies, plans, or programs supporting alternative transportation (e.g., bus turnouts, bicycle racks)?				X
XVI. UTILITIES AND SERVICE SYSTEMS. Would the project:				
a) Exceed waste water treatment requirements of the applicable Regional Water Quality Control Board?			X	
b) Require or result in the construction of new water or waste water treatment facilities or expansion of existing facilities, the construction of which could cause significant environmental effects?			X	
c) Require or result in the construction of new stormwater drainage facilities or expansion of existing facilities, the construction of which could cause significant environmental effects?			X	
d) Have sufficient water supplies available to serve the project from existing entitlements and resources or are new or expanded entitlements needed?			X	
e) Result in a determination by the waste water treatment provider, which serves or may serve the project that it has adequate capacity to serve the project's projected demand in addition to the provider's existing commitments?			X	
f) Be served by a landfill with sufficient permitted capacity to accommodate the project's solid waste disposal needs?			X	
g) Comply with federal, state, and local statutes and regulations related to solid waste?			X	

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

Notes:
"School building" means any building designed and constructed to be used for elementary or secondary school purposes.

Section 4.4 provided a checklist of environmental impacts. This section provides an evaluation of the impact categories and questions contained in the checklist and identifies mitigation measures, if applicable.

5.1 AESTHETICS

Would the project:

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

No Impact. The project site is within the boundaries of the existing high school campus and is not a part of any scenic vista. No impact on a scenic vista would result from the proposed project and no mitigation measures are necessary.

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

No Impact. The proposed performing arts theater would be constructed within the boundaries of the existing high school campus and the project site is not a part of a state scenic highway. There is no state-designated scenic highway in the project vicinity. No damage to scenic resources would result from the proposed project and no mitigation measures are necessary

c) Substantially degrade the existing visual character or quality of the site and its surroundings?

Less Than Significant Impact. The project site is within the boundaries of the existing high school campus. The two-story performing arts theater would be compatible with the existing on-site educational facilities and would not deviate from the existing visual character or quality of the site and its surrounding. As shown in Figures 6 and 7, the maximum height for the theater would be 54 ft. 8 in. for the stage and 42 ft. for the seating area. As shown in the east elevation, other general areas such as practice rooms, storage, and offices would be 24 ft. high. The City of Dana Point Municipal Code allows a maximum height of 31 to 35 feet of 3 stories in CF zone, with exceptions. While the proposed project is not subject to the Municipal Code, its design standards are used to assess the project's compatibility with the neighborhood. Although the proposed project would be two stories tall, the overall height of the theater would exceed what is typically accepted in the CF zone. However, the proposed building would be surrounded by other school facilities and would not be directly visible from nearby sensitive receptors. View of the campus from the residences south of Stonehill Drive and east of Street of the Golden Lantern is obstructed by the existing masonry walls and landscaping that block street noise. View of the campus from residences north of Acapulco Drive is also obstructed by the six-foot masonry wall. Therefore, although the proposed project would exceed the typical maximum building height for the CF zone, the viewing experience of nearby sensitive receptors would not be adversely impacted. In addition, there is no protected public view in the project vicinity that would be obstructed by the proposed development. Visual impacts would be less than significant and no mitigation measures are necessary.

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

Less Than Significant Impact With Mitigation Incorporated. The new performing arts facility would not involve installation of nighttime lighting except for security purposes. Relocation of the tennis courts to south of the athletic fields would require relocation of lighting poles. However, it would require relocation

only and no new lighting would be generated. The relocated tennis court would be closer to the residential units to the east, from approximately 400 feet to 100 feet. However, the athletic field already has nighttime lighting and the relocated lighting poles for the tennis courts would not create additional light and glare impact for the nearby residences. In addition, the relocated lighting fixtures would be adjusted so that no lights are directed upward or result in light spillage. Because improperly installed luminaries may result in light and glare impacts, the following mitigation measure shall be implemented.

Mitigation Measure

1. Exterior lighting shall be energy efficient and shielded or recessed so that direct glare and reflections are contained within the boundaries of the parcel, and shall be directed downward and away from adjoining properties and public rights-of-way. No lighting shall blink, flash, or be of unusually high intensity or brightness. All lighting fixtures shall be appropriate in scale, intensity, and height to the use they are serving. Security lighting shall be provided at all entrances/exits. During installation, luminaries shall be aimed and corrected by a field crew to aim the light only to the intended areas.

5.2 AGRICULTURE RESOURCES

Would the project:

a) Convert Prime Farmland, Unique Farmland, or Farmland of Statewide Importance (Farmland), as shown on the maps prepared pursuant to the Farmland Mapping and Monitoring Program of the California Resources Agency, to nonagricultural use?

No Impact. The project site is within the existing Dana Hills High School and is currently developed as a parking lot. The project site is not designated as agricultural use on the maps of the Farmland Mapping and Monitoring Program. No impact to farmland would result from the proposed project and no mitigation measures are necessary.

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

No Impact. The project site is zoned CF Community Facility and is not under a Williamson Act contract. No impact to agricultural resources would result from the proposed project and no mitigation measures are necessary.

c) Involve other changes in the existing environment which, due to their location or nature, could result in conversion of Farmland to nonagricultural use?

No Impact. The project site is within the existing high school campus and would not result in conversion of farmland to nonagricultural use. No mitigation measures are necessary

5.3 AIR QUALITY

The Air Quality section addresses the impacts of the proposed project on ambient air quality and the exposure of people, especially sensitive individuals, to unhealthful pollutant concentrations. The primary air pollutants of concern for which ambient air quality standards (AAQS) have been established are ozone (O_3), carbon monoxide (CO), coarse inhalable particulate matter (PM_{10}), fine inhalable particulate matter ($PM_{2.5}$), sulfur oxides (SO_x), oxides of nitrogen (NO_x), and lead (Pb). Areas are classified under the federal Clean Air Act as in either attainment or nonattainment for each criteria pollutant based on whether the AAQS have been achieved. The South Coast Air Basin (SoCAB), which is managed by the South

Coast Air Quality Management District (SCAQMD), is designated by both the state and the United States Environmental Protection Agency (USEPA) as a nonattainment area for O_3, PM_{10}, and $PM_{2.5}$. This section analyzes the types and quantities of air pollutant emissions that would be generated by the construction and operation of the proposed project.

In addition, this section analyzes the project's contribution to global climate change impacts in California through an analysis of project-related greenhouse gas (GHG) emissions. The primary GHG of concern is carbon dioxide (CO_2), which constitutes the majority (greater than 99 percent) of project-related emissions. Information on manufacture of cement, steel, and other "life-cycle" emissions that would occur as a result of the project are not available and are not included in the analysis. Lifecycle emissions are the GHG emissions from raw material production, manufacture, distribution, use, and disposal and include all intervening transportation emissions caused by the product's existence. Because the amount of materials consumed during the operation or construction over the lifetime of the project is not known, the origin of the raw materials purchased is not known, and manufacturing information for those raw materials are also not known, calculation of lifecycle emissions would be speculative. In accordance with the Governor's Office of Planning and Research's Technical Advisory, direct and indirect GHG emissions were calculated from vehicular traffic, energy consumption, water usage, and construction activities associated with the project.

A background discussion on the air quality regulatory setting, meteorological conditions, existing ambient air quality in the vicinity of the project site, and air quality modeling can be found in Appendix A.

Methodology

Projected construction-related air pollutant emissions are calculated using the Urban Emissions (URBEMIS2007) inventory computer model distributed by the SCAQMD. URBEMIS2007 compiles an emissions inventory of construction, stationary, and vehicle emissions sources. The calculated emissions of the project are compared to thresholds of significance for individual projects using the SCAQMD's *CEQA Air Quality Analysis Guidance Handbook*.

Thresholds of Significance

CEQA allows for the significance criteria established by the applicable air quality management or air pollution control district to be used to assess impacts of a project on air quality. The SCAQMD has established thresholds of significance for regional air quality emissions for construction activities and project operation. In addition to the daily thresholds listed above, projects are also subject to the AAQS. These are addressed though an analysis of localized significance thresholds (LSTs).

Regional Significance Thresholds

The SCAQMD has adopted regional construction and operational emissions thresholds to determine project-specific and cumulative impacts on air quality within the SoCAB, as shown in Table 1.

Table 1
SCAQMD Regional Significance Thresholds

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

CO Hotspot Analysis

The localized CO impacts are based on the California CO standards:

- 1-hour = 20 parts per million
- 8-hour = 9 parts per million

The SCAQMD requires the assessment of CO hotspots at congested intersections for which project traffic would travel. Exceedance of the one- and eight-hour ambient air quality standards would constitute a significant air quality impact.

Localized Significance Thresholds

The SCAQMD developed LSTs for emissions of NO_2, CO, PM_{10}, and $PM_{2.5}$ generated at the project site (off-site mobile-source emissions are not included in the LST analysis). LSTs represent the maximum emissions at a project site that are not expected to cause or contribute to an exceedance of the most stringent federal or state AAQS. LSTs are based on the ambient concentrations of that pollutant within the project air pollutant monitoring station area, or source receptor area (SRA) and the distance to the nearest sensitive receptor. LST analysis for construction is applicable for all projects of five acres and less; however, it can be used as screening criteria for larger projects to determine whether or not dispersion modeling may be required. The LSTs for a 3.4-acre project site in SRA 21 for sensitive receptors at 25 meters (approximately 82 feet) are shown in Table 2.

Table 2
Localized Significance Thresholds

Air Pollutant	Threshold (lbs/day)	
	Construction	Operation
Nitrogen Oxides (NO_2)	162	162
Carbon Monoxide (CO)	1,397	1,397
Coarse Particulates (PM_{10})	9	2
Fine Particulates ($PM_{2.5}$)	6	1

Source: SCAQMD 2006, Appendix A: Based on LSTs for a project site in SRA 21 that is 3.4 acres at a distance of 25 meters (82 feet) between the source and receptor.

GHG Thresholds

Governor's Office of Planning and Research – SB 97

OPR released a Technical Advisory for addressing climate change through CEQA in June 2008. In its guidance document, OPR recommends that each public agency develop its own consistent approach to performing a climate change analysis based on best available information. OPR states that compliance with CEQA for global climate change analyses entails three basic steps: 1) identify and quantify GHG emissions associated with vehicular traffic, energy consumption, water usage, and construction activities; 2) assess the significance of the impact on climate change; and 3) if the impact is found to be significant, identify alternatives and/or mitigation measures that will reduce the impact below significance. For projects where GHG emissions are considered significant, the California Attorney General has prepared a fact sheet listing various mitigation measures to reduce the project's contribution to global climate change impacts.

California Air Resources Board

On October 24, 2008, CARB released the first preliminary draft of recommended approaches for setting interim significance thresholds for GHG under CEQA. The draft approach establishes GHG thresholds and/or performance standards based on sector types, as defined in the Scoping Plan. Sectors identified in the Scoping Plan are Transportation, Electricity, Industrial, Commercial and Residential, Agricultural, High Global Warming Potential, and Recycling and Waste. CARB has not yet finalized the proposed thresholds/performance standards.

South Coast Air Quality Management District

The issue of global climate change is, by definition, a cumulative environmental impact. In accordance with the South Coast Air Quality Management District (SCAQMD) methodology, any project that produces a significant regional air quality impact in an area adds to the cumulative impact with regard to the criteria pollutants (such as VOC, CO, NO_x, SO_x, PM_{10}, or $PM_{2.5}$). SCAQMD is the local air district responsible for establishing thresholds for air quality. To provide guidance to local lead agencies on determining significance for GHG emissions in their CEQA documents, SCAQMD has convened a GHG CEQA Significance Threshold Working Group. Currently SCAQMD is in the process of establishing a threshold for GHG emissions to determine the project's regional contribution toward global climate change impacts for California.

Where available, the significance criteria established by the applicable air quality management or air pollution control district may be relied upon to make the following determinations.

Would the project:

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

Less Than Significant Impact. A consistency determination plays an important role in local agency project review by linking local planning and individual projects to the air quality management plan (AQMP). It fulfills the CEQA goal of informing decision makers of the environmental efforts of the project under consideration at an early enough stage to ensure that air quality concerns are fully addressed. It also provides the local agency with ongoing information as to whether they are contributing to clean air goals contained in the AQMP. There are two key indicators of consistency:

Indicator 1: Whether the project would result in an increase in the frequency or severity of existing air quality violations, cause or contribute to new violations, or delay timely attainment of the ambient air quality standards or interim emission reductions in the AQMP.

Indicator 2: Whether the project would exceed the assumptions in the AQMP. The AQMP strategy is, in part, based on projections from local general plans.

Emissions generated by construction and operation of the proposed project would be less than the SCAQMD emission thresholds, and therefore it would not be considered by the SCAQMD to be a substantial source of air pollutant emissions, so it would be consistent under the first indicator. The project site is currently a high school and would therefore not result in changes in the assumptions used for the calculation of regional emissions in the general plan or the AQMP. Therefore, the proposed project would be consistent under the second indicator. In addition, the project is not considered by the Southern California Association of Governments (SCAG) to be a regionally significant project that would warrant a consistency review for criteria emissions. Consequently, the project would not conflict or obstruct implementation of the AQMP and impacts are less than significant in this regard.

b) Violate any air quality standard or contribute substantially to an existing or projected air quality violation?

Less Than Significant Impact. The proposed project would develop a 470-person seat performing arts facility (30,560 square feet) on a 3.42-acre portion of the existing Dana Hills High School. The following describes project-related impacts from short-term construction activities and long-term operation of the facility:

Short-Term Air Quality Impacts

Construction activities would result in the generation of air pollutants. These emissions would primarily be 1) exhaust emissions from powered construction equipment; 2) dust generated by demolition, grading, earthmoving, and other construction activities; 3) motor vehicle emissions and 4) emissions of volatile organic compounds from the application of asphalt, paints, and coatings.

According to the District, construction is estimated to take 17 months commencing in March 2010 and ending in September 2011. Portable units would be removed from the site and only demolition of the tennis courts would be required. Construction emissions were estimated using the SCAQMD's URBEMIS2007 inventory model based on the project's construction schedule and equipment list from the District, where available, and model default construction equipment mix for a five-acre project. Results of the URBEMIS2007 modeling are included in Table 3. As shown in this table, all emissions from construction-related activities are less than their respective SCAQMD regional significance threshold values. Therefore, impacts from emissions related to construction activities would be less than significant.

Table 3
Maximum Daily Construction Emissions

Source[1]	Pollutants (lb/day)					
	VOC	NO_X	CO	SO_2	PM_{10}	$PM_{2.5}$
Demolition	1	9	6	0	2	1
Grading[2]	3	25	13	0	4	2
Building Construction						
Construction	1	10	7	0	1	1
Paving	2	12	9	0	1	1
Architectural Coatings	28	<1	<1	0	0	0
Maximum Daily Building Construction	32	21	16	<1	2	1
Maximum Daily Construction	32	25	16	<1	4	2
SCAQMD Threshold	75	100	550	150	150	55
Exceeds Threshold?	No	No	No	No	No	No

Source: URBEMIS2007 Version 9.2.4

[1] Air quality modeling based on construction information provided by Capistrano Unified School District. Construction equipment mix based on URBEMIS2007 default mix for a 3.4 acre project site and 30,560 square feet of new structures.

[2] Fugitive dust emissions assume application of Rule 403, which includes quickly replacing groundcover in disturbed areas, watering exposed surfaces at least two times daily, implementation of equipment loading/unloading procedures to reduce fugitive dust, managing haul road dust by water two times daily, and reducing speed on unpaved roads to less than 15 mph.

Long-Term Operation-Related Impacts

Long-term air emissions generated by the project are associated with new stationary sources (natural gas use, landscape equipment, etc.). Because the project would not increase student capacity at the existing Dana Hills High School, no substantial increase in mobile sources of air pollution would occur as a result of the project. Emissions from project-related stationary-source emissions are shown in Table 4. The project would result in an overall increase of air pollutant emissions for stationary sources. However, project-related emissions would not exceed the SCAQMD regional emissions thresholds for all the analyzed pollutants. Consequently, the proposed project's operational air quality impact is considered less than significant.

Table 4
Project-Related Operational Phase Emissions
(in pounds per day)

	VOC	NO_X	CO	SO_2	PM_{10}	$PM_{2.5}$
Summer						
Stationary Sources	<1	<1	2	0	<1	<1
SCAQMD Standard	55	55	550	150	150	55
Exceeds Threshold?	No	No	No	No	No	No
Winter						
Stationary Sources	<1	<1	<1	0	0	0
SCAQMD Standard	55	55	550	150	150	55
Exceeds Threshold?	No	No	No	No	No	No

Source: URBEMIS2007, Version 9.2.4

Greenhouse Gas Emissions

The SCAQMD, OPR, and CARB have not formally adopted regional emissions thresholds for GHG emissions for development projects. Pursuant to the requirements of Senate Bill 97, OPR transmitted suggested changes to the CEQA Guidelines to the Natural Resource Agency on April 13, 2009. Changes to the CEQA Guidelines include a new Section 15064.4, *Determining the Significance of Impacts from Greenhouse Gas Emissions*. In this section, OPR is recommending that a lead agency consider the following when assessing the significance of impacts from GHG emissions on the environment:

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

b) Whether the project emissions exceed a threshold of significance that the lead agency determines applies to the project;

c) The extent to which the project complies with regulations or requirements adopted to implement an adopted statewide, regional, or local plan for the reduction or mitigation of GHG emissions.[1]

In accordance with the OPR Technical Advisory and suggested revisions to the CEQA Guidelines, GHG emissions were calculated for construction and operation of the project.

Construction

GHG emissions generated by construction activities would cease upon completion of the construction phase of the project and would therefore be a small fraction of total project-related emissions, when considering the longevity of operation emissions associated with the project. GHG emissions generated by construction activities can be reduced by reducing the amount of construction and demolition waste generated by the project. To encourage recycling and salvaging of construction and demolition debris, the City of Dana Point requires that a minimum of 75 percent (as measured by tonnage) of all construction demolition debris be diverted from landfills (City of Dana Point Municipal Code Section 6.12.040). It is anticipated that the District would divert nonhazardous construction demolition debris generated to the extent feasible. Due to the small magnitude of emissions and the diversion of the demolition debris, impacts from construction activities would be less than significant with regard to climate change impacts.

Operation

As shown in Table 5, the project would result in a slight increase of CO_{2e} emissions for stationary sources. Because the project would be constructed after August 1, 2009, the project would be constructed to achieve the energy efficiency standards of the 2008 Building and Energy Efficiency Standards. The 2008 Standard is 15 percent more energy efficiency compared to the 2005 Building and Energy Efficiency Standards. Furthermore, because the project would not exceed the regional thresholds for criteria pollutants established by SCAQMD, CO_2 emissions are likely not to be considered substantial enough to result in a significant cumulative impact relative to GHG emissions and climate change impacts. Therefore, the project's cumulative contribution to GHG emissions is less than significant.

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

Table 5
Project-Generated Greenhouse Gas Emissions

Source	CO_2 Emissions Metric Tons
Construction	
Construction Emissions – 2009	127
Construction Emissions – 2010	111
Total Construction	**238**
Operation	
Area Sources	59
Purchased Energy[1]	93
Total Operation	**152**

Source: URBEMIS2007, Version 9.2.4. Assumes CO_2 represents 99.6 percent of total CO_{2e} emissions from gasoline and 99.7 percent of total from diesel CO_{2e} while CH_4, N_2O, and Fluorinated Gases comprise the remaining percent based on Bay Area Air Quality Management District's Source Inventory of Bay Area Greenhouse Gas Emissions.
Note: One short ton is equivalent to 0.907 metric ton.
[1] CO_{2e} emissions calculated using energy usage factors and emission rates from the United States Department of Energy, EIA, 2003 Commercial Building Energy Consumption, December 2006, Table C14; and Energy Usage Indicators, Released January 2009.

c) Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is nonattainment under an applicable federal or state ambient air quality standard (including releasing emissions that exceed quantitative thresholds for ozone precursors)?

Less Than Significant Impact. The SoCAB is designated by the USEPA and CARB as in nonattainment for O_3, PM_{10}, and $PM_{2.5}$. In accordance with SCAQMD methodology, any project that does not exceed or can be mitigated to less than the daily threshold values does not add significantly to a cumulative impact. The URBEMIS modeling demonstrates that construction and operational activities would not result in emissions in excess of the SCAQMD threshold values, and therefore the project does not add significantly to any cumulative impact. No mitigation measures are necessary.

d) Expose sensitive receptors to substantial pollutant concentrations?

Less Than Significant Impact. The project could expose sensitive receptors to elevated pollutant concentrations if it would cause or contribute significantly to elevated pollutant concentration levels. Unlike the mass (weight) of construction and operational emissions shown in Tables 3 and 4 (pounds per day), localized concentrations refer to the amount of pollutant in a volume of air (ppm or $\mu g/m^3$) and can be correlated to potential health effects. However, Table 2 (also described in pounds per day), calculates the amount of project-related regional emissions at which localized concentrations (ppm or $\mu g/m^3$) would exceed the ambient air quality standards according to the size of the project site and distance to the nearest sensitive receptor.

Construction LSTs

Emissions generated by construction activities are anticipated to cause temporary increases in pollutant concentrations. Table 6 shows the maximum daily construction emissions (pounds per day) generated during construction activities compared with the screening level LSTs for a 3.4-acre site. In accordance with SCAQMD methodology, only on-site stationary sources and mobile equipment occurring on the project site are included in the analysis. As shown in this table, maximum daily combined emissions for NO_X, CO, PM_{10}, and $PM_{2.5}$ from the project would not exceed the LSTs, and therefore would not result in

substantial pollutant concentrations at nearby sensitive receptors. Consequently, construction emissions generated by the project would not expose sensitive receptors to substantial pollutant concentrations and impacts would be less than significant.

Table 6
Maximum Daily On-Site Construction Emissions Compared with the LST

Source[1]	Pollutants (lbs/day)[2]			
	NO_X	CO	PM_{10}	$PM_{2.5}$
Demolition	8	5	1	1
Grading[2]	25	12	4	2
Building Construction	9	5	1	1
Maximum Daily Construction[3]	**25**	**12**	**4**	**2**
SCAQMD LST	162	1,397	9	6
Exceeds Threshold?	No	No	No	No

Source: URBEMIS2007 Version 9.2.4, and SCAQMD 2003, Appendix A: Based on LSTs for a project site in SRA 21 with a 3.4-acre site and a distance of 25 meters (82 feet) between the source and receptor. In accordance with SCAQMD methodology, only on-site stationary sources and mobile equipment occurring on the project site are included in the analysis.

[1] Construction equipment mix based on URBEMIS2007 default mix for a 3.4-acre project site and 30,560 square feet of new structures.

[2] Fugitive dust emissions assume application of Rule 403, which includes quickly replacing groundcover in disturbed areas, watering exposed surfaces at least two times daily, implementation of equipment loading/unloading procedures to reduce fugitive dust, managing haul road dust by water two times daily, and reducing speed on unpaved roads to less than 15 mph.

[3] Represents the maximum daily emissions less on-road emissions from construction activities.

Operational LSTs

To estimate concentrations of air pollutants generated by operation of the project at nearby existing and proposed sensitive receptors, the project's maximum daily emissions were compared to the operational LSTs. In accordance with SCAQMD methodology, only on-site stationary sources and mobile equipment are included in the analysis. Because the project would not increase student capacity at Dana Hills High School, no substantial increase in mobile sources of air pollution would occur as a result of the project. Table 7 shows maximum daily operational emissions generated by the project compared to the LST. As shown in this table, project emissions would not exceed LSTs for CO, NO_X, PM_{10}, or $PM_{2.5}$. Because the project's operational emissions would not exceed the LSTs, no air pollutant concentrations from project-related operational activities would exceed the California or federal AAQS and no significant air quality impact would occur from exposure of persons to substantial air pollutant concentrations.

Table 7
Maximum Daily On-Site Operational Emissions Compared with the LST

Source	Pollutants (lbs/day)			
	NO_X	CO	PM_{10}	$PM_{2.5}$
Stationary Source	<1	2	<1	<1
SCAQMD LST	162	1,397	2	1
Exceeds Threshold?	No	No	No	No

Source: URBEMIS2007 Version 9.2.4, and SCAQMD, 2006, Appendix A: Based on LSTs for a project site in SRA 21 for a 3.4-acre site within sensitive receptors located at 25 meters (82 feet).

e) Is the boundary of the proposed school site within 500 feet of the edge of the closest traffic lane of a freeway or busy traffic corridor? If yes, would the project create an air quality health risk due to the placement of the School?

Less Than Significant Impact. There is a direct association between proximity to high traffic roadways and a variety of health effects, which are attributed to a high concentration of air pollutants generated by vehicle exhaust (CARB 2005). Because placement of sensitive land uses falls outside CARB jurisdiction, CARB developed a handbook for the siting of sensitive land uses in the vicinity of freeways, distribution centers, rail yards, ports, refineries, chrome-plating facilities, dry cleaners, and gasoline-dispensing facilities (CARB 2005). This document was developed as a guide and as a tool for assessing the compatibility and associated health risk when placing sensitive receptors near existing pollution sources.

CARB's recommendations on the siting of new sensitive land uses were developed from a compilation of recent studies that evaluated data on the adverse health effects from proximity to air pollution sources. The key observation in these studies is that close proximity to air pollution sources substantially increases both exposure and the potential for adverse health effects relative to the existing background concentrations found within the air basin. Carcinogenic toxic air contaminants that constitute the majority of the known health risks from motor vehicle traffic include diesel particulate matter (diesel PM) from trucks, and benzene, formaldehyde, 1,3-butadiene, and acetaldehyde emissions from passenger vehicles. On a typical urban freeway (truck traffic of 10,000 to 20,000/day), diesel PM makes up approximately 84 percent of the potential health risk from the vehicle traffic (SCAQMD 2008). The association of truck-related emissions with adverse health effects is generally strongest between 300 and 1,000 feet, and diminishes with distance. The impact of traffic emissions is on a gradient that at some point becomes indistinguishable from the regional air pollution problem. CARB recommends avoiding siting new sensitive land uses within "500 feet of a freeway, urban roads with 100,000 vehicles per day, or rural roads with 50,000 vehicles per day" to avoid exposing sensitive receptors to substantial concentration of air pollutants (CARB 2005).

The closest freeway to the proposed project site is Interstate 5 (I-5), approximately 1.3 miles east of the site. Additionally, future traffic volumes on Golden Lantern Street and Stonehill Drive would not exceed 100,000 vehicles per day. According to the traffic study prepared by Kunzman Associates, traffic volumes on Golden Lantern Street are 19,800 vehicles and traffic volumes on Stonehill Drive are 10,000 vehicles per day. Consequently, the proposed project falls outside the buffer distance for placement of a school near a freeway. Therefore, the project would not expose project occupants to harmful concentrations of air pollutants and impacts would be less than significant.

f) Create objectionable odors affecting a substantial number of people?

Less Than Significant Impact. Project construction would involve the use of heavy equipment creating exhaust pollutants from on-site earth movement and from equipment bringing asphalt and other building materials to the site. With regard to nuisance odors, any air quality impacts would be confined to the immediate vicinity of the equipment itself. By the time such emissions reach any sensitive receptor sites away from the project site, they are typically diluted to well below any level of air quality concern. An occasional "whiff" of diesel exhaust from passing equipment and trucks accessing the site from public roadways may result. Such brief exhaust odors are an adverse, but not significant, air quality impact. No objectionable odors are anticipated to result from the operational phase of the proposed project from use of the performing arts center. Furthermore, odor complaints are subject to SCAQMD Rule 402, Nuisance, which requires that odors not result in a nuisance or annoyance to the public. Therefore, impacts from objectionable odors are less than significant and no mitigation measures are necessary.

5.4 BIOLOGICAL RESOURCES

Would the project:

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

No Impact. The project site is on the existing high school campus, which is already fully developed with a parking lot, tennis courts, racquetball court, and a turf-covered athletic field. The project site does not contain any special status species or habitats that are under the jurisdiction of California Department of Fish and Game or U.S. Fish and Wildlife Service. No impact to biological resources would result from the proposed project and no mitigation measures are necessary.

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

No Impact. The project site is on the existing high school campus, which is already fully developed with a parking lot, tennis courts, racquetball court, and a turf-covered athletic field. The project site does not contain any riparian habitat or other sensitive natural community identified in local or regional plans. No impact to riparian habitat or other sensitive natural community would result from the project implementation and no mitigation measures are necessary.

c) Have a substantial adverse effect on federally protected wetlands as defined by Section 404 of the Clean Water Act (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means?

No Impact. The project site is on the existing high school campus, which is already fully developed with a parking lot, tennis courts, racquetball court, and a turf-covered athletic field. No federally protected wetlands would be impact by the project implementation and no mitigation measures are necessary.

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?

No Impact. The project site is on the existing high school campus, which is already fully developed with a parking lot, tennis courts, racquetball court, and a turf-covered athletic field. The project site does not support a wildlife corridor nor it is being used as a native wildlife nursery. No impacts to biological resources would result from the project implementation and no mitigation measures are necessary.

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

No Impact. No mature or native trees are in the project site. Only ornamental landscaping is along the existing tennis courts. The City of Dana Point Municipal Code regulates handling of trees in public parks and street rights-of-way. Removal or relocation of ornamental plants and trees within the school property would not conflict with any local policy or ordinance. No impact to local biological resources would result from the proposed project and no mitigation measures are necessary.

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

No Impact. The City of Dana Point is within the boundaries of the Orange County's Southern Subregion Natural Community Conservation Plan/Master Streambed Alteration Agreement/Habitat Conservation Plan (NCCP/MSAA/HCP). However, the project site is already fully developed and is not included in any of the critical habitat areas. In addition, according to the Coastal Zone Boundary Map, the project site is outside of the coastal zone jurisdiction. The proposed project would not conflict with the provisions of approved local, regional, or state habitat conservation plan and no mitigation measures are necessary.

5.5 CULTURAL RESOURCES

Would the project:

a) Cause a substantial adverse change in the significance of a historical resource as defined in CCR § 15064.5?

No Impact. Section 10564.5 defines historical resources as resources listed or determined to be eligible for listing by the State Historical Resources Commission, a local register of historical resources, or the lead agency. Generally a resource is considered to be "historically significant" if it meets one of the following criteria:

i) Is associated with events that have made a significant contribution to the broad patterns of California's history and cultural heritage;

ii) Is associated with the lives of persons important in our past;

iii) 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; or

iv) Has yielded, or may be likely to yield, information important in prehistory or history.

The project site is within the boundaries of the existing high school campus and is currently developed with a parking lot, tennis courts, racquetball court, and a turf-covered athletic field. Development of the proposed project would not cause a substantial adverse change to historical resources and no mitigation measures are necessary.

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

Less Than Significant Impact With Mitigation Incorporated. The California State University, Fullerton, South Central Coastal Information Center was contacted for an archaeological records search. The records check did not identify any significant resources on the project site. The records check result is included in Appendix B to this Initial Study. Although it is highly unlikely that the project site would contain any archaeological resources, the lack of past findings does not preclude the discovery of subsurface resources in the future during grading. Therefore, the following mitigation measure has been incorporated to ensure that any potential impacts to archaeological resources are reduced to a less than significant level.

Mitigation Measure

2. In the event that a potential archaeological find is discovered during construction activities, construction shall cease or be temporarily diverted in the vicinity of the find until a qualified archaeologist can analyze the find. If artifacts are uncovered and determined to be significant, the archaeological observer shall determine appropriate actions in cooperation with the property owner/developer for exploration and/or salvage. Specimens that are collected prior to or during the grading process shall be donated to an appropriate educational or research institution or museum. Any archaeological work at the site shall be conducted under the direction of the certified archaeologist. If any artifacts are discovered during grading operations when the archaeological monitor is not present, grading shall be diverted around the area until the monitor can survey the area.

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

Less Than Significant Impact With Mitigation Incorporated. The project site has been previously disturbed and is underlain by fill materials, and there are no vertebrate fossil localities that lie directly underneath the project site. No unique geologic feature exists on-site and the likelihood of presence of a unique paleontological resource is minimal. However, the lack of past findings does not preclude the discovery of subsurface resources in the future during grading. Therefore, the following mitigation measure has been incorporated to ensure that any potential impact to paleontological resources is reduced to a less than significant level.

Mitigation Measure

3. In the event that a potential paleontological find is discovered during construction activities, construction shall cease or be temporarily diverted in the vicinity of the find until a qualified paleontologist can analyze the find. If artifacts are uncovered and determined to be significant, the paleontological observer shall determine appropriate actions in cooperation with the property owner/developer for exploration and/or salvage. Specimens that are collected prior to or during the grading process shall be donated to an appropriate educational or research institution or museum. Any paleontological work at the site shall be conducted under the direction of the certified paleontologist. If any fossils are discovered during grading operations when the paleontological monitor is not present, grading shall be diverted around the area until the monitor can survey the area.

d) Disturb any human remains, including those interred outside of formal cemeteries?

Less Than Significant Impact. The project site is developed with the high school campus. No human remains are known to exist on the project site, and the site is not identified as a formal cemetery. Since the project site is already developed, the likelihood of discovering human remains is highly unlikely. However, the lack of past evidence of a Native American burial ground or human remains at the project site does not guarantee the absence of subsurface remains. Therefore, in the event that suspected remains are uncovered, California Health and Safety Code Section 7050.5 and Public Resources Code Section 5097.98 require that the District stop all work in the area of the find and notify the County Coroner and the Native American Heritage Commission. Mandatory compliance with these requirements would ensure that impacts to human remains are less than significant. No mitigation measures are necessary.

5.6 GEOLOGY AND SOILS

Would the project:

a) Expose people or structures to potential substantial adverse effects, including the risk of loss, injury, or death involving:

i) Rupture of a known earthquake fault, as delineated on the most recent Alquist-Priolo Earthquake Fault Zoning map, issued by the State Geologist for the area or based on other substantial evidence of a known fault? Refer to Division of Mines and Geology Special Publication 42.

Less Than Significant Impact. Fault rupture occurs when an active fault displaces in two separate directions during an earthquake. Fault rupture hazards can be characterized by a property's proximity to an active or potentially active fault and the designation of the site as being within an Alquist-Priolo Special Study Zone, as defined by the Alquist-Priolo Earthquake Fault Zone Act of 1962. The project site is not within a fault-rupture hazard zone as defined by the Alquist-Priolo Special Studies Zones Act and no evidence of active faulting was observed during the geotechnical investigation (NMG 2009). The project site is not underlain by an earthquake fault and no impact would result from the proposed project. No mitigation measures are necessary.

ii) A active earthquake fault or fault trace, or is the site located within the boundaries of any special studies zone or within an area designated as geologically hazardous in the safety element of the local general plan?

Less Than Significant Impact. The project site is not within the boundaries of any special studies zone or within an area designated as geologically hazardous by the General Plan. No impact would result from the proposed project and no mitigation measures are necessary.

iii) The construction, reconstruction, or relocation of any school building on the trace of a geological fault along which surface rupture can reasonably be expected to occur within the life of the school building?

Less Than Significant Impact. The project site is not underlain by any earthquake fault along which surface rupture can be reasonably be expected to occur within the life of the school building. There are no active faults mapped at the site. No impact would result from the proposed project and no mitigation measures are necessary.

iv) Strong seismic ground shaking?

Less Than Significant Impact. The closest major active faults to the project site are the San Joaquin Hills Blind Thrust, approximately six miles to the south and the Newport-Inglewood Fault (offshore), approximately three miles to the west. Because there are no known major or seismically active faults mapped at the project site, groundshaking potential at the project site is not any greater than for any other properties in southern California. The seismic design of public school buildings is governed by the 2007 California Building Code (CBC). The proposed project would be designed in accordance with the CBC and Title 24, California Code of Regulations. In addition, the proposed project would be required to meet the standards of the Division of the State Architects and Department of Education for seismic safety. Compliance with established standards would reduce impacts from strong ground shaking to a less than significant level. No additional mitigation measures are necessary.

v) The construction, reconstruction, or relocation of any school building on a site subject to moderate-to-high liquefaction?

No Impact. The project site is not in an area mapped as having soils that are potentially liquefiable (NMG 2009). The geotechnical investigation also confirmed that the conditions at the site are not conducive to liquefaction. No significant liquefaction impact would result from the project implementation and no mitigation measures are necessary.

vi) The construction, reconstruction, or relocation of any school building on a site subject to landslides?

No Impact. The project site is flat and is not mapped in an area of high landslide susceptibility. No impact from landslides is anticipated and no mitigation measures are necessary.

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

Less Than Significant Impact. Erosion is a normal and inevitable geologic process whereby earth materials are loosened, worn away, decomposed, dissolved, and removed from one place and transported to another. Precipitation, running water, waves, and wind are all agents of erosion. Ordinarily erosion proceeds so slowly as to be imperceptible, but when the natural equilibrium of the environment is changed, the rate of erosion can be greatly accelerated. This can create aesthetic as well as engineering problems. Accelerated erosion within an urban area can cause damage by undermining structures, blocking storm drains, and depositing silt, sand, or mud in road. Eroded materials are eventually deposited into local waterways, where the carried silt remains suspended in the water for some time, constituting a pollutant and altering the normal balance of plant and animal life.

Development of the proposed project would involve grading activities that would result in the exposure of on-site soil to potential erosion impact. However, the proposed project would be required to comply with a National Pollutant Discharge System (NPDES) permit and, consequently, the development and implementation of a Storm Water Pollution Prevention Plan (SWPPP), which is further discussed in Section 3.8 of this Initial Study. For example, the District would comply with best management practices (BMP) as standard mitigation to control erosion impacts, as well as with state codes and requirements for stabilizing disturbed areas, such as sandbags to direct runoff away from disturbed areas and trap sediments on-site. A permanent erosion control program, such as proper care of drainage control devices, proper irrigation, and landscaping, would also be implemented. Compliance with the requirements set forth by the NPDES permit as well as South Coast Air Quality Management District Rule 403 (e.g., regularly water cleared and grubbed areas) to help minimize potential fugitive dust would ensure that erosion impacts resulting from the project would be less than significant. No mitigation measures are necessary.

c) Be located on a geologic unit or soil that is unstable, or that would become unstable as a result of the project, and potentially result in on- or off-site landslide, lateral spreading, subsidence, liquefaction or collapse?

Less Than Significant Impact. The project site is northwest of San Juan Creek in the southern San Joaquin Hills and is underlain by undocumented artificial fill and the Pliocene Capistrano Formation. The Capistrano Formation is comprised of massive to slightly laminated gray to very dark gray silty claystone/clayey siltstone. The existing tennis courts are anticipated to be underlain by several feet of undocumented artificial fill (afu), consisting of yellowish brown to olive silty sands that are in a relatively dense condition. However, the fill is shallow and will be fully removed during remedial grading. Most of the on-site soil from remedial removal is considered suitable for placement as compacted fill and any

soils imported to the site for use as fill would be required to be evaluated and approved by the geotechnical consultant before being transported to the project site. Therefore, on-site geologic units would not result in on- or off-site landslide, lateral spreading, subsidence, liquefaction, or collapse. Impacts would be less than significant and no mitigation measures are necessary.

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

Less Than Significant Impact. The expansion potential of the site depends on the clay content, but it is considered typical of medium expansion potential. However a remedial grading would be conducted beneath the planned structures and soils would be replaced with approved compacted fill so that impacts from expansive soils are minimized. Compliance with the recommendations contained in the geotechnical report would ensure that expansive soils are removed from the site and would not create risks to life or property. No mitigation measures are necessary.

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?

No Impact. The project site is served by the existing sewer system, and no septic tanks or alternative wastewater disposal systems would be necessary. No impact would result from the proposed project and no mitigation measures are necessary.

5.7 HAZARDS AND HAZARDOUS MATERIALS

Would the project:

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

Less Than Significant Impact. The proposed project entails construction and development of a performing arts theater on the existing high school campus. Grading and construction activities would involve limited transport, storage, use, or disposal of hazardous materials, such as in the fueling/servicing of construction equipments on-site or the removal and export of contaminated soils. Any handling, use, or disposal of hazardous materials is subject to federal, state, and local health and safety requirements under Department of Toxic Substances Control (DTSC) oversight. Therefore, this impact would be considered less than significant.

Long-term operation of the proposed project is not anticipated to involve the use of significant quantities of hazardous materials. Therefore, operation of the proposed project would result in less than significant impact and no mitigation measures are necessary.

b) Create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment?

Less Than Significant Impact. The proposed project would not create a hazard through upset or accident conditions involving significant quantities of hazardous materials. The use of hazardous materials and substances at school facilities would be minimal and in small quantities. All materials and substances would be subject to federal, state, and local health and safety requirements. This would include affixing appropriate warning signs and labels where necessary. Hazardous materials are regulated by federal, state, and local agencies, including the USEPA, OSHA, and the County Fire

Department. The District currently complies with all hazardous materials regulations. Therefore, there are no reasonably foreseeable upset or accident conditions that would create a significant hazard to the public due to the release of hazardous materials, impacts would be less than significant. No mitigation measures are necessary.

c) Does the proposed school site contain one or more pipelines, situated underground or aboveground, which carry hazardous substances, acutely hazardous materials, or hazardous wastes, unless the pipeline is a natural gas line that is used only to supply natural gas to that school or neighborhood?

Less Than Significant Impact. According to the Office of the State Fire Marshall, there are no pipelines jurisdictional to the State Fire Marshall in the vicinity of the project site. The Phase I report does not identify any pipelines that may potentially carry hazardous materials. No impact is anticipated and no mitigation measures are necessary.

d) Is the proposed school site located near an aboveground water or fuel storage tank or within 1,500 feet of an easement of an aboveground or underground pipeline that can pose a safety hazard to the site?

Less Than Significant Impact. The Office of the State Fire Marshall and the Southern California Gas Company, there are no high-pressure pipelines within 1,500 feet of the project site. A review of aerial photographs reveals the presence of a water storage tank at the southeast corner of Stonehill Drive and Street of the Golden Lantern, approximately 1,030 feet from the project site. The water reservoir is owned and maintained by the South Coast Water District (SCWD) and serves the 470 pressure zone. Although construction details and maintenance schedule are not available for security reasons, it is anticipated that the tank is maintained regularly by the operator and is consistent with the current seismic hazards standards to withstand seismic hazards. The potential inundation hazard due to the ruptured water tank would depend on the nature and location of the rupture on the reservoir itself. In the unlikely event that the water were to be released all at once, the water would initially flow in all directions, then likely flow south and southwest, channeled by Meridian Drive and Sundown Court. Considering the distance, topography, and intervening development, the volume and velocity of the released would decrease substantially as it spreads toward the project site. Therefore, the potential for flood water to directly impacting the project site is minimal and no mitigation measures are necessary.

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

Less Than Significant Impact. The school facility would not emit hazardous emissions and no significant amounts of hazardous materials, substances, or wastes would be transported, used, or disposed of in conjunction with the proposed project. The only hazardous materials used on the site would be typical cleaning solvents used by the school's janitorial staff. These materials would be utilized in small quantities and would be stored in compliance with established state and federal requirements.

There are no other existing school sites located within 0.25 mile of the project site. Implementation of the proposed project would have no significant impact on emission levels at nearby schools and no significant impacts would occur as a result of the proposed project. Therefore, impacts would be less than significant and no mitigation measures are necessary.

f) Create an air quality hazard due to the placement of a school within one-quarter mile of: (a) permitted and nonpermitted facilities identified by the jurisdictional air quality control board or air pollution control district; (b) freeways and other busy traffic corridors; (c) large agricultural operations; and/or (d) a rail yard, which might reasonably be anticipated to emit hazardous air emissions, or handle hazardous or acutely hazardous material, substances, or waste?

Less Than Significant Impact. Senate Bill 352 (effective January 1, 2004) requires school districts to certify reasonable plans to mitigate air quality impacts that may result from being within one-quarter mile of permitted and nonpermitted facilities that handle or emit hazardous substances including agricultural operations, rail yards, and traffic corridors.

A search for permitted facilities within 0.25 mile of the project site was conducted using the SCAQMD's facility look-up site (http://www.aqmd.gov/webappl/fim/default.htm). The facilities look-up identified three permitted facilities. However, two facilities (Facility ID 13710 and 143525) are part of the school operation at 33333 Street of the Golden Lantern, and one is at 34555 Street of the Golden Lantern (Facility ID 68661), approximately one mile south of the school. Therefore, no off-site permitted facilities are within 0.25 mile of the project site and no significant impacts from permitted air facility would occur.

The proposed project is constructed within the existing high school and would not require additional property acquisition. CARB recommends avoiding siting of new sensitive land uses within 500 feet of a freeway, urban roads, or rural roads. Under SB 352, busy traffic corridors are defined as roadways with an average daily traffic of 100,000 daily vehicles for an urban area. The nearest freeway, I-5, is approximately 1.3 miles east of the project site and there are no roads within 500 feet of the project site that carry traffic volumes of over 100,000 vehicles per day. Therefore, no significant impact due to freeways or other busy traffic corridors would result from the proposed project. No mitigation measures are necessary.

There are no large agricultural operations or rail yards within 0.25 miles of the project site. No mitigation measures are necessary.

g) Is the school site in an area designated in a city, county, or city and county general plan for agricultural use and zoned for agricultural production, and if so, do neighboring agricultural uses have the potential to result in any public health and safety issues that may affect the pupils and employees at the school site?

No Impact. The project site is within the boundaries of the existing high school and no agricultural uses are near the project site. No impact from agricultural production would result from project implementation. No mitigation measures are necessary.

h) Is the property line of the proposed school less than the following distances from the edge of respective power line easements: (1) 100 feet of a 50–133 kV line; (2) 150 feet of a 220–230 kV line; or (3) 350 feet of a 500–550 kV line?

No Impact. The project site is within the boundaries of the existing school and the proposed project would not result in placement of structures closer to power line easements containing power lines 50 kV or above. There are no power lines above 50 kV near the project site and no mitigation measures are necessary.

i) Be located on a site which is included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5 [inclusive of Section 25356 of the Health & Safety Code] and, as a result, would it create a significant hazard to the public or the environment?

Less Than Significant Impact. According to the Phase I, the project site is not a current or former hazardous materials site. No significant hazardous waste impact would result from the proposed project. No mitigation measures are necessary.

j) Does the project site contain a current or former hazardous waste disposal site or solid waste disposal site and, if so, have the wastes been removed?

No Impact. According to the Phase I, the project site is not a current or former hazardous waste disposal site or solid waste disposal site. No mitigation measures are necessary.

k) Is the proposed school site located on a site containing or underlain by naturally occurring hazardous materials?

No Impact. According to the Phase I, the project site is not underlain by naturally occurring hazardous materials. No mitigation measures are necessary.

l) Is the proposed school site situated within 2,000 feet of a significant disposal of hazardous waste?

No Impact. According to the Phase I records search, the project site is not within 2,000 feet of a significant disposal hazardous waste. No mitigation measures are necessary.

m) Is the proposed school site within two miles, measured by air line, of that point on an airport runway or potential runway included in an airport master plan that is nearest to the site? (Ed. Code §17215(a)&(b); Does not apply to schoolsites acquired prior to January 1, 1996.)

No Impact. The project site is not within two miles of an airport. The closest airport to the project site is John Wayne Airport, approximately 15 miles north of the project site. No impact from airport would result from the proposed project and no mitigation measures are necessary.

n) 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?

No Impact. The project site is within the boundaries of the existing high school and is not within the vicinity of a private airstrip. Development of the proposed project would not result in a safety hazard for residents or workers in the area. No mitigation measures are necessary.

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

Less Than Significant Impact. The project site is within the boundaries of the existing high school and would not alter any existing roadway pattern. Orange County Fire Authority (OCFA) would review the final site plan to ensure that adequate emergency vehicle access is provided. The proposed project would not impair or interfere with any adopted emergency response plan. No mitigation measures are necessary.

p) Expose people or structures to a significant risk of loss, injury, or death involving wildland fires, including where wildlands are adjacent to urbanized areas or where residences are intermixed with wildlands?

No Impact. The project site is within the boundaries of the existing high school and project implementation would not expose people or structures to wildland fires. No mitigation measures are necessary.

5.8 HYDROLOGY AND WATER QUALITY

Would the project:

a) Violate any water quality standards or waste discharge requirements?

Less Than Significant Impact. Construction of the proposed project would potentially discharge sediment and pollutants to the nearest receiving waters. Grading an excavation of the site would expose and disturb soils. The storage and use of hazardous materials on-site, including but not limited to treated woods, paints, solvents, fuels, etc., create potential sources of pollutants during construction.

The project site is in the San Juan Creek watershed and is under the jurisdiction of the San Diego Water Quality Control Board. The San Juan Creek Watershed in southern Orange County includes portions of the cities of Mission Viejo, Dana Point, Laguna Hills, Laguna Niguel, Rancho Santa Margarita, San Juan Capistrano, and unincorporated areas of County of Orange. The creek discharges into the Pacific Ocean at Doheny State Beach. Doheny State Beach frequently exceeds state recreational water quality standards for bacteria. Water quality problems in the watershed are primarily due to nonpoint source runoff from urbanized areas.

Section 402 of the Clean Water Act (CWA) delineates a national permitting system for point discharges known as the NPDES. The NPDES permit typically incorporates specific limitations for point-source discharges to ensure that discharges meet permit conditions to protect state-defined water quality standards. In the State of California, nine regional water quality control boards (RWQCB) are responsible for administering the NPDES permitting program and for developing NPDES permitting requirements. The project site is under the jurisdiction of the San Diego RWQCB. The NPDES program was expanded in 1987 to include the regulation of stormwater runoff originating from municipal, industrial, or construction activities on sites larger than one acre. The project involves disturbance of about 55,358 square feet or 1.3 acres. Therefore, the proposed project would be required to develop and implement a SWPPP and be subject to BMPs designated to prevent erosion and siltation during the project's construction.

In accordance with the requirements of the NPDES MS4 Permit, a water quality management plan (WQMP) would be prepared prior to approval of the first grading plan. The WQMP would contain specific source- and treatment-control BMPs that would reduce or eliminate infiltration of pollutants into the stormwater system.

BMPs include, but are not limited to, those measures specified in the California Storm Water Best Management Practice Handbook for Municipal, Industrial/Commercial, Construction, and New Development and Redevelopment by California Stormwater Quality Association and those measures identified by other agencies with jurisdiction over the project. Examples of BMPs that may be incorporated in the SWPPP to minimize impacts resulting from increased erosion include, but are not limited to:

- Preparation of erosion control plans
- Construction scheduling
- Silt fencing
- Sand bagging
- Storm drain inlet protection
- Planting of vegetation and/or placement of jutes on graded slopes not scheduled for construction
- Covering of all construction material and waste
- Development and implementation of a spill prevention/recovery plan
- Vehicle and equipment management
- Off-site fueling
- Compliance with local grading codes
- Stabilization at construction entrances
- Sediment traps
- Straw bale barriers
- Temporary silt basins
- Use of water trucks to prevent dust emissions
- Proper waste handling
- Site inspections and BMP maintenance
- Tracking
- Concrete cleanouts
- Outlet protection

Site-specific BMPs would be established in the SWPPP. The SWPPP helps identify the sources of pollution that affect the quality of stormwater discharges and to describe and ensure the implementation of practices to reduce the pollutants in construction stormwater discharges. The SWPPP must be completed prior to commencement of construction and be available on-site prior to and for the duration of construction.

In addition, development projects within the county are required to prepare a WQMP detailing postconstruction BMPs. The WQMP must list all identified pollutants of concern that may be generated by the project, and must implement a combination of site-design, source-control, and/or treatment-control BMPs to fully address all listed pollutants. Examples of source- and treatment-control BMPs are shown in Tables 8 and 9.

Table 8
Source-Control BMPs

Routine Non-Structural	
• Education of Property Owners	• Employee Training/Education Program
• Activity Restrictions	• Street Sweeping Private Street and Parking Lots
• Spill Contingency Plan	• Common Areas Catch Basin Inspection
Routine Structural	
• Landscape Planning (SD-10)	• Storm Drain Signage (SD-13)
• Hillside Landscaping	• Inlet Trash Racks
• Roof Runoff Controls (SD-11)	• Energy Dissipaters
• Efficient Irrigation (SD-12)	• Trash Storage Areas (SD-32) and Litter Control
• Protect Slopes and Channels	
Individual Project Features	
• Fueling Areas (SD-30)	• Outdoor Material Storage Areas (SD-34)
• Air/Water Supply Area Drainage	• Outdoor Work Areas (SD-35)
• Maintenance Bays and Docks (SD-31)	• Outdoor Processing Areas (SD-36)
• Vehicle Washing Areas (SD-33)	• Wash Water Controls for Food Preparation Areas
Alternate Material	
• Pervious Pavement (SD-20)	• Alternative Building Materials (SD-21)

Table 9
Treatment-Control BMPs

Flow Based	
• Vegetated Buffer Strips (TC-31)	• Multiple Systems (TC-60)
• Vegetated Swale (TC-30)	• Manufactured/Proprietary Devices (MP series)
Volume Based	
• Bioretention (TC-32)	• Retention/Irrigation (TC-12)
• Wet Pond (TC-20)	• Infiltration Basin (TC-11)
• Constructed Wetland (TC-21)	• Infiltration Trench (TC-10)
• Extended Detention Basin (TC-22)	• Media Filter (TC-40)
• Water Quality Inlet (TC-50)	• Manufactured/Proprietary Devices (MP series)

Site-specific BMPs would be established in the WQMP. Mandatory compliance with NPDES permit requirements through the preparation of both SWPPP and WQMP would ensure that no water quality standards or discharge requirements are violated and would reduce impacts on water quality to a less than significant level. No significant impacts would occur and no mitigation measures are necessary.

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)?

Less Than Significant Impact. The project site is on the existing high school campus and the project site is not a groundwater recharging area. According to the State Water Resources Control Board's Geotracker, there are no monitoring wells within a mile of the project site. Implementation of the proposed project would not increase the net acreage of the existing high school and would not substantially increase the water used by the existing school. Impacts would be less than significant and no mitigation measures are necessary.

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 a substantial erosion or siltation on- or off-site.

Less Than Significant Impact. The project site is part of the existing high school campus and it would not change the existing drainage pattern of the site or area. No stormwater drainage system would be affected as a result of the proposed project. The proposed project would not alter the course of a stream or river and cause a substantial erosion or siltation on- or off-site. No mitigation measures are necessary

d) Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, or substantially increase the rate or amount of surface runoff in a manner which would result in flooding on- or off-site?

Less Than Significant Impact. The project site is comprised of existing parking area, access road, tennis courts, and turf-covered playfield. The proposed project would slightly increase the impervious surface area and increase the rate and amount of surface runoff. However, the project site is already developed and implementation of the proposed project would not substantially change the existing drainage pattern. Surface drainage would be taken into consideration during all grading, landscaping, and building construction so that stormwater runoff is directed toward existing parking lot gutters by sheet flow over paved areas. Paved areas would be provided with adequate drainage devices, gradients, and curbing to prevent runoff flowing from paved areas onto any adjacent unpaved areas. No course of a stream or river would be altered. Considering the size of the project, the increased surface runoff would not result in flooding on- or off-site. No mitigation measures are necessary.

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?

Less Than Significant Impact. Implementation of the proposed project would slightly increase the impervious surface by construction of buildings and parking lots. Considering the small size of the project, it would not create or contribute to the exceedance of the existing stormwater drainage system capacity. Additionally, the new building is adjacent to the turf-covered athletic field and any excess runoff would flow to the turf field and would not adversely affect the existing stormwater drainage system. The proposed project could create additional sources of polluted runoff during construction and operation of the performing arts theater. Unless adequate erosion controls are installed and maintained at the site, increased quantities of sediments may be delivered to the downstream receiving water, along with attached soil nutrients and organic matter. Anticipated urban pollutants include toxic chemicals from uncontrolled handling or disposal of synthetic organic compounds such as adhesives, cleaners, sealants, and solvents; polluted wash water from concrete mixers, paints, and painting equipment cleaning; solid wastes from land clearing and wood and paper materials from packaging of building materials; and oil and grease that are petroleum hydrocarbon-based products from leaking vehicles,

esters, oils, fats, waxes, and high molecular-weight fatty acids, could occur from the project implementation.

Unless adequate erosion controls are installed and maintained at the site, increased quantities of sediment may be delivered to the downstream receiving water, along with attached soil nutrients and organic matter. However, pursuant to CWA, the District is required to comply with the NPDES MS4 permit. Implementation of temporary and permanent structural and treatment control BMPs would ensure that additional sources of polluted runoff does not impact the downstream receiving water. No additional mitigation measures are necessary.

f) Otherwise substantially degrade water quality?

Less Than Significant Impact. Development of the proposed project would not directly or indirectly result in a decrease in water quality. The District is required to comply with NPDES, develop and implement a SWPPP, and adhere to standard BMPs designed to prevent erosion and siltation during the project's construction phase, thereby precluding potentially significant impacts to surface water bodies. Therefore, it is anticipated that the development of the proposed project would not directly or indirectly result in a decrease in water quality, and no significant impacts would result from the proposed project. No mitigation measures are necessary.

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?

Less Than Significant Impact. Federal Emergency Management Agency created a Flood Insurance Rate Map (FIRM) for the area (map identification number 06059C0504H), which indicates that the project site is not within a 100-year or 500-year flood zone. In addition, the proposed project would not place any housing within a flood hazard area. No mitigation measures are necessary.

h) Place within a 100-year flood hazard area structures which would impede or redirect flood flows?

Less Than Significant Impact. According to the FIRM for the area, the project site is not in a 100-year or 500-year flood zone and implementation of the proposed project would not place any structures within a flood hazard area which would impede or redirect flood flows. No impact is anticipated and no mitigation measures are necessary.

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?

Less Than Significant Impact. According to the City of Dana Point General Plan, the project site is not within a dam inundation area. The proposed project would not expose people or structures to a significant flooding impact from dam or levee failure. No mitigation measures are necessary.

j) Is the project site subject to flooding or dam inundation?

Less Than Significant Impact. According to the City of Dana Point General Plan, the project site is not within a dam inundation area. The proposed project would not expose people or structures to a significant flooding impact from dam or levee failure. No mitigation measures are necessary.

k) Inundation by seiche, tsunami, or mudflow?

Less Than Significant Impact. Seiches are a type of water-related seismically induced hazard. Seiches are extensive wave actions on lakes or reservoirs. According to the Public Safety Element of Dana Point General Plan, no major lakes or open water impoundments exist in Dana Point and this hazard is considered low. No mitigation measures are necessary.

A tsunami refers to a catastrophic wave caused by an earthquake or other earth movements. Great magnitude waves have not historically been recorded in Orange County because the coastline is somewhat protected from the north by the coastal configuration (Palos Verdes Peninsula and Point Conception) and the offshore islands (Santa Catalina and San Clemente Islands). The project site is approximately one mile from the coastline and the potential for tsunami impact is low.

However, the City's coast is more exposed to damage from a rare tsunami or other storm waves that might come from the south. A study of tsunami inundation potential conducted for San Onofre Nuclear Generating Station found that a 7.5-foot tsunami along Doheny Beach at high tide would cause flooding and structural damage to most homes along Beach Road. Depending on the amount of advance warning, some loss of life could occur. However, the likelihood of such an event occurring is minimal and no mitigation measures are necessary.

The project site is on the existing high school campus and there is no significant slope adjacent to the project site. There are no sources of mudflow on-site. No mudflow impact is anticipated and no mitigation measures are necessary.

5.9 LAND USE AND PLANNING

Would the project:

a) Physically divide an established community?

No Impact. The project site is within the boundaries of the existing high school, and the proposed project would not divide an established community. No impact would result from the proposed project and no mitigation measures are necessary.

b) Conflict with any applicable land use plan, policy, or regulation of an agency with jurisdiction over the project (including, but not limited to the general plan, specific plan, local coastal program, or zoning ordinance) adopted for the purpose of avoiding or mitigating an environmental effect?

Less Than Significant Impact. The project site is zoned CF community facilities and is developed as a high school. The proposed project is part of the existing high school and is compatible with the existing use. Impact would be less than significant and no mitigation measures are necessary.

c) Would the proposed school conflict with any existing or proposed land uses, such that a potential health or safety risk to students would be created?

Less Than Significant Impact. The project site is zoned CF community facilities and is developed as a high school. The proposed project is part of the existing high school and is compatible with the existing use. Impact would be less than significant and no mitigation measures are necessary.

d) Conflict with any applicable habitat conservation plan or natural community conservation plan?

Less Than Significant Impact. The City of Dana Point is within the boundary of the Orange County's Southern Subregion Natural Community Conservation Plan/Master Streambed Alteration Agreement/Habitat Conservation Plan (NCCP/MSAA/HCP). However, the project site is already developed and is not included in any of the critical habitat areas. In addition, according to the Coastal Zone Boundary Map, the project site is outside of the coastal zone jurisdiction. The proposed project would not conflict with the provisions of approved local, regional, or state habitat conservation plan and no mitigation measures are necessary.

5.10 MINERAL RESOURCES

Would the project:

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. According to the Dana Point Genera Plan, no mineral resources have been identified in the City. No impact to mineral resources would result from the proposed project.

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. According to the Dana Point Genera Plan, no mineral resources have been identified in the City. No impact to mineral resources would result from the proposed project.

5.11 NOISE

Noise is defined as unwanted sound, and is known to have several adverse effects on people, including hearing loss, speech and sleep interference, physiological responses, and annoyance. Based on these known adverse effects of noise, the federal government, State of California, and City of Dana Point have established criteria to protect public health and safety and to prevent disruption of certain human activities. The Capistrano Unified School District uses long-term noise criteria for land use compatibility consideration adopted by the State of California. Characterization of noise and vibration, existing regulations, and calculations for construction noise and vibration levels can be found in Appendix E.

Terminology and Noise Descriptors

The following are brief definitions of terminology used in this chapter:

- ***Noise.*** Sound that is loud, unpleasant, unexpected, or otherwise undesirable.
- ***Decibel (dB).*** A unitless measure of sound on a logarithmic scale.
- ***A-Weighted Decibel (dBA).*** An overall frequency-weighted sound level in decibels that approximates the frequency response of the human ear.
- ***Equivalent Continuous Noise Level (L_{eq}).*** The mean of the noise level averaged over the measurement period, regarded as an average level.

- ***Day-Night Level (L_{dn}).*** The energy average of the A-weighted sound levels occurring during a 24-hour period, with 10 dB added to the sound levels occurring during the period from 10 PM to 7 AM.

- ***Community Noise Equivalent Level (CNEL).*** The energy average of the A-weighted sound levels occurring during a 24-hour period with 5 dB added to the sound levels occurring during the period from 7 PM to 10 PM and 10 dB added to the sound levels occurring during the period from 10 PM to 7 AM.

L_{dn} and CNEL values rarely differ by more than 1 dB. As a matter of practice, L_{dn} and CNEL values are considered to be equivalent and are treated as such in this assessment.

Existing Noise Environment

To assess the potential for mobile-source noise impacts, it is necessary to determine the noise currently generated by vehicles traveling through the project area. Noise modeling was conducted using the Federal Highway Administration's (FHWA) Traffic Noise Model (TNM) Version 2.5. Existing traffic volumes were based on the traffic volumes provided by Iteris, Inc. (October 2008). The results of this modeling indicate that average noise levels along roadways currently range from approximately 58 dBA to 73 dBA CNEL as calculated at a distance of 10 feet from the edge of the nearest lane of travel. Noise levels for existing conditions along analyzed roadways are presented in Table 10.

Table 10
Existing Traffic Noise Modeling – 24-Hour

Roadway Segment	*Maximum Noise Levels (dBA CNEL)[1]*
Golden Lantern Street	
n/o Acapulco Drive	66
n/o Stonehill Drive	66
s/o Stonehill Drive	65
Acapulco Drive	
w/o Golden Lantern Street	66
e/o Golden Lantern Street	58
Stonehill Drive	
w/o Golden Lantern Street	71
e/o Golden Lantern Street	73

Source: FHWA TNM, Version 2.5 Traffic volumes based on information obtained from the Traffic Analysis prepared by Kunzman Associations (2009). Speed limits and roadway width obtained from Google Earth/Google Street View.
n/o: north of; s/o: south of; e/o: east of; w/o: west of; btwn: between.
[1] Noise levels in this table are maximum noise levels for each roadway segment at 10 feet from the edge of the roadway.

Methodology

The analysis of noise impacts considers project construction and operations noise as defined by the Capistrano Unified School District, City of Dana Point, and the Federal Transit Administration (FTA) methodology. The proposed project would have a significant adverse noise impact if the project results in any of the following:

Noise

- Project-related construction activities occur outside of the hours specified in the Dana Point Municipal Code (7:00 AM and 8:00 PM on weekdays, including Saturdays).

- For noise compatibility, long-term on-site impacts to future students, faculty, and staff at noise-sensitive areas would exceed the noise level limits applied by the State of California of 70 dBA CNEL for exterior noise (noise compatibility criteria) and 45 dBA for interior noise (California Building Code).

- For a substantial increase in ambient noise levels, based on land use compatibility chart for the community noise of the state of California, the project would cause an audible change in noise levels. A minimum 3 dB change in noise levels is necessary for human hearing to discern a change in noise levels.

Groundborne Vibration

- Construction activities result in vibration levels of 78 VdB at vibration-sensitive uses, which is the vibration level that is barely perceptible based on the FTA vibration criteria during the daytime.

- Construction activities generate vibration that are strong enough to cause vibration-induced structural damage based on the FTA, which is 0.2 in/sec for typical wood-framed buildings and 0.5 in/sec for reinforced concrete, steel, or timber buildings.

Would the project result in:

a) Result in exposure of persons to or generation of noise levels in excess of standards established by the school district, the local general plan or noise ordinance, or applicable standards of other agencies?

Less Than Significant Impact. The proposed project includes construction a 30,560-square-foot performing arts center at Dana Hills High School. Construction of the new performing arts center would necessitate relocation of the tennis courts and permanent removal of the racquetball courts and five portable classroom units. The project would not generate a substantial increase in trips at Dana Hills High School and noise associated with the theater would be confined to the building interior. Consequently, no significant impacts would occur in this regard. However, relocation of the athletic fields has the potential to increase noise levels from athletic activities at the adjacent residential areas off-site. The following describes changes the noise environment associated with the proposed project.

Stationary Noise Source Impacts

The proposed project involves relocating the existing tennis courts to an area south of the baseball fields, adjacent to Golden Lantern Street. Noise-sensitive single-family residential areas are across from the Dana Hills High School on Golden Lantern Street. Because noise from the tennis courts would be closer to the residences across Golden Lantern Street, noise levels from tennis court activities could elevate the ambient noise environment. However, noise levels from use of the tennis courts would not be substantial, as full use of the courts would generate noise levels of 51 dBA L_{eq} at the residential property line in the absence of any attenuation provided by the noise walls along the residential property line. In addition, noise from Street of the Golden Lantern generates noise levels of 74 dBA CNEL at 10 feet from the roadway. Therefore, noise from use of the tennis courts would be masked by noise from the

roadway. In addition, the City of Dana Point exempts noise generated at the high school from the noise limitation of the Municipal Code (Chapter 11.10, *Noise Control*). Consequently, no significant impacts would occur.

b) Is the proposed school site located adjacent to or near a major arterial roadway or freeway whose noise generation may adversely affect the educational program?

Less Than Significant Impact. Sensitive land uses, such as schools, are "normally acceptable" in exterior noise environments up to 70 dBA CNEL. In addition the state of California requires interior noise levels to achieve the California Building Code standard of 45 dBA CNEL.

The proposed project would relocate the existing tennis courts farther east, closer to Street of the Golden Lantern. Traffic noise levels at the noise-sensitive uses are shown in Table 11. As shown in this table, noise levels at the outdoor noise-sensitive areas (i.e., relocated tennis courts) would not exceed the 70 dBA CNEL noise standard for compatible uses.

Table 11
Traffic-Related Noise Levels at the Proposed School

Location	Noise Level (dBA, CNEL) at Buildout[1]		Noise Criteria (dBA CNEL)	Exceeds Criteria
	Exterior	Interior (if applicable)[1]		
Performing Arts Center	60	36		
Relocated Tennis Courts	62	NA	70	No

Source: FHWA, TNM, Version 2.5. Traffic volumes based on information obtained from the Traffic Analysis prepared by Kunzman Associates. (March 2009). Speed limits and roadway width obtained from Google Earth/Google Street View.
[1] Assumes exterior-interior noise reduction of 24 dBA with windows closed, based on SAE 1971.

Exterior noise levels at the performing arts building would be 60 dBA CNEL. Buildings typically provide attenuation of 24 dBA between exterior to interior noise levels under a windows-closed condition, and 12 dBA under a windows-open condition (SAE 1971). Roadway noise would result in interior noise levels of 36 dBA CNEL with windows closed. Each building would be equipped with a heating, ventilation, and air conditioning (HVAC) unit, which would provide ventilation and allow the noise-sensitive receptors to close windows to control the level of noise. Therefore, interior noise levels at these uses would be below the interior noise threshold of 45 dBA CNEL. Consequently, traffic noise impacts at on-site noise-sensitive receptor locations would be less than significant and no mitigation measures are necessary.

c) Result in exposure of persons to or generation of excessive groundborne vibration or groundborne noise levels?

Less Than Significant Impact. The proposed project would generate vibration during construction activities from use of heavy construction equipment. However, no pile driving, blasting, or other vibration-intensive activity would be required in the construction effort. Construction equipment would produce vibration from vehicle travel as well as construction activities. Vibration is typically sensed at nearby structures when objects within the structure generate noise from the vibration, such as rattling windows or picture frames. It is typically not perceptible in outdoor environments and therefore impacts are based on the distance to the nearest structure. The closest off-campus vibration-sensitive structures to construction activity on the project site are the single-family residences east of the site, approximately 340 feet, on average, from construction activities on-site and 140 feet from the boundary of the construction site.

Vibration-Induced Structural Damage – Nearest Off-Site Structure

The FTA has established vibration level thresholds that would cause damage to building structures. The FTA criterion for vibration-induced structural damage is 0.2 inch per second for the peak particle velocity (PPV) for wood-framed structures. As shown in Table 12, project construction activities would not result in PPV levels that exceed the FTA's criteria for vibration-induced structural damage. Therefore, project construction activities would not result in a significant vibration impact.

Table 12
Vibration Source Levels for Construction Equipment at Nearest Structure – Structural Damage Assessment

Equipment	*Maximum RMS Velocity (in/sec)[1]*	*Significance Threshold (in/sec)*	*Exceeds Significance Threshold?*
Small Off-Road Construction Equipment[3]	<0.001	0.2	No

Source: Based on methodology from FTA 2006.
Notes: RMS velocity calculated from vibration level using the reference of one microinch/second. NA: Not Applicable
[1] At a distance of 140 feet from construction area to nearest residences to the east.
[2] Vibration levels from the listed off-road construction equipment are equivalent to vibration levels generated by a small bulldozer.

Vibration Annoyance – Nearest Off-Site Residence

Table 13 lists the maximum and average vibration source levels for construction equipment anticipated to be used at the project site to the nearest off-site vibration-sensitive structure. Maximum vibration is based on construction equipment operating directly adjacent to the property line. However, because construction activities are typically distributed throughout the project site, construction vibration is based on average vibration levels (levels that would be experienced by sensitive receptors the majority of the time) that exceed the FTA's infrequent events criterion for residential land uses.

Table 13
Vibration Levels from Construction Equipment at Nearest Residences – Vibration Annoyance

Equipment	*Maximum Vibration Levels (VdB)[1]*	*Average Vibration Levels (VdB)[2]*	*Significance Threshold (VdB)*	*Exceeds Significance Threshold?*
Small Off-Road Construction Equipment[3]	43	35	78	No

Source: Based on methodology from FTA 2006.
[1] At a distance of 140 feet from off-road construction equipment to the nearest residential structure.
[2] At an average distance of 340 feet (center of construction activities onsite to nearest residences).
[3] Vibration levels from the listed off-road construction equipment are equivalent to vibration levels generated by a small bulldozer.

The FTA criteria for perceptible levels of vibration during the daytime is 78 vibration velocity decibels (VdB) for residential uses. While construction equipment could be operating as close as 140 feet to the nearest residential structure, the majority of heavy construction activities would be operating at greater distances (340 feet or farther). In addition, heavy construction equipment would only be in operation for a short period during grading activities. Average vibration levels would not exceed the FTA criteria for vibration annoyance. Because project construction activities would not generate average vibration levels

that exceed the FTA's vibration annoyance threshold, no significant vibration impact from exposure of persons to excessive levels of vibration would occur during project construction activities. Therefore, project development impacts related to vibration annoyance would be less than significant and no mitigation is required.

Vibration Annoyance – Nearest Classroom

Table 14 lists the maximum and average vibration source levels for construction equipment anticipated to be used at the project site to the nearest classroom building. Because construction activities are typically distributed throughout the project site, construction vibration is based on average vibration levels (levels that would be experienced by sensitive receptors the majority of the time) that exceed the FTA's infrequent events criterion for institutional land uses. Average vibration levels would not exceed the FTA criteria for vibration annoyance for classroom activities. Therefore, project development impacts related to vibration annoyance would be less than significant and no mitigation is required.

Table 14
Vibration Levels from Construction Equipment at the Nearest Classroom – Vibration Annoyance

Equipment	*Maximum Vibration Levels (VdB)[1]*	*Average Vibration Levels (VdB)[2]*	*Significance Threshold (VdB)*	*Exceeds Significance Threshold?*
Small Off-Road Construction Equipment[3]	54	42	78	No

Source: Based on methodology from FTA 2006.
[1] At a distance of 40 feet from off-road construction equipment to the nearest classroom structure.
[2] At an average distance of 150 feet (center of construction activities onsite to nearest classroom).
[3] Vibration levels from the listed off-road construction equipment are equivalent to vibration levels generated by a small bulldozer.

d) Result in a substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project?

Less Than Significant Impact. As described in section a) above, increases in noise levels related to the proposed project would not substantially increase the existing noise environment. Similarly, noise from project traffic along local roadways would not significantly increase noise levels in the project area and would likewise not result in a significant impact. Therefore, no mitigation measures are necessary.

e) Result in a substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project?

Less Than Significant Impact With Mitigation Incorporated. Noise levels associated with construction activities would be higher than the ambient noise levels in the project area today, but would subside once construction of the proposed project is completed.

The transport of workers and equipment to the construction site would incrementally increase noise levels along site access roadways. Even though there would be a relatively high single-event noise exposure potential with passing trucks (a maximum noise level of 86 dBA at 50 feet), the expected number of workers and trucks is minimal. The truck trips would be spread throughout the workday and would primarily occur during nonpeak traffic periods. Therefore, these impacts are less than significant at noise receptors along the construction routes, and no mitigation measures are required.

Noise generated during construction is based on the type of equipment used, the location of the equipment relative to sensitive receptors, and the timing and duration of the noise-generating activities. Construction noise levels reported in Bolt et al. were used to estimate future construction noise levels for the proposed project. Noise levels are the average for each construction phase. Each stage involves the use of different kinds of construction equipment and, therefore, has its own distinct noise characteristics. The anticipated noise level associated with each construction phase appears in Table 15.

Table 15
Average Project-Related Construction Noise Levels

Construction Phase	Noise Levels dBA L_{eq}	
	Nearest Off-Site Residence[1]	Classroom Building (Exterior)[2]
Grounding Clearing/Grading	67	74
Excavation	72	79
Foundation Construction	61	68
Building Construction	68	75
Finishing and Site Cleanup	72	79

Source: Based on Bolt, et al. 1971. Based on analysis for Office Building, Hotel, Hospital, School, and Public Works with all applicable equipment in use.
[1] Based on an average distance of 340 feet from construction activities (center of construction activities onsite to nearest residences).
[2] Based on an average distance of 150 feet from construction activities (center of construction activities onsite to nearest classroom).

The dominant noise source from most construction equipment is the engine, and noise levels from construction activities are dominated by the loudest piece of construction equipment. Noise levels from project-related construction activities were calculated from use of all applicable construction equipment at the same time at an average distance of 340 feet (center of project site to nearest property line of nearest residential use receptors to the east) and would range from 61 to 72 dBA L_{eq} at the nearest residences, in the absence of any attenuation provided by the noise walls located along the residential property line. In addition, Street of the Golden Lantern Street generates noise levels of 74 dBA CNEL at 10 feet from the roadway. Therefore, noise from construction activities would be partially masked by noise from the roadway. Furthermore, construction activities would be restricted to the least noise-sensitive portions of the day. The City Municipal Code allows for noise from construction activities, but limits the hours of occurrence to the daytime hours of 7:00 AM to 8:00 PM on Monday through Saturday (except federal holidays). Consequently, impacts from construction activities are less than significant.

Noise levels at the nearest classroom would range from 68 to 79 dBA L_{eq}. Interior noise levels would be reduced by a minimum of 24 dBA (SAE 1971). Consequently, interior noise levels would range from 44 to 55 dBA L_{eq} during construction activities. To reduce interior noise levels during school hours, the following mitigation measures shall be implemented on-site. With adherence to the following mitigation measures, impacts from construction activities would be less than significant.

Mitigation Measures

4. The project contractor shall properly maintain and tune all construction equipment in accordance with the manufacture's recommendations to minimize noise emissions.

5. The contractor shall fit all equipment with properly operating mufflers, air intake silencers, and engine shrouds no less effective than as originally equipped by the manufacturer.

6. The construction contractor shall locate all stationary noise sources (e.g., generators, compressors, staging areas) as far from noise-sensitive classrooms as is feasible.

7. The construction contractor shall install temporary sound blankets surrounding the areas of construction during the ground clearing, grading, and building foundation construction phase to reduce noise levels at the classrooms approximately 40 feet from construction activities. The temporary sound blankets shall have a minimum height of six feet.

8. Prior to construction, the construction contractor shall coordinate with the school administrator(s) for Dana Hills High School to discuss construction activities that generate high noise and vibration levels. Coordination between the school administrator(s) and the construction contractor shall continue on an as-needed basis throughout the construction phase of the project to avoid potential disruption of classroom activities as feasible.

f) 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 students or staff to excessive noise levels?

No Impact. The proposed project site is not within 2 miles of an airport runway or potential runway. The closest airport to the project site is John Wayne Airport, approximately 15 miles north of the project site. Therefore, the proposed project would not expose students or staff to excessive noise levels and no mitigation is required.

g) 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?

No Impact. The project site is within the boundaries of the existing high school and is not within the vicinity of a private airstrip. Therefore, the proposed project would not expose students or staff to excessive noise levels and no mitigation is required.

5.12 POPULATION AND HOUSING

Would the project:

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)?

Less Than Significant Impact. The project site is within the boundaries of the existing high school. The proposed project would support the existing school program and would not involve any actions—such as increasing the net capacity of the school or extending roads or other infrastructure—that would induce population growth in the area. No impact to population growth would result from the proposed project and no mitigation measures are necessary.

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

No Impact. The project site is within the boundaries of the existing high school and would not demolish or displace any existing housing. No replacement housing would be necessary and no mitigation measures are necessary.

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

No Impact. The project site is within the boundaries of the existing high school and would not displace anyone. No replacement housing would be necessary and no mitigation measures are necessary.

5.13 PUBLIC SERVICES

Would the project result in substantial adverse physical impacts to:

a) Fire protection?

Less Than Significant Impact. Fire protection service for the project site would be provided by the Orange County Fire Authority (OCFA). The OCFA is a regional fire service agency that serves 22 cities in Orange County and all unincorporated areas. The OCFA protects over 1,380,000 residents with its 62 fire stations located throughout Orange County. The City has a general plan goal for the fire engine to reach emergency scene within five minutes and paramedics to reach within ten minutes for 80 percent of the time. As shown in Table 16, there are four OCFA fire stations within three miles of the project site. The closest and the first responding station would be Station No. 30 at 23831 Stonehill Drive in Dana Point.

Table 16
OCFA Fire Stations

Station	*Address*	*Distance from Project Site*	*Staffing*	*Apparatus*
No. 30	23831 Stonehill Dr. Dana Point, CA 92629	0.9 mile	3 Captains, 3 Engineers, 3 Firefighters	PAU Engine, Engine, Air Utility, Patrol
No. 29	26111 Victoria Blvd. Dana Point, CA 92624	1.6 miles	3 Captains, 3 Engineers, 3 Firefighters	PM Engine
No. 49	31461 St. of Golden Lantern, Laguna Niguel,	1.9 miles	3 Captains, 3 Engineers, 6 Firefighters	Battalion, PAU Truck
No. 7	31865 Del Obispo, San Juan Capistrano	2.5 miles	3 Captains, 3 Engineers, 9 Firefighters, Reserve Firefighters	2 Engines, Medic, Water Tender, Patrol

Source: OCFA, 2009

The proposed project would slightly increase the demand for fire protection services. However, the increase would be minimal and the new building would be equipped with fire sprinklers as required and would not necessitate construction or expansion of existing fire stations. The OCFA would review, approve, and inspect the fire and disaster preparedness and for emergency access. Therefore, project implementation is not anticipated to have significant physical impacts on fire services and no mitigation measures are necessary.

b) Police protection?

Less Than Significant Impact. Dana Point contracts with the Orange County Sheriff's Department for police services. The Sheriff's Department is responsible for protecting citizens, enforcing laws, and preventing crime. Dana Point Police Services staff 26 full-time deputies, 5 sergeants, and 5 parking control officers. Two of the parking control officers are funded by and provide service to the Dana Point Harbor Department. Deputies respond to over 17,000 calls for service per year in the City. The City also staffs a school resource officer, community support deputies, motor officers, and special enforcement

officers, and contributes to the south county-directed enforcement team. The proposed project would not increase the capacity of the school or the patrol area covered for the campus. Physical impacts to police protection services would be minimal and no mitigation measures are necessary.

c) Schools?

No Impact. The new performing arts building is being developed as part of the existing high school and would not increase demand on local schools. No adverse school impact would result from the proposed project and no mitigation measures are necessary.

d) Parks?

No Impact. Demand for parks is typically created by the development of new housing or actions that generate additional population. The proposed project is not growth inducing and no additional parks demand would be generated. No mitigation measures are necessary.

e) Other public facilities?

Less Than Significant Impact. The project site is within the boundaries of the existing high school and it would support the existing high school. The proposed project would not require new or altered governmental services for operation. Therefore, no other public facilities demand would be generated and no mitigation measures are necessary.

f) Does the site promote joint use of parks, libraries, museums and other public services?

Less Than Significant Impact. The proposed project would support existing Dana Hills High School programs and would not generate demands for additional parks, libraries, or museums. Joint use of the facility would be allowed under a future joint use agreement and as allowed under the provisions of the Civic Center Act. However, the use of the new facility by the community would not result in physical adverse impacts on other public services and no mitigation measures are necessary.

5.14 RECREATION

a) Would the project increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated?

Less Than Significant Impact. The proposed project is not a growth-inducing development that would likely increase community population and creates additional demand for other community facilities. The displaced tennis courts would be relocated as shown on the site plan but the racquetball court would be removed permanently. However, the removal of the racquetball court would not increase the use of existing neighborhood and regional parks to cause physical deterioration of existing recreational facilities. Impacts would be less than significant and no mitigation measures are necessary.

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?

Less Than Significant Impact. The proposed project is not a growth-inducing development that would likely increase the community population and create additional demand for other community facilities. The displaced tennis courts would be relocated as shown on the site plan but the racquetball court would be removed permanently. However, the proposed relocation of the tennis courts would not result

in physical deterioration of existing recreational facilities. Impacts would be less than significant and no mitigation measures are necessary.

5.15 TRANSPORTATION/TRAFFIC

Would the project:

a) Cause an increase in traffic which is substantial in relation to the existing traffic load and capacity of the street system (i.e., result in a substantial increase in either the number of vehicle trips, the volume to capacity ratio on roads, or congestion at intersections)?

Less Than Significant Impact. The proposed project would not increase the student enrollment capacity at the school. Therefore, the school's existing AM and PM peak hour vehicle trips would not be impacted by the proposed project. Table 17 shows existing intersection capacity utilization and level of service at the nearest two intersections. As shown, these intersections are operating at LOS B or better during both peak hours.

Table 17
Existing ICU and LOS

Intersection	Intersection Approach Lanes[1]												Peak Hour ICU – LOS[2]	
	Northbound			Southbound			Eastbound			Westbound				
	L	T	R	L	T	R	L	T	R	L	T	R	AM	PM
Golden Lantern St (NS) at:														
Acapulco Drive (EW)[3]	1	2	1	1	2	1>	1.5	0.5	1>	1	1	0	0.674 – B	0.473 – A
Stonehill Drive (EW)[3]	1	2	1	1	2	1	1	2	1	1	2	1	0.568 – A	0.663 – B

[1] When a right turn lane is designated, the lane can either be striped or unstriped. To function as a right turn lane, there must be sufficient width for right turning vehicles to travel outside the through lanes. L = Left; T = Through; R = Right; > = Right Turn Overlap
[2] ICU – LOS = Intersection Capacity Utilization – Level of Service
[3] Traffic signal

The City of Dana Point uses both LOS C and LOS D as lowest acceptable level of service for different roadway categories. For peak hour intersection volumes LOS C is applied to primary and secondary arterials and local streets and LOS D is applied to major arterials and state highways. The project site is currently served by Street of the Golden Lantern, Acapulco Drive, and Stonehill Drive. The City of Dana Point General Plan Circulation Element classifies Street of the Golden Lantern as a major arterial and Stonehill Drive is classified as a primary arterial. Acapulco Drive is not classified in the Circulation Element.

b) Exceed, either individually or cumulatively, a level of service standard established by the county congestion management agency for designated roads or highways?

Less Than Significant Impact. Intersections and freeway segments that are designated in the Orange County Congestion Management Program (CMP) are not allowed to deteriorate to conditions that are worse than LOS E without mitigation being prescribed in an acceptable deficiency plan. In the case of base conditions worse than LOS E, existing LOS is defined as any increase in V/C ratio of up to 0.10 over the base condition. V/C ratio increases beyond 0.10 above the base condition are considered not to comply with CMP LOS objectives and require mitigation or a deficiency plan.

The nearest CMP intersection to the project site is the Street of the Golden Lantern and Pacific Coast Highway intersection, approximately 3,250 feet south of the project site. The CMP base year LOS for this intersection is LOS A. The proposed project would not result in a traffic volume increase at this intersection. The proposed project would not exceed a level of service standard established by the county congestion management agency for designated roads or highways, and the project's impacts on the CMP roadways would be less than significant. No mitigation measures are necessary.

c) Result in a change in air traffic patterns, including either an increase in traffic levels or a change in location that results in substantial safety risks?

No Impact. The closest airport to the project site is John Wayne Airport, approximately 15 miles north of the project site. The proposed project would have no impact in air traffic patterns. No mitigation measures are necessary.

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

Less Than Significant Impact With Mitigation Incorporated. The project site within the existing high school boundaries and no changes to area roadway traffic would result from the proposed project. As shown in the site plan, no sharp curves or dangerous intersections are included in the project. It is anticipated that major performing arts theater events would not coincide with other major school events, which may create off-site congestion and safety hazards. Additionally, implementation of the following mitigation measures would further reduce impacts.

Mitigation Measures

9. Prior to approval of the final site plan, the District shall demonstrate adequate access for emergency services, trash services, and performing arts theater equipment deliveries by verifying truck turning movements on the new performing arts theater portion of the site.

10. During construction, the District shall maintain the existing number of available parking spaces, which may include temporary parking on a designated area of the field or the future location of the tennis courts.

e) Are traffic and pedestrian hazards mitigated per Caltrans' *School Area Pedestrian Safety* manual?

Less Than Significant Impact. The project site is within the boundaries of the existing high school and the proposed project would not alter the existing attendance boundaries. There are adequate traffic control devices and signage in the project area. No additional school area warning signs would be necessary. No significant impacts would occur and no additional mitigation measures are necessary.

f) Is the site easily accessible from arterials and is the minimum peripheral visibility maintained for driveways per Caltrans' *Highway Design Manual*?

No Impact. The project is within the boundaries of the existing high school and it would not alter the existing driveways on Acapulco Drive. Table 201.1, Sight Distance Standards, from Caltrans' *Highway Design Manual* indicates minimum sight distance values to a range of design speeds. The proposed project would not impact the roadway speed on Acapulco Drive, which is 25 mph. The minimum sight distance for design speed of 25 mph is 150 feet. The project site is easily accessible from arterials and

the minimum peripheral visibility would be maintained per Caltrans' Highway Design Manual. No impact would result from the proposed project and no mitigation measures are necessary.

g) Is the proposed school site within 1,500 feet of a railroad track easement?

No Impact. The project site is not within 1,500 feet of a railroad track easement. The closest railroad easement is approximately 1.2 miles east of the project site. No impact from railroad tracks is anticipated and no mitigation measures are necessary.

h) Result in inadequate emergency access?

Less Than Significant Impact. The new building would be constructed within the existing high school campus and the proposed project would not change the existing roadway system or site emergency access. The final site plan would be required to reviewed and approved by the OCFA for fire and emergency vehicle access. The proposed project would not result in inadequate emergency access and no mitigation measures are necessary.

i) Result in inadequate parking capacity?

Less Than Significant Impact. The proposed project would remove 52 regular parking spaces in the east parking lot and provide 54 replacement parking spaces, including one van space. The proposed theater would require 118 spaces based on the City of Dana Point's parking standard, which requires one space for four fixed seats for live performing theaters. The DHHS provides a total of 561 spaces. Therefore, adequate parking capacity would be provided and no mitigation measures are necessary.

j) Conflict with adopted policies, plans, or programs supporting alternative transportation (e.g., bus turnouts, bicycle racks)?

No Impact. The project site is within the boundaries of the existing high school. The proposed project would not change the operation of the existing high school and would not conflict with adopted policies, plans, or programs supporting alternative transportation. No mitigation measures are necessary.

5.16 UTILITIES AND SERVICE SYSTEMS

Would the project:

a) Exceed waste water treatment requirements of the applicable Regional Water Quality Control Board?

Less Than Significant Impact. The wastewater generated by the proposed project would be similar to that of the present use at the project site and would not contain substantial levels or concentrations of toxic substances or materials. The project site is in the San Juan Creek Watershed and the proposed project would not exceed the wastewater treatment requirements of the San Diego Regional Water Quality Control Board. Impacts would be less than significant and no mitigation measures are necessary.

b) Require or result in the construction of new water or waste water treatment facilities or expansion of existing facilities, the construction of which could cause significant environmental effects?

Less Than Significant Impact. The project site is served by the South Coast Water District (SCWD) for sewer services. The SCWD has 140 miles of sewer main lines ranging from 6 to 24 inches, 14 sewer lift

stations, and 3 miles of force mains. The collected wastewater is pumped to the J.B. Latham Plant in Dana Point, which has 13 million gallons per day (gpd) capacity, owned and operated by the South Orange County Wastewater Authority. The proposed project would generate approximately 1,880 gpd based on a generation factor of 4 gpd per seat.

The SCWD also provides water services to the project site. SCWD is 100 percent dependent on imported water from the Colorado River and northern California. The Metropolitan Water District of Southern California (MWD) supplies the imported water and the Municipal Water District of Orange County purchases it from MWD on behalf of its member agencies, including SCWD. SCWD has the capacity to store approximately 22 million gallons of water in its 15 reservoirs and distributes approximately 7 million gallons of drinking water daily through 147 miles of pipelines and 11 pump stations. The proposed project would consume approximately 2,350 gpd of potable water, assuming 125 percent of the sewer generation.

The increase in water and sewer demand would not occur daily and would not coincide with the operation of the existing school. The increased sewer demand constitutes approximately 0.01 percent of the daily treatment capacity and the water demand would constitute approximately 0.03 percent of the daily water consumption, and would not require the expansion or construction of new water or wastewater treatment facilities. Given the general scope of the project, the school's reconstruction is not anticipated to require the construction or expansion of any new water or wastewater treatment facilities. No significant impacts would occur and no mitigation measures are necessary.

c) Require or result in the construction of new stormwater drainage facilities or expansion of existing facilities, the construction of which could cause significant environmental effects?

Less Than Significant Impact. Urban development has two typical effects on stormwater runoff hydrology: an increase in total runoff volume, and faster rising and higher peak flows. Impervious surfaces, such as roads, sidewalks, and buildings, prevent the natural infiltration of stormwater to the soil and thus create higher runoff volumes. More rapid transport of runoff over smooth artificial surfaces and drainage facilities, combined with the higher volume of runoff, cause elevated peak flows. This increase in flows may adversely affect stormwater drainage systems. The project site is within the boundaries of the existing high school. The project site is already covered with impervious surfaces such as a parking lot and tennis courts. The proposed project would increase the pavement area by approximately 0.19 acre due to the relocation of the tennis courts, which is about 0.5 percent of the total school area. The school site is equipped with an on-site drainage system that takes site runoff to the City storm drain system. Such minimal increase in impervious area would not result in substantial change in stormwater runoff hydrology. The District would coordinate site-specific drainage improvements with the City of Dana Point and would be responsible for required drainage improvements, as appropriate. No significant impacts would occur and no mitigation measures are necessary.

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 Impact. The project site's water service is provided by SCWD. The City water supplies are imported water purchased from the MWD. The proposed project would not require the procurement of additional water since the proposed project would largely support the existing school operation and occasional community use. The proposed project would not permanently increase the existing student enrollment. The proposed project would consume approximately 2,350 gpd of potable water, less than 0.03 percent of the 7 million gpd distributed by the SCWD. This figure assumes that the performing arts center is used every day at its full capacity, which is highly unlikely. According to the 2005 Urban Water Management Plan (UWMP) for the SCWD, the MWD has the potential reserve and

replenishment supplies of 243,000 acre-feet per year (afy) in 2010, 424,000 afy in 2020, and 132,000 afy in 2030. The SCWD has sufficient water supplies available to serve its customers and no expanded entitlements are needed to serve the proposed project. No significant impact would result from the proposed project and no mitigation measures are necessary.

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

Less Than Significant Impact. The project site is currently connected to the SCWD sewer system. As discussed in Section 3.16 (b), the existing facilities are anticipated to have the capacity to accommodate the proposed project. The proposed project would not require expansion of any wastewater treatment facilities, and therefore would have no physical impacts related to wastewater treatment facilities. No mitigation measures are necessary.

f) Be served by a landfill with sufficient permitted capacity to accommodate the project's solid waste disposal needs?

Less Than Significant Impact. Solid waste would be generated by the project during the project's construction phase and through the long-term operation. Construction waste would be taken to authorized landfills. The proposed project would not permanently increase student capacity; instead, the proposed project would support the existing school program. Although there would be slight increase in solid waste volume during operation, the increase would not be substantial. The anticipated solid waste generated by the proposed project would be typical of a school use and would not be of an unusual amount given the size of the project. The existing solid waste disposal system and landfills would have sufficient capacity to accommodate the project's needs.

Landfills accepting waste from the Dana Point include the Olinda Alpha Landfill, Frank R. Bowerman, and the Prima Deshecha Landfill. The Olinda Alpha Landfill is in the City of Brea, the Frank R. Bowerman Landfill is in the City of Irvine, and the Prima Deshecha Landfill is in the City of San Juan Capistrano. The Olinda Alpha Landfill is authorized to receive an annual average of 7,000 tons of waste per day (tpd) with a daily maximum of 8,000 tpd. The Frank R. Bowerman Landfill receives an annual average of 7,015 tpd and is permitted to receive a daily maximum of 8,500 tpd. The Prima Deshecha Landfill, which is scheduled to close in 2040, is permitted to accept up to 4,000 tpd.

While the project would result in a slightly increased volume of solid waste received at local landfills, there is sufficient landfill capacity to serve the project. The District would make every effort to recycle, reuse, and/or reduce the amount of construction and demolition materials (e.g., concrete, asphalt, wood) generated by the project that would otherwise be taken to a landfill. Project-generated demolition debris is not expected to result in a significant impact to landfill capacity. No mitigation measures are necessary.

g) Comply with federal, state, and local statutes and regulations related to solid waste?

Less Than Significant Impact. All local government, including the City of Dana Point, are required under Assembly Bill 939 (AB 939), to develop source reduction, reuse, recycling, and composting programs to reduce tonnage of solid waste going to landfills. To reduce the amount of waste going into local landfills from schools, the state passed the School Diversion and Environmental Education Law, Senate Bill 373, which required the California Integrated Waste Management Board (CIWMB) to develop school waste reduction tools for use by school districts. In compliance with this law, the CIWMB encourages school districts to establish and maintain a paper recycling program in all classrooms,

administrative offices, and other areas owned and leased by the school district. Participation in this and other such programs would further reduce solid waste generated from the proposed project and assist in the City's compliance with AB 939.

The proposed project would comply with all federal, state, and local statutes and regulations related to solid waste. Hazardous waste and paints used during construction would be disposed only at facilities permitted to receive them and in accordance with local, state, and federal regulations. No mitigation measures are necessary.

5.17 MANDATORY FINDINGS OF SIGNIFICANCE

a) Does the project have the potential to degrade the quality of the environment, substantially reduce the habitat of a fish or wildlife species, cause a fish or wildlife population to drop below self-sustaining levels, threaten to eliminate a plant or animal community, reduce the number or restrict the range of a rare or endangered plant or animal or eliminate important examples of the major periods of California history or prehistory?

Less Than Significant Impact. The project site is already developed and does not contain any special status biological resources. There are also no known cultural resources identified near the project. Implementation of the proposed project would not degrade the quality of the environment through alteration of sensitive biological species or habitats nor eliminate important examples of California history or prehistory. Impacts would not be significant and no mitigation measures are necessary.

b) Does the project have impacts that are individually limited, but cumulatively considerable? ("Cumulatively considerable" means that the incremental effects of a project are considerable when viewed in connection with the effects of past projects, the effects of other current projects, and the effects of probable future projects.)

Less Than Significant Impact. The proposed project is not growth inducing and would not itself result in an increase in area population, employment, or new infrastructure. The issues relevant to this project are localized and confined to the immediate vicinity of the site. No significant cumulatively considerable impacts are anticipated to result from the proposed project and no mitigation measures are necessary.

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

Less Than Significant Impact. Most of the impacts resulting from the proposed project would be due to the construction activities and would be temporary. As explained in previous sections of the report, potentially significant impacts would be mitigated to a less than significant level and no remaining substantial adverse effects on human being would result from the proposed development. No additional mitigation measures are necessary.

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Appendix A
Air Quality Modeling Output

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Air Quality Appendix

The Air Quality section addresses the impacts of the proposed project on ambient air quality and the exposure of people, especially sensitive individuals, to unhealthful pollutant concentrations. Air pollutants of concern include ozone, carbon monoxide, particulate matter, and oxides of nitrogen. This section analyzes the type and quantity of emissions that would be generated by the construction and operation of the proposed project.

Climate/Meteorology

Air quality is affected by both the rate and location of pollutant emissions and by meteorological conditions that influence movement and dispersal of pollutants. Atmospheric conditions such as wind speed, wind direction, and air temperature gradients, along with local topography, provide the link between air pollutant emissions and air quality.

The City of Dana Point is located within the South Coast Air Basin (SoCAB). The SoCAB incorporates approximately 6,645 square miles within the non-desert portions of San Bernardino, Riverside, Los Angeles, and all of Orange. The distinctive climate of the SoCAB is determined by its terrain and geographic location. The SoCAB is a coastal plain with connecting broad valleys and low hills, bounded by the Pacific Ocean to the southwest and high mountains around the rest of its perimeter. The general region lies in the semi-permanent high-pressure zone of the eastern Pacific, resulting in a mild climate tempered by cool sea breezes with light average wind speeds. The usually mild climatological pattern is interrupted occasionally by periods of extremely hot weather, winter storms, or Santa Ana winds.

The vertical dispersion of air pollutants in the SoCAB is hampered by the presence of persistent temperature inversions. High-pressure systems, such as the semi-permanent high-pressure zone in which the SoCAB is located, are characterized by an upper layer of dry air that warms as it descends, restricting the mobility of cooler marine-influenced air near the ground surface, resulting in the formation of high-level subsidence inversions. Such inversions restrict the vertical dispersion of air pollutants released into the marine layer, and together with strong sunlight, can produce worst-case conditions for the formation of photochemical smog.

The atmospheric pollution potential of an area is largely dependent on winds, atmospheric stability, solar radiation, and terrain. The combination of low wind speeds and low-level inversions produces the greatest concentration of air pollutants. On days without inversions, or on days of winds averaging over 15 mph, smog potential is greatly reduced.

Air Quality Regulations, Plans and Policies

The Federal Clean Air Act (FCAA) was passed in 1963 by the U.S. Congress and has been amended several times. The 1970 Clean Air Act Amendments strengthened previous legislation and laid the foundation for the regulatory scheme of the 1970s and 1980s. In 1977, Congress again added several provisions, including non-attainment requirements for areas not meeting National Ambient Air Quality Standards (NAAQS) and the Prevention of Significant Deterioration (PSD) program. The 1990 Amendments represent the latest in a series of federal efforts to regulate the protection of air quality in the United States.

In 1988, the State Legislature passed the California Clean Air Act (CCAA), which established California's air quality goals, planning mechanisms, regulatory strategies and standards of progress for the first time. The CCAA provides the State with a comprehensive framework for air quality planning regulation. The CCAA requires attainment of state ambient air quality standards by the earliest practicable date. Attainment Plans are required for air basins in violation of the state ozone (O_3), carbon monoxide (CO), sulfur dioxide (SO_2), nitrogen dioxide (NO_2), and particulate matter (PM_{10} and $PM_{2.5}$) standards. Preparation of and adherence to attainment plans are the responsibility of the local air pollution districts or air quality management districts.

State and federal agencies have set ambient air quality standards for certain air pollutants. NAAQS have been established for the following criteria pollutants: CO, O_3, SO_2, NO_2, lead (Pb), and respirable particulate matter (PM_{10} and $PM_{2.5}$). The state standards for these criteria pollutants are more stringent than the corresponding federal standards. Table 1 summarizes the state and federal standards.

Areas are classified under the Federal Clean Air Act as either "attainment" or "non-attainment" areas for each criteria pollutant based on whether the NAAQS have been achieved or not. The SoCAB is designated by both the state and the USEPA as a non-attainment area for O_3, PM_{10} and $PM_{2.5}$.

Table 1
Ambient Air Quality Standards for Criteria Pollutants

Pollutant	*Averaging Time*	*California Standard*	*Federal Primary Standard*	*Pollutant Health and Atmospheric Effects*	*Major Pollutant Sources*
Ozone (O_3)	1 hour	0.09 ppm	NA	High concentrations can directly affect lungs, causing irritation. Long-term exposure may cause damage to lung tissue.	Motor vehicles.
	8 hours	0.070 ppm	0.075 ppm		
Carbon Monoxide (CO)	1 hour	20 ppm	35 ppm	Classified as a chemical asphyxiant, CO interferes with the transfer of fresh oxygen to the blood and deprives sensitive tissues of oxygen.	Internal combustion engines, primarily gasoline-powered motor vehicles.
	8 hours	9.0 ppm	9 ppm		
Nitrogen Dioxide (NO_2)[2]	Annual Arithmetic Mean	0.30 ppm	0.053 ppm	Irritating to eyes and respiratory tract. Colors atmosphere reddish-brown.	Motor vehicles, petroleum-refining operations, industrial sources, aircraft, ships, and railroads.
	1 hour	0.18 ppm	*		
Sulfur Dioxide (SO_2)	Annual Arithmetic Mean	*	0.03 ppm	Irritates upper respiratory tract; injurious to lung tissue. Can yellow the leaves of plants, destructive to marble, iron, and steel. Limits visibility and reduces sunlight.	Fuel combustion, chemical plants, sulfur recovery plants, and metal processing.
	1 hour	0.25 ppm	*		
	24 hours	0.04 ppm	0.14 ppm		
Respirable Coarse Particulate Matter (PM_{10})	Annual Arithmetic Mean	20 $\mu g/m^3$	—	May irritate eyes and respiratory tract, decreases in lung capacity, cancer and increased mortality. Produces haze and limits visibility.	Dust and fume-producing industrial and agricultural operations, combustion, atmospheric photochemical reactions, and natural activities (e.g. wind-raised dust and ocean sprays).
	24 hours	50 $\mu g/m^3$	150 $\mu g/m^3$		
Respirable Fine Particulate Matter ($PM_{2.5}$)	Annual Arithmetic Mean	12 $\mu g/m^3$	15 $\mu g/m^3$		
	24 hours	*	35 $\mu g/m^3$		
Lead (Pb)	Monthly	1.5 $\mu g/m^3$	*	Disturbs gastrointestinal system, and causes anemia, kidney disease, and neuromuscular and neurologic dysfunction (in severe cases).	Present source: lead smelters, battery manufacturing & recycling facilities. Past source: combustion of leaded gasoline.
	Quarterly	*	1.5 $\mu g/m^3$		
Sulfates (SO_4)	24 hours	25 $\mu g/m^3$	*	Decrease in ventilatory functions; aggravation of asthmatic symptoms; aggravation of cardio-pulmonary disease; vegetation damage; degradation of visibility; property damage.	Industrial processes.

Source: California Air Resources Board, updated November 2008.
ppm: parts per million; $\mu g/m^3$: micrograms per cubic meter
* = standard has not been established for this pollutant/duration by this entity.

AB32: Global Warming Solutions Act

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

CARB Scoping Plan

Assembly Bill 32 (AB 32), the Global Warming Solutions Act, was passed by the California state legislature on August 31, 2006, to place the state on a course toward reducing its contribution of GHG. AB 32 follows the emissions reduction targets established in Executive Order S-3-05, signed on June 1, 2005, which requires the state's global warming emissions to be reduced to 1990 levels by the year 2020 and by 80 percent of 1990 levels by year 2050. Projected GHG emissions in California are estimated at 596 million metric tons (MTons) of CO_{2e} by 2020. In December 2007, CARB approved a 2020 emissions limit of 427 million MTons (471 million tons) of CO_{2e} for the state. The 2020 target requires emissions reductions of 169 million MTons, approximately 30 percent of the projected emissions compared to business-as-usual (BAU) in year 2020 (i.e., 30 percent of 596 MTons). BAU may be defined as emissions levels that would occur if California continued to grow and add new GHG emissions but did not adopt any measures to reduce emissions (e.g., 2008 Building and Energy Efficiency Standards, Low Carbon Fuel standard, Corporate Average Fuel Economy [CAFE] standards, cap and trade program, etc.).

In order to effectively implement the cap, AB 32 directed CARB to establish a mandatory reporting system to track and monitor global warming emissions levels, prepare a plan demonstrating how the 2020 deadline can be met, and develop appropriate regulations and programs to implement the plan by 2012. The Climate Action Registry Reporting Online Tool was established through the Climate Action Registry to track GHG emissions. In June 2008, California Air Resources Board (CARB) released a draft of the *Climate Change Scoping Plan,* which was revised in October 2008. The final Scoping Plan was adopted by CARB on December 11, 2008. Key elements of CARB's GHG reduction plan are:

- Expanding and strengthening existing energy efficiency programs as well as building and appliance standards;
- Achieving a mix of 33 percent for energy generation from renewable sources;
- Developing a California cap-and-trade program that links with other Western Climate Initiate partner programs to create a regional market system;
- 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 state laws and policies, including California's clean car standards, goods movement measures, and the Low Carbon Fuel Standard; and
- Creating target fees, including a public goods charge on water use, fees on high global warming potential gases, and a fee to fund the administrative costs of the state's long-term commitment to AB 32 implementation.

As part of the Scoping Plan, CARB recommended that all new schools should be required to meet the Collaborative for High Performance Schools (CHPS) 2009 criteria. Existing schools applying for modernization funds should also be required to meet CHPS 2009 criteria. The CHPS

criteria are included as CARB's green building GHG emissions reduction measures that would achieve 26 million MTons of CO_{2e} reductions.

Governor's Office of Planning and Research CEQA Guidelines

In addition to the requirements under AB 32 to address GHG emission and global climate change in general plans and CEQA documents, Senate Bill 97 (Chapter 185, 2007) requires the Governor's Office of Planning and Research (OPR) to develop CEQA guidelines for addressing global warming emissions and mitigating project-generated GHG. OPR is required to prepare, develop, and transmit these guidelines on or before July 1, 2009. The California Natural Resources Agency must adopt the CEQA guidelines by January 1, 2010. In June 2008, OPR released the Technical Advisory for addressing climate change through CEQA review

Existing Air Quality

Existing levels of ambient air quality and historical trends and projections in the City of Dana Point are best documented by measurements taken by the SCAQMD. The City of Dana Point is located within Source Receptor Area (SRA) 21 –Inland Orange County (Capistrano Valley). The SCAQMD air quality monitoring station in SRA 21 located closest to the project site is the Mission Viejo Monitoring Station. The Mission Viejo Monitoring Station monitors CO, O_3, PM_{10}, and $PM_{2.5}$ only. Data for NO_x and SO_x were obtained from the Costa Mesa Monitoring Station. The most current five years of data monitored at these monitoring stations are included in Table 2.

Table 2
Ambient Air Quality Monitoring Summary

Pollutant/Standard	*Number of Days Threshold Were Exceeded and Maximum Levels during Such Violations*				
	2004	*2005*	*2006*	*2007*	*2008*
Ozone (O_3)[1]					
State 1-Hour ≥ 0.09 ppm	11	3	13	5	9
State 8-Hour > 0.07 ppm	32	10	23	10	25
Federal 8-Hour > 0.08[2] ppm	15	6	12	5	15
Max. 1-Hour Conc. (ppm)	0.116	0.125	0.123	0.108	0.118
Max. 8-Hour Conc. (ppm)	0.090	0.086	0.106	0.090	0.104
Carbon Monoxide (CO)[1]					
State 8-Hour > 9.0 ppm	0	0	0	0	0
Federal 8-Hour ≥ 9.0 ppm	0	0	0	0	0
Max. 8-Hour Conc. (ppm)	1.49	1.59	1.64	2.16	1.10
Nitrogen Dioxide (NO_2)[3]					
State 1-Hour ≥ 0.25[3] ppm	0	0	0	0	0
Max. 1-Hour Conc. (ppm)	0.097	0.085	0.101	0.074	0.081
Sulfur Dioxide (SO_2)[3]					
State 24-Hour ≥ 0.04 ppm	0	0	0	0	0
Federal 24-Hour ≥ 0.14 ppm	0	0	0	0	0
Max 24-Hour Conc. (ppm)	0.008	0.008	0.005	0.004	0.003
Coarse Particulates (PM_{10})[1]					
State 24-Hour > 50 $\mu g/m^3$	0	0	1	3	0
Federal 24-Hour > 150 $\mu g/m^3$	0	0	0	0	0
Max. 24-Hour Conc. ($\mu g/m^3$)	47.0	41.0	57.0	74.0	39.0
Fine Particulates ($PM_{2.5}$)[1]					
Federal 24-Hour > 65[5] $\mu g/m^3$	3	0	1	2	0
Max. 24-Hour Conc. ($\mu g/m^3$)	49.4	35.3	46.9	46.8	31.9

Table 2
Ambient Air Quality Monitoring Summary

Pollutant/Standard	Number of Days Threshold Were Exceeded and Maximum Levels during Such Violations				
	2004	2005	2006	2007	2008

Source: South Coast Air Quality Management District, Ambient Air Quality Monitoring Data, obtained March 2009.
ppm: parts per million; $\mu g/m^3$, or micrograms per cubic meter
[1] Data obtained from Mission Viejo Monitoring Station
[2] The USEPA recently revised the 8-hour O_3 standard from 0.08 ppm to 0.075 ppm, effective May 2008.
[3] Data obtained from the Costa Mesa Monitoring Station.
[4] The NO_X standard was amended on February 22, 2007, to lower the 1-hr standard to 0.18 ppm.
[5] The USEPA recently revised the 24-hour $PM_{2.5}$ standard from 65 $\mu g/m^3$ to 35 $\mu g/m^3$. However, this standard did not take effect until December 2006. Number of days threshold was exceeded is based on measured days exceeding 65 $\mu g/m^3$.

The data show recurring violations of both the state and federal ozone. The data also indicate that the area consistently exceeds the state PM_{10} standards and federal $PM_{2.5}$ standard. The CO, SO_2, and NO_2 standard have not been violated in the last five years at this station.

Sensitive Receptors

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

Residential areas are also considered to be sensitive receptors to air pollution because residents (including children and the elderly) tend to be at home for extended periods of time, resulting in sustained exposure to any pollutants present. Schools are also considered sensitive receptors, as children are present for extended durations and engage in regular outdoor activities. Recreational land uses are considered moderately sensitive to air pollution. Although exposure periods are generally short, exercise places a high demand on respiratory functions, which can be impaired by air pollution. In addition, noticeable air pollution can detract from the enjoyment of recreation. Industrial and commercial areas are considered the least sensitive to air pollution. Exposure periods are relatively short and intermittent, as the majority of the workers tend to stay indoors most of the time. In addition, the working population is generally the healthiest segment of the public.

4/7/2009 02:39:54 PM

Urbemis 2007 Version 9.2.4

Combined Summer Emissions Reports (Pounds/Day)

File Name: P:\CVS-04.0E\Tech Reports\AQ_txt for MND\modeling\Dana Point HS.urb924
Project Name: Dana Point High School
Project Location: Orange County
On-Road Vehicle Emissions Based on: Version : Emfac2007 V2.3 Nov 1 2006
Off-Road Vehicle Emissions Based on: OFFROAD2007

Summary Report:

CONSTRUCTION EMISSION ESTIMATES

	ROG	NOx	CO	SO2	PM10 Dust	PM10 Exhaust	PM10	PM2.5 Dust	PM2.5 Exhaust	PM2.5	CO2
2010 TOTALS (lbs/day unmitigated)	3.03	25.05	13.44	0.00	17.01	1.25	18.26	3.55	1.15	4.70	2,371.76
2010 TOTALS (lbs/day mitigated)	3.03	25.05	13.44	0.00	2.69	1.25	3.94	0.56	1.15	1.71	2,371.76
2011 TOTALS (lbs/day unmitigated)	31.66	20.63	15.66	0.01	0.03	1.56	1.59	0.01	1.43	1.44	2,493.85
2011 TOTALS (lbs/day mitigated)	31.66	20.63	15.66	0.01	0.03	1.56	1.59	0.01	1.43	1.44	2,493.85

AREA SOURCE EMISSION ESTIMATES

	ROG	NOx	CO	SO2	PM10	PM2.5	CO2
TOTALS (lbs/day, unmitigated)	0.32	0.32	1.80	0.00	0.01	0.01	357.31

SUM OF AREA SOURCE AND OPERATIONAL EMISSION ESTIMATES

	ROG	NOx	CO	SO2	PM10	PM2.5	CO2
TOTALS (lbs/day, unmitigated)	0.32	0.32	1.80	0.00	0.01	0.01	357.31

Construction Unmitigated Detail Report:

CONSTRUCTION EMISSION ESTIMATES Summer Pounds Per Day, Unmitigated

	ROG	NOx	CO	SO2	PM10 Dust	PM10 Exhaust	PM10	PM2.5 Dust	PM2.5 Exhaust	PM2.5	CO2
Time Slice 3/10/2010-3/23/2010 Active	1.24	8.61	5.99	0.00	0.88	0.62	1.50	0.18	0.57	0.76	946.40
Demolition 03/10/2010-03/23/2010	1.24	8.61	5.99	0.00	0.88	0.62	1.50	0.18	0.57	0.76	946.40
Fugitive Dust	0.00	0.00	0.00	0.00	0.87	0.00	0.87	0.18	0.00	0.18	0.00
Demo Off Road Diesel	1.14	7.68	4.68	0.00	0.00	0.59	0.59	0.00	0.54	0.54	700.30
Demo On Road Diesel	0.06	0.87	0.32	0.00	0.00	0.03	0.04	0.00	0.03	0.03	121.66
Demo Worker Trips	0.03	0.06	0.98	0.00	0.01	0.00	0.01	0.00	0.00	0.00	124.44
Time Slice 3/24/2010-4/23/2010 Active	3.03	**25.05**	13.44	0.00	**17.01**	1.25	**18.26**	**3.55**	1.15	**4.70**	2,371.76
Fine Grading 03/24/2010-04/24/2010	3.03	25.05	13.44	0.00	17.01	1.25	18.26	3.55	1.15	4.70	2,371.76
Fine Grading Dust	0.00	0.00	0.00	0.00	17.00	0.00	17.00	3.55	0.00	3.55	0.00
Fine Grading Off Road Diesel	3.00	24.99	12.46	0.00	0.00	1.25	1.25	0.00	1.15	1.15	2,247.32
Fine Grading On Road Diesel	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Fine Grading Worker Trips	0.03	0.06	0.98	0.00	0.01	0.00	0.01	0.00	0.00	0.00	124.44

Time Slice 4/26/2010-12/31/2010	1.29	9.60	7.00	0.00	0.01	0.59	0.61	0.00	0.55	0.55	1,199.40
Building 04/25/2010-09/10/2011	1.29	9.60	7.00	0.00	0.01	0.59	0.61	0.00	0.55	0.55	1,199.40
Building Off Road Diesel	1.21	9.16	4.81	0.00	0.00	0.58	0.58	0.00	0.53	0.53	893.39
Building Vendor Trips	0.03	0.32	0.26	0.00	0.00	0.01	0.02	0.00	0.01	0.01	62.62
Building Worker Trips	0.06	0.11	1.93	0.00	0.01	0.01	0.02	0.00	0.01	0.01	243.39
Time Slice 1/3/2011-8/9/2011 Active	1.19	8.90	6.71	0.00	0.01	0.56	0.58	0.00	0.52	0.52	1,199.34
Building 04/25/2010-09/10/2011	1.19	8.90	6.71	0.00	0.01	0.56	0.58	0.00	0.52	0.52	1,199.34
Building Off Road Diesel	1.11	8.51	4.68	0.00	0.00	0.54	0.54	0.00	0.50	0.50	893.39
Building Vendor Trips	0.02	0.29	0.24	0.00	0.00	0.01	0.01	0.00	0.01	0.01	62.62
Building Worker Trips	0.05	0.10	1.80	0.00	0.01	0.01	0.02	0.00	0.01	0.01	243.33
Time Slice 8/10/2011-9/9/2011 Active	**31.66**	20.63	**15.66**	**0.01**	0.03	**1.56**	1.59	0.01	**1.43**	1.44	**2,493.85**
Asphalt 08/10/2011-09/10/2011	2.00	11.71	8.65	0.00	0.01	1.00	1.01	0.00	0.92	0.92	1,253.18
Paving Off-Gas	0.10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Paving Off Road Diesel	1.83	11.26	6.91	0.00	0.00	0.98	0.98	0.00	0.90	0.90	979.23
Paving On Road Diesel	0.03	0.36	0.13	0.00	0.00	0.01	0.02	0.00	0.01	0.01	56.23
Paving Worker Trips	0.05	0.09	1.61	0.00	0.01	0.01	0.02	0.00	0.00	0.01	217.72
Building 04/25/2010-09/10/2011	1.19	8.90	6.71	0.00	0.01	0.56	0.58	0.00	0.52	0.52	1,199.34
Building Off Road Diesel	1.11	8.51	4.68	0.00	0.00	0.54	0.54	0.00	0.50	0.50	893.39
Building Vendor Trips	0.02	0.29	0.24	0.00	0.00	0.01	0.01	0.00	0.01	0.01	62.62
Building Worker Trips	0.05	0.10	1.80	0.00	0.01	0.01	0.02	0.00	0.01	0.01	243.33
Coating 08/10/2011-09/10/2011	28.47	0.02	0.30	0.00	0.00	0.00	0.00	0.00	0.00	0.00	41.33
Architectural Coating	28.46	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Coating Worker Trips	0.01	0.02	0.30	0.00	0.00	0.00	0.00	0.00	0.00	0.00	41.33

Phase Assumptions

Phase: Demolition 3/10/2010 - 3/23/2010 - Default Demolition Description

Building Volume Total (cubic feet): 20580

Building Volume Daily (cubic feet): 2066.7

On Road Truck Travel (VMT): 28.7

Off-Road Equipment:

1 Concrete/Industrial Saws (10 hp) operating at a 0.73 load factor for 8 hours per day

1 Rubber Tired Dozers (357 hp) operating at a 0.59 load factor for 1 hours per day

2 Tractors/Loaders/Backhoes (108 hp) operating at a 0.55 load factor for 6 hours per day

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Phase: Fine Grading 3/24/2010 - 4/24/2010 - Default Fine Site Grading/Excavation Description
Total Acres Disturbed: 3.4
Maximum Daily Acreage Disturbed: 0.85
Fugitive Dust Level of Detail: Default
20 lbs per acre-day
On Road Truck Travel (VMT): 0
Off-Road Equipment:
1 Graders (174 hp) operating at a 0.61 load factor for 6 hours per day
1 Rubber Tired Dozers (357 hp) operating at a 0.59 load factor for 6 hours per day
1 Tractors/Loaders/Backhoes (108 hp) operating at a 0.55 load factor for 7 hours per day
1 Water Trucks (189 hp) operating at a 0.5 load factor for 8 hours per day

Phase: Paving 8/10/2011 - 9/10/2011 - Default Paving Description
Acres to be Paved: 0.85
Off-Road Equipment:
4 Cement and Mortar Mixers (10 hp) operating at a 0.56 load factor for 6 hours per day
1 Pavers (100 hp) operating at a 0.62 load factor for 7 hours per day
1 Rollers (95 hp) operating at a 0.56 load factor for 7 hours per day
1 Tractors/Loaders/Backhoes (108 hp) operating at a 0.55 load factor for 7 hours per day

Phase: Building Construction 4/25/2010 - 9/10/2011 - Default Building Construction Description
Off-Road Equipment:
1 Cranes (399 hp) operating at a 0.43 load factor for 4 hours per day
2 Forklifts (145 hp) operating at a 0.3 load factor for 6 hours per day
1 Tractors/Loaders/Backhoes (108 hp) operating at a 0.55 load factor for 8 hours per day

Phase: Architectural Coating 8/10/2011 - 9/10/2011 - Default Architectural Coating Description
Rule: Residential Interior Coatings begins 1/1/2005 ends 6/30/2008 specifies a VOC of 100
Rule: Residential Interior Coatings begins 7/1/2008 ends 12/31/2040 specifies a VOC of 50
Rule: Residential Exterior Coatings begins 1/1/2005 ends 6/30/2008 specifies a VOC of 250
Rule: Residential Exterior Coatings begins 7/1/2008 ends 12/31/2040 specifies a VOC of 100
Rule: Nonresidential Interior Coatings begins 1/1/2005 ends 12/31/2040 specifies a VOC of 250
Rule: Nonresidential Exterior Coatings begins 1/1/2005 ends 12/31/2040 specifies a VOC of 250

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Construction Mitigated Detail Report:

CONSTRUCTION EMISSION ESTIMATES Summer Pounds Per Day, Mitigated

	ROG	NOx	CO	SO2	PM10 Dust	PM10 Exhaust	PM10	PM2.5 Dust	PM2.5 Exhaust	PM2.5	CO2
Time Slice 3/10/2010-3/23/2010 Active	1.24	8.61	5.99	0.00	0.88	0.62	1.50	0.18	0.57	0.76	946.40
Demolition 03/10/2010-03/23/2010	1.24	8.61	5.99	0.00	0.88	0.62	1.50	0.18	0.57	0.76	946.40
Fugitive Dust	0.00	0.00	0.00	0.00	0.87	0.00	0.87	0.18	0.00	0.18	0.00
Demo Off Road Diesel	1.14	7.68	4.68	0.00	0.00	0.59	0.59	0.00	0.54	0.54	700.30
Demo On Road Diesel	0.06	0.87	0.32	0.00	0.00	0.03	0.04	0.00	0.03	0.03	121.66
Demo Worker Trips	0.03	0.06	0.98	0.00	0.01	0.00	0.01	0.00	0.00	0.00	124.44
Time Slice 3/24/2010-4/23/2010 Active	3.03	**25.05**	13.44	0.00	2.69	1.25	3.94	0.56	1.15	1.71	2,371.76
Fine Grading 03/24/2010-04/24/2010	3.03	25.05	13.44	0.00	2.69	1.25	3.94	0.56	1.15	1.71	2,371.76
Fine Grading Dust	0.00	0.00	0.00	0.00	2.68	0.00	2.68	0.56	0.00	0.56	0.00
Fine Grading Off Road Diesel	3.00	24.99	12.46	0.00	0.00	1.25	1.25	0.00	1.15	1.15	2,247.32
Fine Grading On Road Diesel	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Fine Grading Worker Trips	0.03	0.06	0.98	0.00	0.01	0.00	0.01	0.00	0.00	0.00	124.44
Time Slice 4/26/2010-12/31/2010	1.29	9.60	7.00	0.00	0.01	0.59	0.61	0.00	0.55	0.55	1,199.40
Building 04/25/2010-09/10/2011	1.29	9.60	7.00	0.00	0.01	0.59	0.61	0.00	0.55	0.55	1,199.40
Building Off Road Diesel	1.21	9.16	4.81	0.00	0.00	0.58	0.58	0.00	0.53	0.53	893.39
Building Vendor Trips	0.03	0.32	0.26	0.00	0.00	0.01	0.02	0.00	0.01	0.01	62.62
Building Worker Trips	0.06	0.11	1.93	0.00	0.01	0.01	0.02	0.00	0.01	0.01	243.39
Time Slice 1/3/2011-8/9/2011 Active	1.19	8.90	6.71	0.00	0.01	0.56	0.58	0.00	0.52	0.52	1,199.34
Building 04/25/2010-09/10/2011	1.19	8.90	6.71	0.00	0.01	0.56	0.58	0.00	0.52	0.52	1,199.34
Building Off Road Diesel	1.11	8.51	4.68	0.00	0.00	0.54	0.54	0.00	0.50	0.50	893.39
Building Vendor Trips	0.02	0.29	0.24	0.00	0.00	0.01	0.01	0.00	0.01	0.01	62.62
Building Worker Trips	0.05	0.10	1.80	0.00	0.01	0.01	0.02	0.00	0.01	0.01	243.33
Time Slice 8/10/2011-9/9/2011 Active	**31.66**	20.63	**15.66**	**0.01**	0.03	**1.56**	1.59	0.01	**1.43**	1.44	**2,493.85**
Asphalt 08/10/2011-09/10/2011	2.00	11.71	8.65	0.00	0.01	1.00	1.01	0.00	0.92	0.92	1,253.18
Paving Off-Gas	0.10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Paving Off Road Diesel	1.83	11.26	6.91	0.00	0.00	0.98	0.98	0.00	0.90	0.90	979.23
Paving On Road Diesel	0.03	0.36	0.13	0.00	0.00	0.01	0.02	0.00	0.01	0.01	56.23
Paving Worker Trips	0.05	0.09	1.61	0.00	0.01	0.01	0.02	0.00	0.00	0.01	217.72
Building 04/25/2010-09/10/2011	1.19	8.90	6.71	0.00	0.01	0.56	0.58	0.00	0.52	0.52	1,199.34
Building Off Road Diesel	1.11	8.51	4.68	0.00	0.00	0.54	0.54	0.00	0.50	0.50	893.39
Building Vendor Trips	0.02	0.29	0.24	0.00	0.00	0.01	0.01	0.00	0.01	0.01	62.62
Building Worker Trips	0.05	0.10	1.80	0.00	0.01	0.01	0.02	0.00	0.01	0.01	243.33
Coating 08/10/2011-09/10/2011	28.47	0.02	0.30	0.00	0.00	0.00	0.00	0.00	0.00	0.00	41.33
Architectural Coating	28.46	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Coating Worker Trips	0.01	0.02	0.30	0.00	0.00	0.00	0.00	0.00	0.00	0.00	41.33

Construction Related Mitigation Measures

The following mitigation measures apply to Phase: Fine Grading 3/24/2010 - 4/24/2010 - Default Fine Site Grading/Excavation Description

For Soil Stablizing Measures, the Replace ground cover in disturbed areas quickly mitigation reduces emissions by:
PM10: 5% PM25: 5%

For Soil Stablizing Measures, the Water exposed surfaces 2x daily watering mitigation reduces emissions by:
PM10: 55% PM25: 55%

For Soil Stablizing Measures, the Equipment loading/unloading mitigation reduces emissions by:
PM10: 69% PM25: 69%

For Unpaved Roads Measures, the Reduce speed on unpaved roads to less than 15 mph mitigation reduces emissions by:
PM10: 44% PM25: 44%

For Unpaved Roads Measures, the Manage haul road dust 2x daily watering mitigation reduces emissions by:
PM10: 55% PM25: 55%

Area Source Unmitigated Detail Report:

AREA SOURCE EMISSION ESTIMATES Summer Pounds Per Day, Unmitigated

Source	ROG	NOx	CO	SO2	PM10	PM2.5	CO2
Natural Gas	0.02	0.30	0.25	0.00	0.00	0.00	354.50
Hearth - No Summer Emissions							
Landscape	0.12	0.02	1.55	0.00	0.01	0.01	2.81
Consumer Products	0.00						
Architectural Coatings	0.18						
TOTALS (lbs/day, unmitigated)	0.32	0.32	1.80	0.00	0.01	0.01	357.31

Area Source Changes to Defaults

4/7/2009 02:40:02 PM

Urbemis 2007 Version 9.2.4

Combined Winter Emissions Reports (Pounds/Day)

File Name: P:\CVS-04.0E\Tech Reports\AQ_txt for MND\modeling\Dana Point HS.urb924
Project Name: Dana Point High School
Project Location: Orange County
On-Road Vehicle Emissions Based on: Version : Emfac2007 V2.3 Nov 1 2006
Off-Road Vehicle Emissions Based on: OFFROAD2007

Summary Report:

CONSTRUCTION EMISSION ESTIMATES

	ROG	NOx	CO	SO2	PM10 Dust	PM10 Exhaust	PM10	PM2.5 Dust	PM2.5 Exhaust	PM2.5	CO2
2010 TOTALS (lbs/day unmitigated)	3.03	25.05	13.44	0.00	17.01	1.25	18.26	3.55	1.15	4.70	2,371.76
2010 TOTALS (lbs/day mitigated)	3.03	25.05	13.44	0.00	2.69	1.25	3.94	0.56	1.15	1.71	2,371.76
2011 TOTALS (lbs/day unmitigated)	31.66	20.63	15.66	0.01	0.03	1.56	1.59	0.01	1.43	1.44	2,493.85
2011 TOTALS (lbs/day mitigated)	31.66	20.63	15.66	0.01	0.03	1.56	1.59	0.01	1.43	1.44	2,493.85

AREA SOURCE EMISSION ESTIMATES

	ROG	NOx	CO	SO2	PM10	PM2.5	CO2
TOTALS (lbs/day, unmitigated)	0.20	0.30	0.25	0.00	0.00	0.00	354.50

SUM OF AREA SOURCE AND OPERATIONAL EMISSION ESTIMATES

	ROG	NOx	CO	SO2	PM10	PM2.5	CO2
TOTALS (lbs/day, unmitigated)	0.20	0.30	0.25	0.00	0.00	0.00	354.50

Construction Unmitigated Detail Report:

CONSTRUCTION EMISSION ESTIMATES Winter Pounds Per Day, Unmitigated

	ROG	NOx	CO	SO2	PM10 Dust	PM10 Exhaust	PM10	PM2.5 Dust	PM2.5 Exhaust	PM2.5	CO2
Time Slice 3/10/2010-3/23/2010 Active	1.24	8.61	5.99	0.00	0.88	0.62	1.50	0.18	0.57	0.76	946.40
Demolition 03/10/2010-03/23/2010	1.24	8.61	5.99	0.00	0.88	0.62	1.50	0.18	0.57	0.76	946.40
Fugitive Dust	0.00	0.00	0.00	0.00	0.87	0.00	0.87	0.18	0.00	0.18	0.00
Demo Off Road Diesel	1.14	7.68	4.68	0.00	0.00	0.59	0.59	0.00	0.54	0.54	700.30
Demo On Road Diesel	0.06	0.87	0.32	0.00	0.00	0.03	0.04	0.00	0.03	0.03	121.66
Demo Worker Trips	0.03	0.06	0.98	0.00	0.01	0.00	0.01	0.00	0.00	0.00	124.44
Time Slice 3/24/2010-4/23/2010 Active	3.03	**25.05**	13.44	0.00	**17.01**	1.25	**18.26**	**3.55**	1.15	**4.70**	2,371.76
Fine Grading 03/24/2010-04/24/2010	3.03	25.05	13.44	0.00	17.01	1.25	18.26	3.55	1.15	4.70	2,371.76
Fine Grading Dust	0.00	0.00	0.00	0.00	17.00	0.00	17.00	3.55	0.00	3.55	0.00
Fine Grading Off Road Diesel	3.00	24.99	12.46	0.00	0.00	1.25	1.25	0.00	1.15	1.15	2,247.32
Fine Grading On Road Diesel	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Fine Grading Worker Trips	0.03	0.06	0.98	0.00	0.01	0.00	0.01	0.00	0.00	0.00	124.44

Time Slice 4/26/2010-12/31/2010	1.29	9.60	7.00	0.00	0.01	0.59	0.61	0.00	0.55	0.55	1,199.40
Building 04/25/2010-09/10/2011	1.29	9.60	7.00	0.00	0.01	0.59	0.61	0.00	0.55	0.55	1,199.40
Building Off Road Diesel	1.21	9.16	4.81	0.00	0.00	0.58	0.58	0.00	0.53	0.53	893.39
Building Vendor Trips	0.03	0.32	0.26	0.00	0.00	0.01	0.02	0.00	0.01	0.01	62.62
Building Worker Trips	0.06	0.11	1.93	0.00	0.01	0.01	0.02	0.00	0.01	0.01	243.39
Time Slice 1/3/2011-8/9/2011 Active	1.19	8.90	6.71	0.00	0.01	0.56	0.58	0.00	0.52	0.52	1,199.34
Building 04/25/2010-09/10/2011	1.19	8.90	6.71	0.00	0.01	0.56	0.58	0.00	0.52	0.52	1,199.34
Building Off Road Diesel	1.11	8.51	4.68	0.00	0.00	0.54	0.54	0.00	0.50	0.50	893.39
Building Vendor Trips	0.02	0.29	0.24	0.00	0.00	0.01	0.01	0.00	0.01	0.01	62.62
Building Worker Trips	0.05	0.10	1.80	0.00	0.01	0.01	0.02	0.00	0.01	0.01	243.33
Time Slice 8/10/2011-9/9/2011 Active	**31.66**	20.63	**15.66**	**0.01**	0.03	**1.56**	1.59	0.01	**1.43**	1.44	**2,493.85**
Asphalt 08/10/2011-09/10/2011	2.00	11.71	8.65	0.00	0.01	1.00	1.01	0.00	0.92	0.92	1,253.18
Paving Off-Gas	0.10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Paving Off Road Diesel	1.83	11.26	6.91	0.00	0.00	0.98	0.98	0.00	0.90	0.90	979.23
Paving On Road Diesel	0.03	0.36	0.13	0.00	0.00	0.01	0.02	0.00	0.01	0.01	56.23
Paving Worker Trips	0.05	0.09	1.61	0.00	0.01	0.01	0.02	0.00	0.00	0.01	217.72
Building 04/25/2010-09/10/2011	1.19	8.90	6.71	0.00	0.01	0.56	0.58	0.00	0.52	0.52	1,199.34
Building Off Road Diesel	1.11	8.51	4.68	0.00	0.00	0.54	0.54	0.00	0.50	0.50	893.39
Building Vendor Trips	0.02	0.29	0.24	0.00	0.00	0.01	0.01	0.00	0.01	0.01	62.62
Building Worker Trips	0.05	0.10	1.80	0.00	0.01	0.01	0.02	0.00	0.01	0.01	243.33
Coating 08/10/2011-09/10/2011	28.47	0.02	0.30	0.00	0.00	0.00	0.00	0.00	0.00	0.00	41.33
Architectural Coating	28.46	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Coating Worker Trips	0.01	0.02	0.30	0.00	0.00	0.00	0.00	0.00	0.00	0.00	41.33

Phase Assumptions

Phase: Demolition 3/10/2010 - 3/23/2010 - Default Demolition Description

Building Volume Total (cubic feet): 20580

Building Volume Daily (cubic feet): 2066.7

On Road Truck Travel (VMT): 28.7

Off-Road Equipment:

1 Concrete/Industrial Saws (10 hp) operating at a 0.73 load factor for 8 hours per day

1 Rubber Tired Dozers (357 hp) operating at a 0.59 load factor for 1 hours per day

2 Tractors/Loaders/Backhoes (108 hp) operating at a 0.55 load factor for 6 hours per day

Phase: Fine Grading 3/24/2010 - 4/24/2010 - Default Fine Site Grading/Excavation Description
Total Acres Disturbed: 3.4
Maximum Daily Acreage Disturbed: 0.85
Fugitive Dust Level of Detail: Default
20 lbs per acre-day
On Road Truck Travel (VMT): 0
Off-Road Equipment:
1 Graders (174 hp) operating at a 0.61 load factor for 6 hours per day
1 Rubber Tired Dozers (357 hp) operating at a 0.59 load factor for 6 hours per day
1 Tractors/Loaders/Backhoes (108 hp) operating at a 0.55 load factor for 7 hours per day
1 Water Trucks (189 hp) operating at a 0.5 load factor for 8 hours per day

Phase: Paving 8/10/2011 - 9/10/2011 - Default Paving Description
Acres to be Paved: 0.85
Off-Road Equipment:
4 Cement and Mortar Mixers (10 hp) operating at a 0.56 load factor for 6 hours per day
1 Pavers (100 hp) operating at a 0.62 load factor for 7 hours per day
1 Rollers (95 hp) operating at a 0.56 load factor for 7 hours per day
1 Tractors/Loaders/Backhoes (108 hp) operating at a 0.55 load factor for 7 hours per day

Phase: Building Construction 4/25/2010 - 9/10/2011 - Default Building Construction Description
Off-Road Equipment:
1 Cranes (399 hp) operating at a 0.43 load factor for 4 hours per day
2 Forklifts (145 hp) operating at a 0.3 load factor for 6 hours per day
1 Tractors/Loaders/Backhoes (108 hp) operating at a 0.55 load factor for 8 hours per day

Phase: Architectural Coating 8/10/2011 - 9/10/2011 - Default Architectural Coating Description
Rule: Residential Interior Coatings begins 1/1/2005 ends 6/30/2008 specifies a VOC of 100
Rule: Residential Interior Coatings begins 7/1/2008 ends 12/31/2040 specifies a VOC of 50
Rule: Residential Exterior Coatings begins 1/1/2005 ends 6/30/2008 specifies a VOC of 250
Rule: Residential Exterior Coatings begins 7/1/2008 ends 12/31/2040 specifies a VOC of 100
Rule: Nonresidential Interior Coatings begins 1/1/2005 ends 12/31/2040 specifies a VOC of 250
Rule: Nonresidential Exterior Coatings begins 1/1/2005 ends 12/31/2040 specifies a VOC of 250

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Construction Mitigated Detail Report:

CONSTRUCTION EMISSION ESTIMATES Winter Pounds Per Day, Mitigated

	ROG	NOx	CO	SO2	PM10 Dust	PM10 Exhaust	PM10	PM2.5 Dust	PM2.5 Exhaust	PM2.5	CO2
Time Slice 3/10/2010-3/23/2010 Active	1.24	8.61	5.99	0.00	0.88	0.62	1.50	0.18	0.57	0.76	946.40
Demolition 03/10/2010-03/23/2010	1.24	8.61	5.99	0.00	0.88	0.62	1.50	0.18	0.57	0.76	946.40
Fugitive Dust	0.00	0.00	0.00	0.00	0.87	0.00	0.87	0.18	0.00	0.18	0.00
Demo Off Road Diesel	1.14	7.68	4.68	0.00	0.00	0.59	0.59	0.00	0.54	0.54	700.30
Demo On Road Diesel	0.06	0.87	0.32	0.00	0.00	0.03	0.04	0.00	0.03	0.03	121.66
Demo Worker Trips	0.03	0.06	0.98	0.00	0.01	0.00	0.01	0.00	0.00	0.00	124.44
Time Slice 3/24/2010-4/23/2010 Active	3.03	**25.05**	13.44	0.00	2.69	1.25	3.94	0.56	1.15	1.71	2,371.76
Fine Grading 03/24/2010-04/24/2010	3.03	25.05	13.44	0.00	2.69	1.25	3.94	0.56	1.15	1.71	2,371.76
Fine Grading Dust	0.00	0.00	0.00	0.00	2.68	0.00	2.68	0.56	0.00	0.56	0.00
Fine Grading Off Road Diesel	3.00	24.99	12.46	0.00	0.00	1.25	1.25	0.00	1.15	1.15	2,247.32
Fine Grading On Road Diesel	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Fine Grading Worker Trips	0.03	0.06	0.98	0.00	0.01	0.00	0.01	0.00	0.00	0.00	124.44
Time Slice 4/26/2010-12/31/2010	1.29	9.60	7.00	0.00	0.01	0.59	0.61	0.00	0.55	0.55	1,199.40
Building 04/25/2010-09/10/2011	1.29	9.60	7.00	0.00	0.01	0.59	0.61	0.00	0.55	0.55	1,199.40
Building Off Road Diesel	1.21	9.16	4.81	0.00	0.00	0.58	0.58	0.00	0.53	0.53	893.39
Building Vendor Trips	0.03	0.32	0.26	0.00	0.00	0.01	0.02	0.00	0.01	0.01	62.62
Building Worker Trips	0.06	0.11	1.93	0.00	0.01	0.01	0.02	0.00	0.01	0.01	243.39
Time Slice 1/3/2011-8/9/2011 Active	1.19	8.90	6.71	0.00	0.01	0.56	0.58	0.00	0.52	0.52	1,199.34
Building 04/25/2010-09/10/2011	1.19	8.90	6.71	0.00	0.01	0.56	0.58	0.00	0.52	0.52	1,199.34
Building Off Road Diesel	1.11	8.51	4.68	0.00	0.00	0.54	0.54	0.00	0.50	0.50	893.39
Building Vendor Trips	0.02	0.29	0.24	0.00	0.00	0.01	0.01	0.00	0.01	0.01	62.62
Building Worker Trips	0.05	0.10	1.80	0.00	0.01	0.01	0.02	0.00	0.01	0.01	243.33
Time Slice 8/10/2011-9/9/2011 Active	**31.66**	20.63	**15.66**	**0.01**	0.03	**1.56**	1.59	0.01	**1.43**	1.44	**2,493.85**
Asphalt 08/10/2011-09/10/2011	2.00	11.71	8.65	0.00	0.01	1.00	1.01	0.00	0.92	0.92	1,253.18
Paving Off-Gas	0.10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Paving Off Road Diesel	1.83	11.26	6.91	0.00	0.00	0.98	0.98	0.00	0.90	0.90	979.23
Paving On Road Diesel	0.03	0.36	0.13	0.00	0.00	0.01	0.02	0.00	0.01	0.01	56.23
Paving Worker Trips	0.05	0.09	1.61	0.00	0.01	0.01	0.02	0.00	0.00	0.01	217.72
Building 04/25/2010-09/10/2011	1.19	8.90	6.71	0.00	0.01	0.56	0.58	0.00	0.52	0.52	1,199.34
Building Off Road Diesel	1.11	8.51	4.68	0.00	0.00	0.54	0.54	0.00	0.50	0.50	893.39
Building Vendor Trips	0.02	0.29	0.24	0.00	0.00	0.01	0.01	0.00	0.01	0.01	62.62
Building Worker Trips	0.05	0.10	1.80	0.00	0.01	0.01	0.02	0.00	0.01	0.01	243.33
Coating 08/10/2011-09/10/2011	28.47	0.02	0.30	0.00	0.00	0.00	0.00	0.00	0.00	0.00	41.33
Architectural Coating	28.46	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Coating Worker Trips	0.01	0.02	0.30	0.00	0.00	0.00	0.00	0.00	0.00	0.00	41.33

Construction Related Mitigation Measures

The following mitigation measures apply to Phase: Fine Grading 3/24/2010 - 4/24/2010 - Default Fine Site Grading/Excavation Description

For Soil Stablizing Measures, the Replace ground cover in disturbed areas quickly mitigation reduces emissions by:
PM10: 5% PM25: 5%

For Soil Stablizing Measures, the Water exposed surfaces 2x daily watering mitigation reduces emissions by:
PM10: 55% PM25: 55%

For Soil Stablizing Measures, the Equipment loading/unloading mitigation reduces emissions by:
PM10: 69% PM25: 69%

For Unpaved Roads Measures, the Reduce speed on unpaved roads to less than 15 mph mitigation reduces emissions by:
PM10: 44% PM25: 44%

For Unpaved Roads Measures, the Manage haul road dust 2x daily watering mitigation reduces emissions by:
PM10: 55% PM25: 55%

Area Source Unmitigated Detail Report:

AREA SOURCE EMISSION ESTIMATES Winter Pounds Per Day, Unmitigated

Source	ROG	NOx	CO	SO2	PM10	PM2.5	CO2
Natural Gas	0.02	0.30	0.25	0.00	0.00	0.00	354.50
Hearth	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Landscaping - No Winter Emissions							
Consumer Products	0.00						
Architectural Coatings	0.18						
TOTALS (lbs/day, unmitigated)	0.20	0.30	0.25	0.00	0.00	0.00	354.50

Area Source Changes to Defaults

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Urbemis 2007 Version 9.2.4

Combined Annual Emissions Reports (Tons/Year)

File Name: P:\CVS-04.0E\Tech Reports\AQ_txt for MND\modeling\Dana Point HS.urb924
Project Name: Dana Point High School
Project Location: Orange County
On-Road Vehicle Emissions Based on: Version : Emfac2007 V2.3 Nov 1 2006
Off-Road Vehicle Emissions Based on: OFFROAD2007

Summary Report:

CONSTRUCTION EMISSION ESTIMATES

	ROG	NOx	CO	SO2	PM10 Dust	PM10 Exhaust	PM10	PM2.5 Dust	PM2.5 Exhaust	PM2.5	CO2
2010 TOTALS (tons/year unmitigated)	0.16	1.19	0.81	0.00	0.20	0.07	0.27	0.04	0.07	0.11	139.95
2010 TOTALS (tons/year mitigated)	0.16	1.19	0.81	0.00	0.04	0.07	0.11	0.01	0.07	0.07	139.95
Percent Reduction	0.00	0.00	0.00	0.00	81.86	0.00	60.49	81.47	0.00	31.98	0.00
2011 TOTALS (tons/year unmitigated)	0.46	0.94	0.71	0.00	0.00	0.06	0.06	0.00	0.06	0.06	122.83
2011 TOTALS (tons/year mitigated)	0.46	0.94	0.71	0.00	0.00	0.06	0.06	0.00	0.06	0.06	122.83
Percent Reduction	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

AREA SOURCE EMISSION ESTIMATES

	ROG	NOx	CO	SO2	PM10	PM2.5	CO2
TOTALS (tons/year, unmitigated)	0.05	0.05	0.33	0.00	0.00	0.00	65.21

SUM OF AREA SOURCE AND OPERATIONAL EMISSION ESTIMATES

	ROG	NOx	CO	SO2	PM10	PM2.5	CO2
TOTALS (tons/year, unmitigated)	0.05	0.05	0.33	0.00	0.00	0.00	65.21

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Construction Unmitigated Detail Report:

CONSTRUCTION EMISSION ESTIMATES Annual Tons Per Year, Unmitigated

	ROG	NOx	CO	SO2	PM10 Dust	PM10 Exhaust	PM10	PM2.5 Dust	PM2.5 Exhaust	PM2.5	CO2
2010	0.16	1.19	0.81	0.00	0.20	0.07	0.27	0.04	0.07	0.11	139.95
Demolition 03/10/2010-03/23/2010	0.01	0.04	0.03	0.00	0.00	0.00	0.01	0.00	0.00	0.00	4.73
Fugitive Dust	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Demo Off Road Diesel	0.01	0.04	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.50
Demo On Road Diesel	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.61
Demo Worker Trips	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.62
Fine Grading 03/24/2010-	0.03	0.29	0.15	0.00	0.20	0.01	0.21	0.04	0.01	0.05	27.28
Fine Grading Dust	0.00	0.00	0.00	0.00	0.20	0.00	0.20	0.04	0.00	0.04	0.00
Fine Grading Off Road Diesel	0.03	0.29	0.14	0.00	0.00	0.01	0.01	0.00	0.01	0.01	25.84
Fine Grading On Road Diesel	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Fine Grading Worker Trips	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.43
Building 04/25/2010-09/10/2011	0.12	0.86	0.63	0.00	0.00	0.05	0.05	0.00	0.05	0.05	107.95
Building Off Road Diesel	0.11	0.82	0.43	0.00	0.00	0.05	0.05	0.00	0.05	0.05	80.40
Building Vendor Trips	0.00	0.03	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	5.64
Building Worker Trips	0.01	0.01	0.17	0.00	0.00	0.00	0.00	0.00	0.00	0.00	21.91
2011	0.46	0.94	0.71	0.00	0.00	0.06	0.06	0.00	0.06	0.06	122.83
Building 04/25/2010-09/10/2011	0.11	0.80	0.60	0.00	0.00	0.05	0.05	0.00	0.05	0.05	107.94
Building Off Road Diesel	0.10	0.77	0.42	0.00	0.00	0.05	0.05	0.00	0.04	0.04	80.40
Building Vendor Trips	0.00	0.03	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	5.64
Building Worker Trips	0.00	0.01	0.16	0.00	0.00	0.00	0.00	0.00	0.00	0.00	21.90
Asphalt 08/10/2011-09/10/2011	0.02	0.13	0.10	0.00	0.00	0.01	0.01	0.00	0.01	0.01	14.41
Paving Off-Gas	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Paving Off Road Diesel	0.02	0.13	0.08	0.00	0.00	0.01	0.01	0.00	0.01	0.01	11.26
Paving On Road Diesel	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.65
Paving Worker Trips	0.00	0.00	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.50
Coating 08/10/2011-09/10/2011	0.33	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.48
Architectural Coating	0.33	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Coating Worker Trips	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.48

Phase Assumptions

Phase: Demolition 3/10/2010 - 3/23/2010 - Default Demolition Description
Building Volume Total (cubic feet): 20580
Building Volume Daily (cubic feet): 2066.7
On Road Truck Travel (VMT): 28.7
Off-Road Equipment:
1 Concrete/Industrial Saws (10 hp) operating at a 0.73 load factor for 8 hours per day
1 Rubber Tired Dozers (357 hp) operating at a 0.59 load factor for 1 hours per day
2 Tractors/Loaders/Backhoes (108 hp) operating at a 0.55 load factor for 6 hours per day

Phase: Fine Grading 3/24/2010 - 4/24/2010 - Default Fine Site Grading/Excavation Description
Total Acres Disturbed: 3.4
Maximum Daily Acreage Disturbed: 0.85
Fugitive Dust Level of Detail: Default
20 lbs per acre-day
On Road Truck Travel (VMT): 0
Off-Road Equipment:
1 Graders (174 hp) operating at a 0.61 load factor for 6 hours per day
1 Rubber Tired Dozers (357 hp) operating at a 0.59 load factor for 6 hours per day
1 Tractors/Loaders/Backhoes (108 hp) operating at a 0.55 load factor for 7 hours per day
1 Water Trucks (189 hp) operating at a 0.5 load factor for 8 hours per day

Phase: Paving 8/10/2011 - 9/10/2011 - Default Paving Description
Acres to be Paved: 0.85
Off-Road Equipment:
4 Cement and Mortar Mixers (10 hp) operating at a 0.56 load factor for 6 hours per day
1 Pavers (100 hp) operating at a 0.62 load factor for 7 hours per day
1 Rollers (95 hp) operating at a 0.56 load factor for 7 hours per day
1 Tractors/Loaders/Backhoes (108 hp) operating at a 0.55 load factor for 7 hours per day

Phase: Building Construction 4/25/2010 - 9/10/2011 - Default Building Construction Description
Off-Road Equipment:
1 Cranes (399 hp) operating at a 0.43 load factor for 4 hours per day
2 Forklifts (145 hp) operating at a 0.3 load factor for 6 hours per day
1 Tractors/Loaders/Backhoes (108 hp) operating at a 0.55 load factor for 8 hours per day

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Phase: Architectural Coating 8/10/2011 - 9/10/2011 - Default Architectural Coating Description

Rule: Residential Interior Coatings begins 1/1/2005 ends 6/30/2008 specifies a VOC of 100

Rule: Residential Interior Coatings begins 7/1/2008 ends 12/31/2040 specifies a VOC of 50

Rule: Residential Exterior Coatings begins 1/1/2005 ends 6/30/2008 specifies a VOC of 250

Rule: Residential Exterior Coatings begins 7/1/2008 ends 12/31/2040 specifies a VOC of 100

Rule: Nonresidential Interior Coatings begins 1/1/2005 ends 12/31/2040 specifies a VOC of 250

Rule: Nonresidential Exterior Coatings begins 1/1/2005 ends 12/31/2040 specifies a VOC of 250

Construction Mitigated Detail Report:

CONSTRUCTION EMISSION ESTIMATES Annual Tons Per Year, Mitigated

	ROG	NOx	CO	SO2	PM10 Dust	PM10 Exhaust	PM10	PM2.5 Dust	PM2.5 Exhaust	PM2.5	CO2
2010	0.16	1.19	0.81	0.00	0.04	0.07	0.11	0.01	0.07	0.07	139.95
Demolition 03/10/2010-03/23/2010	0.01	0.04	0.03	0.00	0.00	0.00	0.01	0.00	0.00	0.00	4.73
Fugitive Dust	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Demo Off Road Diesel	0.01	0.04	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.50
Demo On Road Diesel	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.61
Demo Worker Trips	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.62
Fine Grading 03/24/2010-	0.03	0.29	0.15	0.00	0.03	0.01	0.05	0.01	0.01	0.02	27.28
Fine Grading Dust	0.00	0.00	0.00	0.00	0.03	0.00	0.03	0.01	0.00	0.01	0.00
Fine Grading Off Road Diesel	0.03	0.29	0.14	0.00	0.00	0.01	0.01	0.00	0.01	0.01	25.84
Fine Grading On Road Diesel	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Fine Grading Worker Trips	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.43
Building 04/25/2010-09/10/2011	0.12	0.86	0.63	0.00	0.00	0.05	0.05	0.00	0.05	0.05	107.95
Building Off Road Diesel	0.11	0.82	0.43	0.00	0.00	0.05	0.05	0.00	0.05	0.05	80.40
Building Vendor Trips	0.00	0.03	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	5.64
Building Worker Trips	0.01	0.01	0.17	0.00	0.00	0.00	0.00	0.00	0.00	0.00	21.91
2011	0.46	0.94	0.71	0.00	0.00	0.06	0.06	0.00	0.06	0.06	122.83
Building 04/25/2010-09/10/2011	0.11	0.80	0.60	0.00	0.00	0.05	0.05	0.00	0.05	0.05	107.94
Building Off Road Diesel	0.10	0.77	0.42	0.00	0.00	0.05	0.05	0.00	0.04	0.04	80.40
Building Vendor Trips	0.00	0.03	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	5.64
Building Worker Trips	0.00	0.01	0.16	0.00	0.00	0.00	0.00	0.00	0.00	0.00	21.90
Asphalt 08/10/2011-09/10/2011	0.02	0.13	0.10	0.00	0.00	0.01	0.01	0.00	0.01	0.01	14.41
Paving Off-Gas	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Paving Off Road Diesel	0.02	0.13	0.08	0.00	0.00	0.01	0.01	0.00	0.01	0.01	11.26
Paving On Road Diesel	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.65
Paving Worker Trips	0.00	0.00	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.50
Coating 08/10/2011-09/10/2011	0.33	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.48
Architectural Coating	0.33	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Coating Worker Trips	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.48

Construction Related Mitigation Measures

The following mitigation measures apply to Phase: Fine Grading 3/24/2010 - 4/24/2010 - Default Fine Site Grading/Excavation Description

For Soil Stablizing Measures, the Replace ground cover in disturbed areas quickly mitigation reduces emissions by:
PM10: 5% PM25: 5%

For Soil Stablizing Measures, the Water exposed surfaces 2x daily watering mitigation reduces emissions by:
PM10: 55% PM25: 55%

For Soil Stablizing Measures, the Equipment loading/unloading mitigation reduces emissions by:
PM10: 69% PM25: 69%

For Unpaved Roads Measures, the Reduce speed on unpaved roads to less than 15 mph mitigation reduces emissions by:
PM10: 44% PM25: 44%

For Unpaved Roads Measures, the Manage haul road dust 2x daily watering mitigation reduces emissions by:
PM10: 55% PM25: 55%

Area Source Unmitigated Detail Report:

AREA SOURCE EMISSION ESTIMATES Annual Tons Per Year, Unmitigated

Source	ROG	NOx	CO	SO2	PM10	PM2.5	CO2
Natural Gas	0.00	0.05	0.05	0.00	0.00	0.00	64.70
Hearth	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Landscape	0.02	0.00	0.28	0.00	0.00	0.00	0.51
Consumer Products	0.00						
Architectural Coatings	0.03						
TOTALS (tons/year, unmitigated)	0.05	0.05	0.33	0.00	0.00	0.00	65.21

Area Source Changes to Defaults

Pavement Demolition Volumes - Dana Hills High School

Tennis Court Area Dimensions		
Length	490	feet
Width	140	feet
	68,600	square-feet

Class 1 :	Tennis Courts	3	inches	0.3 feet

Demolition Volumes		
Volume	20,580	cft
for URBEMIS	262	feet
days of demolition	10	days
Demo/day	2,058	square-feet
for URBEMIS	83	feet

Source: Gibbons, Jim. 1999. Pavements and Surface Materials. NonPoint Education for Municipal Officals. Technical Paper No. 8. University of Connecticut, Cooperative Exension System.

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Pavements and Surface Materials

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Introduction

Pavements are composite materials that bear the weight of pedestrian and vehicular loads. Pavement thickness, width and type should vary based on the intended function of the paved area.

Pavement Thickness

Pavement thickness is determined by four factors: environment, traffic, base characteristics and the pavement material used.

Environmental factors such as moisture and temperature significantly affect pavement. For example, as soil moisture increases the load bearing capacity of the soil decreases and the soil can heave and swell. Temperature also effects the load bearing capacity of pavements. When the moisture in pavement freezes and thaws, it creates stress leading to pavement heaving. The detrimental effects of moisture can be reduced or eliminated by: keeping it from entering the pavement base, removing it before it has a chance to weaken the pavement or using moisture resistant pavement materials.

Traffic subjects pavement to wear and damage. The amount of wear depends on the weight and number of vehicles using the pavement over a given period of time. Road engineers estimate the pavement damage from the axle loads of the various vehicles expected to use the pavement over its designed life, usually 20 years. As a general principle, the heavier and more numerous the vehicles using the road, the thicker the pavement needed to support them.

For example, The Asphalt Institute recommends various asphalt pavement thicknesses to support various types of automobile traffic. The Institute suggests the following five “Traffic Classes,” based on the number and weight of vehicles expected to use the road:

Traffic Class	Type of Road
1	Parking Lots, Driveways, Rural Roads
2	Residential Streets
3	Collector Roads
4	Arterial roads
5	Freeways, Expressways, Interstates

Based on the above classes, pavement thickness ranges from 3" for a Class 1 parking lot, to 10" or more for Class 5 freeways.

Sub grade strength has the greatest effect in determining pavement thickness. As a general rule, weaker sub grades require thicker asphalt layers to adequately bear different loads associated with different uses. The bearing capacity and permeability of the sub grade influences total pavement thickness. There are actually two or three separate layers or courses below the paved wearing surface including: the sub grade, sub base and base. The sub grade is either natural, undisturbed earth or imported, compacted till. The bearing capacity and permeability of the sub grade influences total pavement thickness. The sub base consists of a layer of clean course aggregate, such as gravel or crushed stone. Sub bases are installed where heavy-duty surfaces require an additional layer of base material. The base consists of a graded aggregate foundation that transfers the wearing surface load to the sub grade in a controlled manner. The base should also prevent the upward movement of water.

The **pavement material** or wearing surface, receives the traffic wear and transfers its load to the base, while at the same time serving as the base's protective cover. Pavements are classified as either flexible or rigid. Flexible pavements are resilient surfaces that distribute loads down to the sub base in a radiant manner. Flexible pavements generally have thin wearing surfaces and thick bases. Asphalt is an example of a flexible pavement. Hot mix asphalt has more strength than cold mixes therefore it can be laid in thinner layers. Rigid pavements distribute imposed loads over a broader area than do flexible pavements and therefore require thicker wearing surfaces and thinner bases. Reinforced concrete

slabs and paver stone embedded in reinforced concrete are examples of rigid pavement.

The Asphalt Institute in College Park, Maryland has issued a "Asphalt Thickness and Design," manual that suggests that asphalt thickness for roads be based on the following three factors:
1. Traffic weight and number of vehicles that will use the road
2. Strength of proposed sub base, and,
3. Pavement material to be used.

Pavement Width

As with thickness, pavement width should vary based on its intended use. Interstate highways will obviously need to be much wider than local residential roads. Similarly, the parking lot serving a regional shopping center will be much larger than one for a neighborhood convenience store. A sidewalk in a low-density residential area can be narrower than one serving a central business district.

While the relationship of width to intended use seems so logical, many communities still have a "one design fits all occasions" approach to pavement widths. Pavement width standards are often found in local land use regulations. Zoning and subdivision regulations generally contain "minimum" width requirements for roads, driveways, sidewalks, parking stalls, loading areas, emergency access ways, alleys and multi-use trails. Developers often install pavement far exceeding "minimum" standards.

The over-paving of the developed landscape has well documented adverse environmental, social, and economic consequences. The direct adverse relationship between a watershed's imperviousness and its water quality is well established. As we pave the Earth's surface, we disrupt natural drainage and infiltration systems, drastically altering land and water as well as people and wildlife whose lives depend on the health of these resources. People are concerned that landscape design often pays more attention to the paved areas serving the automobile, than to green areas serving man and wildlife. Local officials are beginning to better understand the costs associated with the design, installation and maintenance of paved areas. It is one thing to require developers to install expansive roads, curb and curtain drain systems, it is another for municipalities to provide the resources to own and properly maintain these areas once they are built.

Pavement Material

Asphalt and concrete are the most common paving materials found in the developed landscape. However, there are other strong, durable pavements that can add variety to the built landscape and help reduce pavement's imperviousness. The following is a review of selected paving materials:

1. Asphault

Bituminous concrete or asphalt is composed of aggregates bound together with asphalt cement. The aggregate is heated and mixed with hot (275º f) asphalt cement then taken to the construction site where it is placed, as a wearing surface, over a base course. The asphalt is laid by hand or paving machine, then rolled to force the mixture to firmly set. It is then allowed to cool. Depending on: how it is constructed, the traffic it will bear, the climate it must endure, and the maintenance it receives, typical asphalt pavement has a life expectancy of 20 years before it needs resurfacing.

Bituminous surfaces when properly installed are: durable, can be used year round, drain quickly, are comparatively easy and inexpensive to maintain, resilient, hard, firm, easily marked, dust free, neat, non-glare and can be used for many different activities. The disadvantages of bituminous surfaces are their relatively high installation costs and their imperviousness.

Asphalt can be mixed with cork, sponge or rubber to create more resilient surfaces or with crushed stone to produce a hard or more porous surface.

Asphalt pavement is composed of the following two layers, the wearing course and the base course:

The Wearing Course transfers and distributes traffic loads to the base course. The wearing course is actually composed of two layers, a 1-1/4" to 1-1/2" surface layer and a 3" bonding layer. The bonding course penetrates voids in the sub base and binds the wearing course to the sub base aggregate. The thickness of the wearing course varies according to intended use, the materials used and the bearing strength of the sub base.
The Base Course thickness might range from 6" to 18" depending on the designed use and the bearing strength of material used. If the material has low bearing strength, sub base thickness is increased or stronger materials used.

The thinnest applications of asphalt involve the spreading of a liquid mix on gravel roads to provide water and dust proofing while at the other end of the thickness scale, some roads may require 10" or more of asphalt to support projected traffic. Liquid asphalt is also applied to existing pavement to renewed the wearing course, act as a sealer and to fill cracks. There is some debate as to how often asphalt needs to be sealed. For example, some contractors recommend asphalt driveways be sealed one year after installation, and four additional times over its 20 year life span. Others recommend that they should not be sealed at all, citing the need for asphalt to breathe.

Another application, commonly called "chipstone" or "chipseal" involves spreading new asphalt, waiting two months or so, and then applying a mixture of oil and stone. Chipseal can also be applied over existing pavement, using asphalt to fill in depressions and provide a surface coating, before covering with stone chips. Stone color can vary with salt and pepper mixes popular to provide a more rustic look. The stones can get displaced, but not as much as in a loose crushed stone application. Every five to seven years the chipstone surface should receive a new coat.

Pre molded asphalt blocks are also used for sidewalks, driveways, roads, plazas, piers and airport runways. The blocks range in thickness from 1-1/4" for a basic waterproofing surface to 3" roads and ramps.

Another asphalt surface, textured asphalt pavement involves imprinting softened asphalt with steel grid templates to produce a brick or cobblestone look. To install a textured surface, asphalt is laid on a base and allowed to semi harden. The surface is then softened with a heater and the steel template is pounded onto the surface to imprint the desired pattern. The template is raised and moved to the next paved section. A color coating can be added to the surface. Manufacturers recommend that new asphalt be laid for textured paving as old asphalt gets too polished with age to allow new asphalt to properly adhere.

Conventional hot mixes of asphalt are impervious to water as long as the total air void content is kept below 7 percent. Some mixtures often referred to as, “pop corn,” use larger sized aggregate to increase the air voids and thus make the pavement more porous. Porous asphalt pavements need to be washed with high-pressure sprays or vacuumed to keep soil particles from collecting in and clogging the voids. Porous mixtures have been used on parking lots, driveways, sidewalks, local roads and temporary roads and ramps.

2. Concrete

Concrete consists of binding material called cement, composed of lime, silica, alumina and gypsum, that is mixed with sand, aggregate and water. After curing concrete becomes as hard and impervious as stone. Steel rods or glass fibers are sometimes used to reinforce the strength of concrete mixtures. Concrete can be mixed in bulk and placed in forms to achieve any desired shape. The surface can finished with a variety of textures. Concrete surfaces can be used year round for multiple purposes. Concrete surface maintenance costs are very low.

The thickness of the wearing surface and gravel base of concrete sidewalks varies based on intended use. Common concrete sidewalk wearing surfaces range from 4" to 6" with gravel bases ranging from 4" to 8."

Concrete is also used to make precast paver stones of various shapes, sizes, finishes and colors. These pavers must meet industry standards of high comprehension strengths, of at least 8000 pounds per square inch, to resist breakage from freezing and traffic loads. Typical thickness range from 2-3/8" for use in sidewalks and residential driveways to 4" for pavements subject to vehicular traffic. Some pavers are designed to interlock forming an impervious surface while others are made to be porous. Interlocking concrete paving stones are laid in prepared beds of compacted soil, crushed stone and sand. The interlocking system withstands; snow plowing, shoveling or snow blowing. The chamfered joints between each paver eliminates the cracking often found in asphalt or concrete pavements and facilitate the removal of surface water helping to reduce nighttime glare and enhance skid resistance. As concrete pavers do not rely on continuity for structural integrity, cuts can easily be made for surface or underground utility repair. Herringbone patterns, the most effect-laying pattern for maintaining interlock, offer greater structural capacity and resistance to lateral movement. Therefore, herringbone patterns are recommended for areas subject to vehicular traffic. Restraints are used along the perimeter of the pavers or where there is a change in the use of pavement material to hold the pavers tightly together and help prevent spreading as a result of traffic forces. Concrete pavers come in many colors, shapes and patterns that can be used to mark traffic and parking lanes and pedestrian walkways.

3. Brick

Brick from kiln-fired clay or shale has been used as paving for thousands of years. The Romans used brick to build their roads and since the colonial era, brick has been used in America for pathways, sidewalks and as a building material. Until the mid-20s brick was the most popular street paving material in America, thereafter, asphalt and concrete were widely used. Brick is a popular paving material because it is easy to produce, easy to use in small, hard to reach areas, can be used with other paving materials, is flexible, and is readily available in a variety of shapes and colors. Bricks come in all sizes. A survey conducted in 1973 by the brick industry association showed approximately 40 different size brick were being manufactured. Brick texture can range from a highly finished smooth glaze to rough finishes. Brick can be colored and installed in many different patterns, such as herringbone and basket weave. Brick is graded by its' weather resistance, measured by porosity. When properly installed, brick pavement is stable and durable, however, it is generally more costly to install than bulk paving materials such as concrete and asphalt. In northern climates there is concern that the bricks may create an uneven surface making snow plowing difficult.

Paver bricks, specially made for outdoor and street use, are different from those used on historic brick walks and streets in that they have a slip resistant surface and are very dense to resist freeze/thaw damage. Abrasion and weight can destroy brick not made for outdoor use. Modern outdoor bricks range in thickness from 3/4" to 2-1/2," with 1-5/8" and 2-1/4" the most popular thickness.

There are three basic types of brick paving systems: flexible brick over a flexible base, flexible brick over a rigid or semi rigid base and rigid brick on a rigid concrete base.

Flexible brick paving on flexible or semi rigid bases is not subject to cracking as are rigid pavements. This is especially important in regions where frost heaves and soil swelling occur. Brick laid mortarless in sand allows storm water to infiltrate the ground. Less skill is needed to lay brick in sand than mortared brick and individual bricks can be removed allowing for easy surface repair or access to subsurface utilities. Also the brick pavement can be immediately open to traffic, following the repair, as no hardening or curing time is needed as with asphalt or concrete. Sand quality is

critical to the performance of flexible brick paving especially where heavy traffic loads and weights are planned. Sand manufactured from crushed stone may break down under the weight of heavy trucks or buses, natural silica sand has proven resistant to such wear. In some instances elastic coatings are applied on the surface to keep sand from moving between the bricks. However, surface coatings may reduce the porosity of the mortarless system.

Sometimes bricks are laid in gravel or crushed stone as opposed to sand. If a porous surface is desired, care must be taken to provide a sub base and joints that do not join the bricks to form an interlocking impervious cover.

Semi rigid systems consist of bricks set in a bituminous bed laid over an asphalt or concrete base. This system is popular in urban areas as it can be laid over an existing base. Semi rigid systems may be more durable than flexible systems, but they may cost more.

Rigid brick paving systems have bricks set in mortar, laid over a mortar bed, that rests on a concrete slab. Used where water must drain from the surface or where mortared joints are desired for aesthetic reasons, this system requires maintenance as the mortar deteriorates. Thinner paver bricks can be used for walks when they are set in a mortar bed.

4. Stone

Stone is a durable paving surface that is available in either natural or synthetic form. Natural paving stone is graded based on its' hardness, porosity and abrasion resistance. It is available either in cut or uncut form in various degrees of smoothness.

Cut stone is available as either roughly squared, unfinished blocks or as uniformly trimmed, highly polished tiles. Common cut stone used for paving include blue or flagstone, marble, slate, granite blocks, cobblestones and Belgium blocks. Quarries can offer stone cut to measure and sell it by the square face, by its' thickness, or by unit price.

Examples of uncut or rubble stone, are broken quarry rock and river stone available in varying degrees of smoothness. Crushed stone of various sizes and hardness is used as sub-base for other surface materials, surface pavement or ground cover. When mixed with asphalt or concrete, crushed stone or aggregate is used in the wearing and base coarse of roads, drives, parking lots and sidewalks. Larger stones are mixed with asphalt or concrete when a rougher or more porous surface is desired.

While providing a slightly irregular surface, crushed stone can be used where a porous material is desired for roads, driveways, paths or parking lots with light traffic. It is also used as a durable, decorative ground cover and to reduce erosion and promote infiltration in areas receiving roof and surface runoff. Crushed stone is commonly used for residential driveways particularly where a country look is desired or the driveway is long. Typical driveway stone sizes range from 1/4" to 2" sizes, with pea size (3/8") the most popular because it is the easiest to walk on. Stone colors can ranges from bright white to black, depending on local characteristics.

Synthetic stone made of concrete mixtures is available in a variety of shapes, colors and textures. It can be made to closely resemble natural stone and often costs less than the real thing.

Stone, as with brick, can be set in a sand or concrete bed. If a pervious surface is desired, the stone should be laid on a smooth bed of sand that in turn is placed over a level and compacted cinder or gravel base. If sand is used, it should be brushed over the stone to form a grout, tamped and watered.

Crushed stone can be placed in plastic grid pavers that are laid over a base designed to accept and filter runoff and support heavy vehicular weight. If an impervious surface is required, the stone is laid over a concrete bed that is reinforced with steel rods or welded wire fabric. The concrete bed rests on a level gravel base.

The advantages of crushed stone are its relatively low installation cost, high porosity and enhancement of community character. Crushed stone also has some disadvantages including: dust generation and weed growth, rutting from tires, displacement of stone during snow plowing, stones getting caught in snow blowers and lawn mowers and need to periodically replenish displaced stones.

5. Tile

Tiles are baked clay of various shapes, colors and finishes. Tile is often graded on its' weather resistance. Tile can be glazed or unglazed. Glazing increases tile's imperviousness. Tile's small unit size makes it easy to work with, particularly where space is limited or hard to reach. When used as a paving surface, tile is laid similar to brick and stone.

6. Wood

Wood and wood products are used in the construction of decks, walks and steps. At one time, wood was used to surface roads, resulting in what was commonly known as "plank roads." Wood is strong and durable for its weight. Wood used outdoors must be; non-splintering, stiff, strong and resistant to decay, wear and warp. Woods with many of these characteristics include; white oak, Douglas fir, redwood, cedar, southern pine and various tropical hardwoods. To help prevent short order rot, wood can be pressure treated to increase its resistance to decay from insects and weather. However, there is some concern that commonly used wood preservatives, at certain stages of their life cycle, may be harmful. For example, the copper, in many pressure treating compounds and surface applied preservatives, is toxic to aquatic organisms. For this reason, extreme care should be taken in the use of wood pressure treated with copper for decking, walks or support columns in or near wetlands.

In addition to wood boards or logs used to make decks and planked walks, landscape timbers and railroad ties are used as steps and in paths. An interesting use of wood in walks is 6" thick, wood disks of cypress; redwood, chestnut or locust set in sand, gravel or concrete. Other wood products used as surface materials include shredded bark and wood chips of various sizes and colors.

7. Earth Materials

Earth materials used for paving include sand, gravel, soil, granular products, and turf. The volume of earth materials is determined by its state in the earth moving process. For example a cubic yard of gravel as it lies in its natural, undisturbed state usually swells to 1.25 cubic yards after it has been disturbed by excavation. The same quantity of gravel decreases in volume to about .90 cubic yards after it has been compacted by machinery on site.

Sand is often used as a sub base for other paving material such as brick and paver blocks. Depending on how the paving material is laid in the sand and the sub base used, sand surfaces can be porous or impervious. There are problems using sand as a surface material as it can generate dust and has a tendency to become rutted when used extensively by heavy vehicles in wet weather.

Gravel has been used for years as a road and path surface. In the "Design Guide for Rural Roads," prepared in 1998 by the Dutchess Land Conservancy, Inc., 16' wide gravel roads are suggested for residential areas with lots of five acres or greater and traffic is less than 100 vehicles per day. The Conservancy also suggests 12' wide gravel roads serving no more than four residential lots with traffic less than 25 vehicle per day. The Design Guide also lists the advantages and disadvantages of gravel roads. Advantages of gravel roads include: less costly to construct than paved roads, easier to maintain as they require less equipment and equipment used is easier and less expensive to operate, surface damage is easier and less expansive to correct and they discourage speeding and preserve the area's rural character. Disadvantages include: they generate dust, require more frequent maintenance, can become impassable with frequent snow or rain and create greater wear and tear on vehicles than paved roads.

A suggested design of a gravel road is a 4" layer of high quality gravel or crushed stone over an 18" to 24" bed of porous compacted fill. Gravel roads can be designed to be porous but unless properly designed and maintained, porous gravel roads can become compacted and their voids clogged with particles creating a surface as impervious as asphalt or concrete. Some communities allow gravel roads only if they are privately owned and maintained.

Soil, while not commonly used as a surface material by itself, can be bound with various stabilizers to decrease its muddy or dusty qualities and to harden it. Used motor oil was once sprayed onto dirt roads to act as a soil stabilizer. The most common form of stabilized soil is soil cement, a mixture of existing soil and 5 to 16 percent Portland cement. No aggregate or sand is used, so costs are less than those of concrete or asphalt are. The surface looks like local soil, but is hard with a compressive strength up to 1500 pounds per square inch. Soil cement is usually created by spreading dry cement over the ground and tilling to a depth of 4 " to 6," thoroughly mixing soil and cement. The mixture is wetted, compacted and cured under plastic sheeting. The National Park Service uses soil cement as the surface material on trails that are handicapped accessible. It has also been successfully used for road base courses, road and trail surfaces, pond liners and as an inexpensive riprap alternative.

Granular surfacing such as crushed shells, decomposed granite, crusher fines and crushed brick offer a traditional paving surface that is easy to construct and maintain. As these surfaces have historically been used on walks and roads, they are especially appropriate for sites where historic preservation or a period or regional look is desired. As they use local materials, granular surfaces naturally blend into the site helping to preserve a sense of local character and identity. For example, along coastal areas crushed shells are used for informal paving and in Tidewater Virginia on country roads. Shells are cleaned and crushed to sizes of 1" or ¼". Sometimes shells are mixed 2:1 with limestone dust or sand, placed 4" deep over filter fabric, machine tamped and wetted until firmly compacted.

Turf is the upper layer of soil bound together by grass and plant roots to form a mat. The advantages of turf as a surface material are its appearance, resiliency, porosity and smoothness. Turf is difficult to maintain in areas of high use and it may require time and care to restore itself after heavy utilization. During wet periods it may become rutted and unusable. During dry periods, compacted turf can become dry and hard as concrete. It also needs watering, mowing, fertilization and protection from insects and plant diseases. Improper use of fertilizers and pesticides can result in water pollution. Unless proper care is taken, plowing snow off turf surfaces can destroy the vegetative cover. When turf is used as the wearing surface, reinforced base applications provide support for vehicle weight while allowing infiltration of storm water through the grass, top soil and specially designed sub base. (See porous pavements).

8. Synthetics

There are many types of synthetic surfacing materials on the market. Most have been used at recreation facilities. Examples include, sponge, sponge rubber, rubber mats, plastics, cork and various combinations of these with a binder coating material, such as asphalt. Synthetics have been used on running tracks, as a grass substitute on athletic playing fields and as a cushioned base for playgrounds. Synthetics require little maintenance, are pleasant to look at, have high resiliency, come in a variety of colors, are nonabrasive and can be used year round.

Another synthetic product that can be used for decking, walks, play structure flooring, boardwalks, steps and landscape timbers, is recycled plastic lumber. In the United States approximately 20 million tons of plastic are disposed of each year. Plastic lumber is a product developed to provide a market for the large amount of

available, recycled plastic. Plastic lumber is either made of pure plastic resins or plastic mixed with wood fibers or fiberglass. A relatively new product without a long history of use, 100% plastic lumber, has some shortcomings including: lower structural strength than wood, softening and expanding when heated, and slippery when wet. The wood-plastic composites have greater strength, greater stiffness and less expansion than the all-plastic products. The benefits of plastic lumber are resistance to rot and insect damage, lack of harmful chemicals and ease of maintenance. At the present time most recycled plastic lumber costs two to three times as much as pressure treated lumber.

9. Porous Pavements

Plastic Grid Pavers feature a system of 100 percent recycled molded, interlocking plastic grids that support a strong, attractive, porous surface of 100 percent grass or crushed stone. Some systems have hollow rings or honeycombs attached to a base, others have open cells without bases. Other systems designed for crushed stone, have a fabric base that prevents the stone from moving down to the sub base. The plastic grids are flexible, allowing use on uneven sites without grading. The grid rings or cells transfer surface loads to the underlying base course material. This prevents surface rutting, compaction of grass roots, and displacement of soil or stone due to traffic. The grids, not the grass or stone, absorb vehicle weights of well over 100,000 pounds. This system is environmentally friendly in that it:
1. uses only recycled plastic, keeping it out of local landfills;
2. promotes infiltration which recharges the water table, reduces surface runoff, helps prevent flooding and reduces non-point source pollution; 3. Reduces the imperviousness of development and
4. Minimizes site disturbances, especially on erosion prone slopes.

Manufactures recommend their use for paved areas, including sidewalks, parking areas, golf cart paths, residential driveways, fire lanes, emergency access roads

Plastic grid pavers, using grass as the surface material, are installed by first preparing a porous base course of compact sandy gravel as determined by local engineers. To ensure base course porosity, it should be hosed and the water observed for complete drainage. Next, a fertilizer and soil polymer mix is spread over the base course. The grass paver units are then placed rings up, directly over the growth mixture and interlocked as needed. The plastic pavers can be cut to any desired shape with a knife or pruning shears. The rings are then filled to the top with sand, then grass seed and mulch is added. Sod can be applied over the sand filled rings as an alternative to grass seed and mulch. After installation the grass or sod should be protected until root systems are well established. The surface is then maintained as a grass lawn.

When crushed stone is used instead of grass, a heavier plastic grid is used.

Plastic grid pavers do not require curbs, curtain drains, detention or retention ponds or any other associated drainage facility making them competitively priced with asphalt and concrete paving when their required associated drainage facilities are cost factored.

Cement Grid Pavers are similar to plastic grids described above but made of concrete rather than plastic.

Concrete Grid Pavement first appeared in the early 1960s when concrete building blocks were placed in the ground, hollow side up, to handle overflow parking at a cultural center near Stuttgart, Germany. Since then concrete grids have been used for embankment stabilization and as ditch liners. However, a significant application of this technology is as a pavement specifically as it is used in: driveways, parking areas, shoulders along airstrips and highways, roadway medians, boat launching ramps, emergency access roads, fire lanes, sidewalks, sidewalk borders, grassed rooftops, pool decks and, patios. There are two types of concrete grid pavers: lattice and castellated. Lattice pavers produce a flat, continuous, patterned, concrete surface when installed. Castellated grid pavers feature protruding cement knobs on their surface that make the grass surface appear continuous when installed. Unlike plastic grid pavers, concrete pavers are heavy, ranging in weight from 45 to 90 pounds. The percentage of open area associated with concrete pavers range from 20 percent to 50 percent.

Whether grass or crushed stone is used in the grids, depends on the expected intensity and duration of use and maintenance capability. As most grasses require about five hours of daily sunlight, grass should be used in areas of less intense use such as over flow parking and fire lanes. For heavily used areas and areas that will be continually covered by vehicles during the day, crushed stone should be used. Solid concrete pavers can be used to delineate parking spaces including those that are handicapped accessible, pedestrian paths and bicycle parking areas. Concrete grid pavers with grass require the same maintenance as lawns including, watering, mowing, weed removal, and fertilization. If the grass can not be properly maintained, then crush stone should be used. Crushed stone is also recommended if the sediment from the site or adjacent areas is expected to wash into the grids.

Snow can be plowed from the grids if the plow blade is set slightly above their surface. Deicing compounds and salt should not be applied to grass, as they will kill it. If individual grid units are damaged from soil or base settlement they can be easily removed and replaced.
Two designs for the base areas under concrete grid paving are suggested, dense graded or open graded aggregate. The choice for base design depends on the amount of infiltration and storage of storm water desired.

Dense Graded Base installations typically consist of a sub grade of existing compacted soil, a layer of geotextile in poorly drained areas, compacted crushed stone, 1" to 1½" of bedding sand and the cement grids filled with either grass or aggregate. A minimum

of 8" of compacted crushed stone is suggested for emergency fire lanes, driveways and parking lots. Thicker bases may be needed when extremely heavy vehicles are expected to use the surface, the soil sub grade is weak, has high clay or silt content, or is wet. However, for residential uses in sandy, well-drained soils a base may not be needed as the grids and bedding sand can be placed directly on the compacted sandy soil. When grass is used, it should not be exposed to tire wear until it is well established, typically 3 to 4 weeks after application.

When maximum infiltration, partial pollutant treatment and storm water storage is sought, an open graded base is suggested, otherwise a dense graded base can be used. When concrete grid pavers with 60 percent solid area are placed over a 12" open graded sub base with 40 percent void space, they can infiltrate 5" of rain per hour before becoming saturated. Thicker bases can store greater rainfall amounts. In view of their drainage capability grid pavers should be considered as representing a 100 percent pervious area as opposed to just the area defined by its openings. Areas with high water tables, impermeable soil layers or shallow depth to bedrock may not be suitable as an infiltration area with an open graded base. Care should be taken to assess the bearing capacity of the soil to withstand vehicular loads when saturated. Also, manufactures suggest that infiltration areas with concrete grids should be used to drain areas less than five acres and targeted to drain 2 to 10 year storms.

Research shows that concrete grid pavements designed as infiltration areas over an open graded base can substantially reduce nonpoint source pollutants in storm water. A key determinant of pollution reduction capability of infiltration systems is the soil found in the base course. For instance, clay soils have been found to be particularly effective pollutant filters. Unfortunately, many clay soils do not have high infiltration rates or strong bearing capacities, when saturated, to be used under infiltration areas subjected to heavy vehicle loads.

Any infiltration area can become clogged with sediments thereby decreasing storage capacity and infiltration capability. One way to avoid clogging is to prevent sediment from flowing into the infiltration system during construction or use. Another method is to treat the runoff before it enters the infiltration area. Both methods will help extend the useful life of the system and reduce removal and replacement costs. Also, concrete grid pavers are not recommended in places where grease and oil loads are high. Filter areas such as settling basins should be used to remove grease and oil before they enter the grid system.

Stabilized Grass Root Zone Systems address the problem of turf and its root zone being compressed by vehicle weight, or heavy play. The compaction destroys soil voids containing oxygen and water necessary for healthy turf. Stabilized turf systems blend pieces of polypropylene mesh, about the size of a playing card, with soil or a grass, growing medium. The mesh pieces interlock, with each other and root zone particles, creating a stable structure. As the grass roots develop they entwine with the mesh to provide a deep, anchored, root system supporting a tough, stable, springy turf surface. The mesh elements in the soil produce high aeration for enhanced oxygen levels and improved infiltration. The mesh elements act as springs, whose flexing action creates and maintains voids holdings water and oxygen necessary for healthy roots and turf surfaces.

Stabilized turf systems are most often used as a playing surface at athletic facilities mainly because spectators and players enjoy the look and feel of healthy turf. It provides a strong, damage resistant surface that drains rapidly, withstands heavy use and recovers fast. Athletes enjoy it because it provides consistent traction and is highly resilient, capable of absorbing impact from falls. In addition, stabilized turf can be used for overflow parking lots, airstrips, heavy used visitor attractions, emergency access areas and playgrounds. It resists compaction and rutting even when the surface is saturated. One manufacturer claims its stabilized turf system increases the vehicle load bearing capacity of natural turf areas by up to 500% while others claim a 40 ton truck can be driven across or parked on the turf surface without leaving any noticeable tire marks.

Turf Reinforcement Mats are synthetic or natural, permanent or temporary, blankets or mats that reinforce turf areas designed for erosion control on steep slopes, shorelines, and stream banks. They are also used as an alternative to rock riprap to line drainage ditches and open channels. Synthetic turf reinforcement mats are commonly referred to as "geotextiles." Typical installation guidelines for geotextiles include: grade and compact area, prepare a 3" seedbed above the final grade, add lime and fertilizer as needed, apply turf reinforced mat directly on soil, apply seed and ¾ " of fine top soil to the mat and water as needed.

A review of literature from several manufacturers of geotextile turf reinforcement mats, mentions they can support lightweight rubber-tired construction equipment but no tracked equipment or sharp turns should be used on the mat. Whether this is only during the installation phase or permanently is not clear.

Degradable erosion control blankets are flexible erosion control products designed to hold seeds and soil in place until vegetation is established. The blankets are designed to protect the soil surface from water and wind erosion while offering partial shade and heat storage to accelerate vegetative development. The blanket is designed so the various fibers used in its construction degrade and become part of the soil. Some "roll type" erosion control blankets are made of natural products such as straw, excelsior, coconut and jute others of synthetics such as polypropylene. Some blankets are porous allowing turf roots to adhere to open areas in the weave, other are made impervious and puncture resistant so they can serve as pond liners or landfill caps.

Contact Information
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Box 70, 1066 Saybrook Road
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University of Connecticut
COOPERATIVE EXTENSION SYSTEM
College of Agriculture and Natural Resources

NEMO is an educational project of the University of Connecticut, Cooperative Extension System, Connecticut Sea Grant College Program and Natural Resource Management and Engineering Department. In addition to support from UConn, NEMO is funded by grants from the CT DEP Nonpoint Source Program and the NOAA National Sea Grant College Program. NEMO is a program of the Center for Land use Education And Research (CLEAR). For more information about CLEAR, visit www.clear.uconn.edu. The Connecticut Cooperative Extension System is an equal opportunity employer. © 2002 University of Connecticut 11-02

Construction Localized Significance Thresholds - Dana Hills High School

SRA No.	Acres	Source Receptor Distance (meters)	Source Receptor Distance (Feet)
21	3.42	25	82

Source Receptor	**Capistrano Valley**
Distance (meters)	25
NOx	**162**
CO	**1397**
PM10	**9**
PM2.5	**6**

	Acres	**25**	**50**	**100**	**200**	**500**
NOx	3	153	148	160	184	248
	4	175	168	180	203	263
		162	156	168	192	254
CO	3	1282	1519	2052	3439	9138
	4	1556	1810	2407	3913	9823
		1397	1641	2201	3638	9426
PM10	3	8	24	36	61	135
	4	10	31	43	68	142
		9	27	39	64	138
PM2.5	3	5	8	12	25	79
	4	7	9	14	27	85
		6	8	13	26	82

Capistrano Valley

3.42 Acres

	25	**50**	**100**	**200**	**500**
NOx	162	156	168	192	254
CO	1397	1641	2201	3638	9426
PM10	9	27	39	64	138
PM2.5	6	8	13	26	82

Acre Below		**Acre Above**	
SRA No.	Acres	SRA No.	Acres
21	3	21	4
Distance Increment Below			
25			
Distance Increment Above			
25			

Updated: 1/23/2009 - Table C-1. 2005 – 2007

Operation Localized Significance Thresholds - Dana Hills High School

SRA No.	Acres	Source Receptor Distance (meters)	Source Receptor Distance (Feet)
21	3.42	25	82

Source Receptor	**Capistrano Valley**
Distance (meters)	25
NOx	**162**
CO	**1397**
PM10	**2**
PM2.5	**1**

	Acres	**25**	**50**	**100**	**200**	**500**
NOx	3	153	148	160	184	248
	4	175	168	180	203	263
		162	156	168	192	254
CO	3	1282	1519	2052	3439	9138
	4	1556	1810	2407	3913	9823
		1397	1641	2201	3638	9426
PM10	3	2	6	9	15	33
	4	3	8	11	17	34
		2	7	10	16	33
PM2.5	3	1	2	3	7	19
	4	2	3	4	7	21
		1	2	3	7	20

Capistrano Valley

3.42 Acres

	25	**50**	**100**	**200**	**500**
NOx	162	156	168	192	254
CO	1397	1641	2201	3638	9426
PM10	2	7	10	16	33
PM2.5	1	2	3	7	20

Acre Below		**Acre Above**	
SRA No.	Acres	SRA No.	Acres
21	3	21	4
Distance Increment Below			
25			
Distance Increment Above			
25			

Updated: 1/23/2009 - Table C-1. 2005 – 2007

Greenhouse Gases Emission from Energy Use - Dana Hills High School

Proposed Uses - Commercial

Land Use	Area (ft^2)	Energy Consumption (kWh/ft^2/Year)	lbs of CO_2e/Year
Education	30,560	11	205,499
Total for Commercial	**30560**	**11**	**205,499**
		Tons	103
		lbs/day	563
Net Increase	**Energy Use**	**lbs of CO_2e/Year**	205,499
		Metric Tons/year	93
		Tons/Year	103
		lbs/day	563
		Percent of State	0.0000%

Sources

Note: New structures would be constructed to meet newer California Building Code energy efficiency requirements

[1]Based on CARB emissions inventory of GHG emissions for the State of California in 1990 of 471 million short tons of CO2e (427 million metric tons of CO2e) of in state emissions adopted in December 2007.

[1] Commercial energy use based on Table C14 US Energy Information Admininstration www.eia.doe.gov/emeu/cbecs/

[1] Residential energy use based on US Energy Information Administration www.eia.doe.gov Table US1. Total Energy Consumption, Expenditures, and Intensitities, 2005. Part 1: Housing Unit Characteristics and Energy Usage Indicators Released January 2009.

California Energy Emission Factors

0.61	lbs of CO2/kwh	For California
0.0000067	lbs of CH4/kwh	For California
0.00000378	lbs of N20/kwh	For California

US EUA http://www.eia.doe.gov/oiaf/1605/ee-factors.html

GHG Potential - Coversion to CO2e	CH4	N20
	21	310
lbs of CO2e/kwh	**0.611**	

Conversion Factors

0.0005	lbs in a ton
0.9071847	Metric Tons
0.000293	BTU (British Thermal Units) in a kwh
471,000,000	tons of CO2e in 1990 and Goal for 2020:

Based on CARB emissions inventory of GHG emissions for the State of California in 1990 of 471 million short tons of CO2e (427 million metric tons of CO2e) of in state emissions adopted in December 2007.

Appendix B
Cultural Resources Records Search Result

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McKenna et al.

History/Archaeology/Historic Architecture/Paleontology

Jeanette A. McKenna, MA
Registered Prof. Archaeologist
Owner and Principal Investigator

March 21, 2009

THE PLANNING CENTER
Attn: Elizabeth Kim
1580Metro Drive
Costa Mesa, California 92626

RE: Archaeological Records Search, Dana Hills High School, Dana Point.

Dear Andy:

In response to your request, McKenna et al. completed a standard archaeological records search for the Dana Hills High School property at 33333 Golden Lantern, in the City of Dana Point, Orange County, California. I have attached the necessary supporting documentation resulting from this research.

In summarizing the research, a minimum of twenty-seven studies have been completed within one half mile of the school site. Of these, three were immediately adjacent or involved portions of the school property (Jackson 1974, OR-21; Westec Services 1976, OR-1014; and Brechbiel 1998, OR-1738). The majority (95%+) of the school site has not been investigated for cultural resources.

The surrounding properties have been intensively studied, resulting in the identification of four archaeological sites: 30-000371 (Desautels 1972); 30-000434 (Ellis, Hardesty, and Crabtree 1973); 30-000603 (Desautels 1976); and 30-000642 (Tadlock and Tadlock 1977). In each case, these sites were identified as lithic scatters with groundstone, shell, flakes, and possible midden. Site 30-000642 was the most extensive resource, exhibiting a wide range of artifacts with considerable depth. None of these four sites will be impacted by any proposed activities within the school site.

A review of various listing for significant resources showed no California Points of Historical Interest, no California Historic Landmarks, no registered California Historic Places, and no National Register of Historic Places properties within ½ mile of the project area. In contrast, the California Historic Resources Inventory listed nine properties evaluated within ½ mile, including:

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33771 Blue Lantern Street (1928)
33792 Blue Lantern Street (1929)
33959 Chula Vista Avenue (1928)
34031 Chula Vista Avenue (1930)
33802 El Encanto Avenue (1930)
33901 El Encanto Avenue (1929)
33912 El Encanto Avenue (1930)
33962 Granada Avenue (1929)
24441 La Cresta Drive (1929)

A review of historic maps failed to indicate any historic development within the specific project area. Overall, the research suggests the Dana Hills High School property is likely to be sensitive for evidence of prehistoric archaeological resources, but not historic archaeological resources. All standing structures within the school site are considered modern and of no historic significance. Based on the extent of modern development within the project area, there is no apparent need to complete a surface survey. However, should portions of the property be scheduled for redevelopment, an archaeological monitoring program should be considered.

If you have any questions regarding this summary, please feel free to call me at your convenience.

Sincerely,

Jeanette A. McKenna, Principal
McKenna et al.

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Anonymous
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Archaeological Advisory Group
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Desautels, Roger

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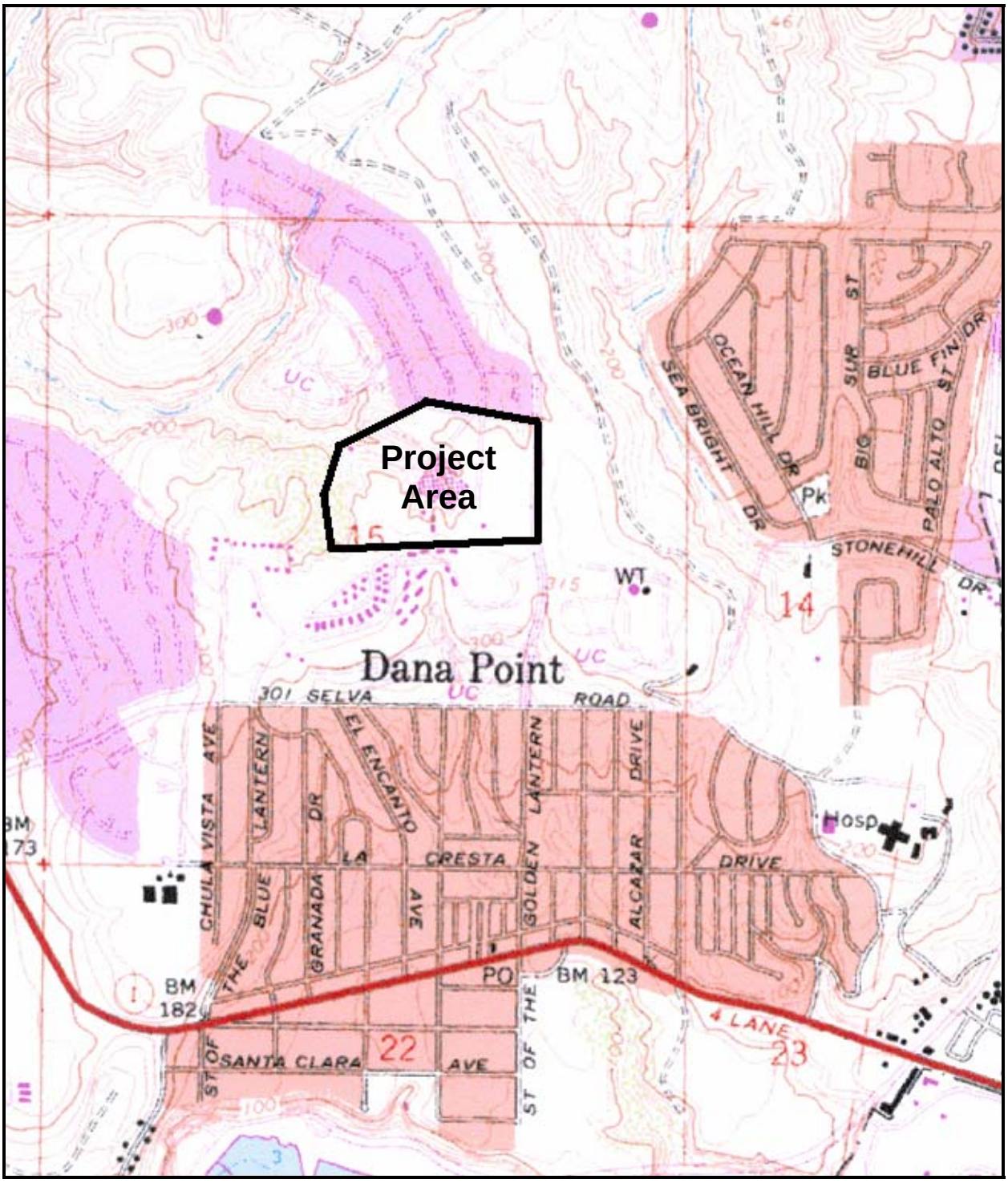

Figure 1. Specific Location of the Dana Hills High School Site (USGS Dana Point Quadrangle, rev. 1975).

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Figure 2. Aerial Photograph Illustrating Current School Complex.

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California Historical Resources Information System
Orange, Los Angeles, and Ventura Counties

March 18, 2009 SCCIC #9349.6290

Ms. Jeanette McKenna
McKenna et al.
6008 Friends Ave.
Whittier, CA 90601
562.696.3852

RE: Records Search for McKenna et al. Job #1420, 33333 Golden Lantern St., Dana Point.

Dear Ms. McKenna,

As per your request received on February 25, 2009, a records search was conducted for the above referenced project. The search includes a review of all recorded archaeological sites within a ½-mile radius of the project site as well as a review of cultural resource reports on file. In addition, the California Points of Historical Interest (PHI), the California Historical Landmarks (CHL), the California Register of Historical Resources (CR), the National Register of Historic Places (NR), and the California State Historic Resources Inventory (HRI) listings were reviewed for the above referenced project. The following is a discussion of the findings.

Dana Point, CA. USGS 7.5' Quadrangle

ARCHAEOLOGICAL RESOURCES:

Four archaeological sites (30-000371, 30-000434, 30-000603, and 30-000642) have been identified within a ½-mile radius of the project site. No archaeological sites are located within the project site. No sites are listed on the Archaeological Determination of Eligibility (DOE) list. No isolates have been identified within a ½-mile radius of the project site. No isolates are located within the project site.

HISTORIC RESOURCES:

Copies of our historic maps – San Juan Capistrano (1942) 15' USGS - are enclosed for your review.

The California Point of Historical Interest of the Office of Historic Preservation, Department of Parks and Recreation, lists no properties within a ½-mile radius of the project site.

The California Historical Landmarks of the Office of Historic Preservation, Department of Parks and Recreation, lists no properties within a ½-mile radius of the project site.

The California Register of Historic Places lists no properties within a ½-mile radius of the project site. These are properties determined to have a National Register of Historic Places Status of 1 or 2, a California Historical Landmark numbering 770 and higher, or a Point of Historical Interest listed after 1/1/1998.

The National Register of Historic Places lists no properties within a ½-mile radius of the project site.

The California Historic Resources Inventory lists nine properties that have been evaluated for historical significance within a ½-mile radius of the project site (see enclosed list).

PREVIOUS CULTURAL RESOURCES INVESTIGATIONS:

Twenty-seven studies (OR21*, OR107, OR131, OR146, OR149, OR154, OR158, OR159, OR161, OR177, OR181, OR231, OR296, OR372, OR439, OR450, OR490, OR540, OR542, OR733, OR823, OR850, OR902, OR1014*, OR1738*, OR2318, and OR2567) have been conducted within a ½-mile radius of the project site. Of these, three are located within the project site. There are six additional investigations located on the Dana Point, CA. 7.5' USGS Quadrangle that are potentially within a ½-mile radius of the project site. These reports are not mapped due to insufficient locational information.
(= Located within the project site)*

Please forward a copy of any resulting reports from this project to the office as soon as possible. Due to the sensitive nature of archaeological site location data, we ask that you **do not include** resource location maps and resource location descriptions in your report if the report is for public distribution. If you have any questions regarding the results presented herein, please contact the office at 714.278.5395 Monday through Thursday 9:00 am to 3:30 pm.

Should you require any additional information for the above referenced project, reference the SCCIC number listed above when making inquiries. Requests made after initial invoicing will result in the preparation of a separate invoice.

Sincerely,
SCCIC

Michelle Galaz
Staff Researcher

Enclosures:

(X) Maps – 7.5' USGS Quadrangle, 15' USGS Quadrangle – 5 pages
(X) Bibliography – 6 pages
(X) Bibliography of Unmapped Reports – 2 pages
(X) HRI – 1 page
(X) National Register Status Codes – 1 page
(X) Site Records – (30-000371, 30-000434, 30-000603, and 30-000642) – 12 pages
(X) Survey Reports – (OR21, OR1014, and OR1738) – 8 pages
(X) Survey Report Title Pages – 24 pages
(X) Confidentiality Form
(X) Invoice #9349.6290

PROPERTY-NUMBER	PRIMARY-#	STREET.ADDRESS.....	NAMES.....	CITY.NAME.....	OWN	YR-C	OHP-PROG..	PRG-REFERENCE-NUMBER	STAT-DAT	NRS	CRIT
069862	30-161865	5431 DELONG ST		CYPRESS	U	1930	PROJ.REVW.	HUD900823C	01/11/91	6Y	
116521		5660 ORANGEWOOD AVE		CYPRESS	F	1965	HIST.RES.	DOE-30-98-0001-0000	07/29/98	6Y	
							PROJ.REVW.	USN980707A	07/29/98	6Y	
073458	30-161898	0	VIRGINIA / DANA POINT YOUTH AND GR	DANA POINT	P	1913	HIST.RES.	NPS-91000337-0000	04/02/91	1S	C
							NAT.REG.	30-0006	04/02/91	1S	C
035900	30-156541	33771 BLUE LANTERN ST		DANA POINT	P	1928	HIST.SURV.	2629-0001-0021		5D2	
035899	30-156540	33792 BLUE LANTERN ST		DANA POINT	P	1929	HIST.SURV.	2629-0001-0020		5D2	
035902	30-156543	33959 CHULA VISTA AVE		DANA POINT	P	1928	HIST.SURV.	2629-0001-0023		5D2	
035903	30-156544	34031 CHULA VISTA AVE		DANA POINT	P	1930	HIST.SURV.	2629-0001-0024		5D2	
035904	30-156545	COAST HWY	DANA POINT	DANA POINT	P	1928	HIST.SURV.	2629-0001-9999		5S2	
							HIST.RES.	SHL-0189-0000	06/20/35	7L	
035881	30-156523	34090 COAST HWY		DANA POINT	P	1928	HIST.SURV.	2629-0001-0002		5D2	
035882	30-156524	34098 COAST HWY		DANA POINT	P	1928	HIST.SURV.	2629-0001-0003		5D2	
035883	30-156525	34105 COAST HWY		DANA POINT	P	1928	HIST.SURV.	2629-0001-0004		5D2	
035884	30-156526	34111 COAST HWY		DANA POINT	P	1928	HIST.SURV.	2629-0001-0005		5D2	
035885	30-156527	34175 COAST HWY		DANA POINT	P	1928	HIST.SURV.	2629-0001-0006		5D2	
035887	30-156529	DEL OBISPO RD	SCENIC INN	DANA POINT	C	1924	HIST.SURV.	2629-0001-0008		3S	
066660	30-161831	24521 DEL PRADO AVE	DANA POINT MPO	DANA POINT	U		PROJ.REVW.	USPS870203E	06/06/88	6Y	
066661	30-161832	24561 DEL PRADO AVE	DANA POINT MPO	DANA POINT	U		PROJ.REVW.	USPS870203E	06/06/88	6Y	
066662	30-161833	24581 DEL PRADO AVE	DANA POINT MPO	DANA POINT	U		PROJ.REVW.	USPS870203E	06/06/88	6Y	
035886	30-156528	DEL PRADO ST	DANA POINT INN, DANA POINT INN RUI	DANA POINT	U	1928	HIST.SURV.	2629-0001-0007		3S	
035880	30-156522	24720 DEL PRADO ST	DANA POINT INN WAREHOUSE	DANA POINT	P	1928	HIST.SURV.	2629-0001-0001		3S	
035891	30-156532	24622 EL CAMINO CAPISTRANO		DANA POINT	P	1928	HIST.SURV.	2629-0001-0012		5D2	
							HIST.SURV.	2629-0001-0011		5D1	
035892	30-156533	24642 EL CAMINO CAPISTRANO		DANA POINT	P	1928	HIST.SURV.	2629-0001-0013		5D2	
035893	30-156534	24711 EL CAMINO CAPISTRANO		DANA POINT	P	1928	HIST.SURV.	2629-0001-0014		5D2	
035894	30-156535	24721 EL CAMINO CAPISTRANO		DANA POINT	P	1928	HIST.SURV.	2629-0001-0015		5D2	
035895	30-156536	33802 EL ENCANTO AVE		DANA POINT	P	1930	HIST.SURV.	2629-0001-0016		5D2	
035896	30-156537	33901 EL ENCANTO AVE		DANA POINT	P	1929	HIST.SURV.	2629-0001-0017		5D2	
035897	30-156538	33912 EL ENCANTO AVE		DANA POINT	P	1930	HIST.SURV.	2629-0001-0018		5D2	
035898	30-156539	33962 GRANADA AVE		DANA POINT	P	1929	HIST.SURV.	2629-0001-0019		5D2	
035901	30-156542	24441 LA CRESTA DR		DANA POINT	P	1929	HIST.SURV.	2629-0001-0022		5D2	
035888	30-156530	24401 SANTA CLARA AVE		DANA POINT	P	1928	HIST.SURV.	2629-0001-0009		5D2	
035889	30-156531	24422 SANTA CLARA AVE		DANA POINT	P	1929	HIST.SURV.	2629-0001-0010		5D2	
069495	30-161860		SAN JOAQUIN HILL DISTRICT	EAST IRVINE	U		PROJ.REVW.		10/28/77	2S	
037152	30-157787	SR 5	BRIDGE #55-02L	(VIC) EAST IRVINE	S	1929	HIST.SURV.	2650-0001-0000		7R	
117878		5103 1ST ST	BUILDING #5103 / MARRIED HOUSING /	EL TORO	F	1947	HIST.RES.	DOE-30-98-0625-0000	09/15/98	6Y	
							PROJ.REVW.	USMC980828A	09/15/98	6Y	
117880		5152 5TH ST	BUILDING #5152 / MARRIED HOUSING /	EL TORO	F	1947	HIST.RES.	DOE-30-98-0627-0000	09/15/98	6Y	
							PROJ.REVW.	USMC980828A	09/15/98	6Y	
117925		5157 5TH ST	BUILDING #5157 / OFFICERS HOUSING	EL TORO	F	1964	HIST.RES.	DOE-30-98-0672-0000	09/15/98	6Y	
							PROJ.REVW.	USMC980828A	09/15/98	6Y	
117926		5158 5TH ST	BUILDING #5158 / OFFICERS HOUSING	EL TORO	F	1964	HIST.RES.	DOE-30-98-0673-0000	09/15/98	6Y	
							PROJ.REVW.	USMC980828A	09/15/98	6Y	
117927		5159 5TH ST	BUILDING #5159 / OFFICERS HOUSING	EL TORO	F	1964	HIST.RES.	DOE-30-98-0674-0000	09/15/98	6Y	
							PROJ.REVW.	USMC980828A	09/15/98	6Y	
117918		8682 BOUGAINVILLE PL	BUILDING #5669 / WHERRY VILLAGE /	EL TORO	F	1954	HIST.RES.	DOE-30-98-0665-0000	09/15/98	6Y	
							PROJ.REVW.	USMC980828A	09/15/98	6Y	
117917		8682 BOUGAINVILLE PL	BUILDING #5668 / WHERRY VILLAGE /	EL TORO	F	1954	HIST.RES.	DOE-30-98-0664-0000	09/15/98	6Y	
							PROJ.REVW.	USMC980828A	09/15/98	6Y	
117915		8741 BOUGAINVILLE PL	BUILDING #5654 / WHERRY VILLAGE /	EL TORO	F	1954	HIST.RES.	DOE-30-98-0662-0000	09/15/98	6Y	
							PROJ.REVW.	USMC980828A	09/15/98	6Y	

California Historical Resource Status Codes

1 Properties listed in the National Register (NR) or the California Register (CR)

1D Contributor to a district or multiple resource property listed in NR by the Keeper. Listed in the CR.
1S Individual property listed in NR by the Keeper. Listed in the CR.

1CD Listed in the CR as a contributor to a district or multiple resource property by the SHRC
1CS Listed in the CR as individual property by the SHRC.
1CL Automatically listed in the California Register – Includes State Historical Landmarks 770 and above and Points of Historical Interest nominated after December 1997 and recommended for listing by the SHRC.

2 Properties determined eligible for listing in the National Register (NR) or the California Register (CR)

2B Determined eligible for NR as an individual property and as a contributor to an eligible district in a federal regulatory process. Listed in the CR.
2D Contributor to a district determined eligible for NR by the Keeper. Listed in the CR.
2D2 Contributor to a district determined eligible for NR by consensus through Section 106 process. Listed in the CR.
2D3 Contributor to a district determined eligible for NR by Part I Tax Certification. Listed in the CR.
2D4 Contributor to a district determined eligible for NR pursuant to Section 106 without review by SHPO. Listed in the CR.
2S Individual property determined eligible for NR by the Keeper. Listed in the CR.
2S2 Individual property determined eligible for NR by a consensus through Section 106 process. Listed in the CR.
2S3 Individual property determined eligible for NR by Part I Tax Certification. Listed in the CR.
2S4 Individual property determined eligible for NR pursuant to Section 106 without review by SHPO. Listed in the CR.

2CB Determined eligible for CR as an individual property and as a contributor to an eligible district by the SHRC.
2CD Contributor to a district determined eligible for listing in the CR by the SHRC.
2CS Individual property determined eligible for listing in the CR by the SHRC.

3 Appears eligible for National Register (NR) or California Register (CR) through Survey Evaluation

3B Appears eligible for NR both individually and as a contributor to a NR eligible district through survey evaluation.
3D Appears eligible for NR as a contributor to a NR eligible district through survey evaluation.
3S Appears eligible for NR as an individual property through survey evaluation.

3CB Appears eligible for CR both individually and as a contributor to a CR eligible district through a survey evaluation.
3CD Appears eligible for CR as a contributor to a CR eligible district through a survey evaluation.
3CS Appears eligible for CR as an individual property through survey evaluation.

4 Appears eligible for National Register (NR) or California Register (CR) through other evaluation

4CM Master List - State Owned Properties – PRC §5024.

5 Properties Recognized as Historically Significant by Local Government

5D1 Contributor to a district that is listed or designated locally.
5D2 Contributor to a district that is eligible for local listing or designation.
5D3 Appears to be a contributor to a district that appears eligible for local listing or designation through survey evaluation.

5S1 Individual property that is listed or designated locally.
5S2 Individual property that is eligible for local listing or designation.
5S3 Appears to be individually eligible for local listing or designation through survey evaluation.

5B Locally significant both individually (listed, eligible, or appears eligible) and as a contributor to a district that is locally listed, designated, determined eligible or appears eligible through survey evaluation.

6 Not Eligible for Listing or Designation as specified

6C Determined ineligible for or removed from California Register by SHRC.
6J Landmarks or Points of Interest found ineligible for designation by SHRC.
6L Determined ineligible for local listing or designation through local government review process; may warrant special consideration in local planning.
6T Determined ineligible for NR through Part I Tax Certification process.
6U Determined ineligible for NR pursuant to Section 106 without review by SHPO.
6W Removed from NR by the Keeper.
6X Determined ineligible for the NR by SHRC or Keeper.
6Y Determined ineligible for NR by consensus through Section 106 process – Not evaluated for CR or Local Listing.
6Z Found ineligible for NR, CR or Local designation through survey evaluation.

7 Not Evaluated for National Register (NR) or California Register (CR) or Needs Revaluation

7J Received by OHP for evaluation or action but not yet evaluated.
7K Resubmitted to OHP for action but not reevaluated.
7L State Historical Landmarks 1-769 and Points of Historical Interest designated prior to January 1998 – Needs to be reevaluated using current standards.
7M Submitted to OHP but not evaluated - referred to NPS.
7N Needs to be reevaluated (Formerly NR Status Code 4)
7N1 Needs to be reevaluated (Formerly NR SC4) – may become eligible for NR w/restoration or when meets other specific conditions.
7R Identified in Reconnaissance Level Survey: Not evaluated.
7W Submitted to OHP for action – withdrawn.

SCCIC Bibliography: McKenna et al. Job #1420

OR-00021

Author(s): Jackson, E. A., Jr.
Year: 1974
Title: An Archaeological Survey of a 22.7 Acre Parcel (tract #6928) in Dana Point, California.
Affiliation: VTN CONSOLIDATED, INC.
Resources: 30-000434
Quads: DANA POINT
Pages:
Notes:

OR-00107

Author(s): Desautels, Roger J.
Year: 1976
Title: Archaeological Survey Report on a Parcel of Land Located in the Dana Point Area of the County of Orange
Affiliation: Scientific Resource Surveys, Inc.
Resources:
Quads: DANA POINT
Pages:
Notes:

OR-00131

Author(s): Desautels, Roger J.
Year: 1976
Title: Archaeological Survey Report on One Half Acre of Land Located in the Dana Point Area of the County of Orange
Affiliation: Scientific Resource Surveys, Inc.
Resources:
Quads: DANA POINT
Pages:
Notes:

OR-00146

Author(s): Desautels, Roger J.
Year: 1977
Title: Archaeological Field Test Report on Parcel 4 - Block 051 Located in the Dana Point Area of the County of Orange, California
Affiliation: Scientific Resource Surveys, Inc.
Resources: 30-000603
Quads: DANA POINT
Pages:
Notes:

OR-00149

Author(s): Desautels, Roger J.
Year: 1977
Title: Archaeological Survey Report on 3/4 Acres of Land Located in the Dana Point Area of the County of Orange
Affiliation: Scientific Resource Surveys, Inc.
Resources:
Quads: DANA POINT
Pages:
Notes:

SCCIC Bibliography: McKenna et al. Job #1420

OR-00154

Author(s): Desautels, Roger J.
Year: 1977
Title: Archaeological Survey Report on Property Located in the Dana Point Area of the County of Orange
Affiliation: Scientific Resource Surveys, Inc.
Resources:
Quads: DANA POINT
Pages:
Notes:

OR-00158

Author(s): Desautels, Roger J.
Year: 1977
Title: Archaeological Survey Report on Lot 21, Block 3, Tract 857 Located in the Dana Point Area of Orange County
Affiliation: Scientific Resource Surveys, Inc.
Resources:
Quads: DANA POINT
Pages:
Notes:

OR-00159

Author(s): Desautels, Roger J.
Year: 1976
Title: Archaeological Survey Report on Parcels 2 and 4 of Tentative Tract No. 9406 Located in the Dana Point Area of the County of Orange.
Affiliation: Scientific Resource Surveys, Inc.
Resources:
Quads: DANA POINT
Pages:
Notes:

OR-00161

Author(s): Desautels, Roger J.
Year: 1977
Title: Archaeological Survey Report on Lots 10 and 11 - Block 4 -tract 881 Located in the Dana Point Area of Orange County
Affiliation: Scientific Resource Surveys, Inc.
Resources:
Quads: DANA POINT
Pages:
Notes:

SCCIC Bibliography: McKenna et al. Job #1420

OR-00177

Author(s): Desautels, Roger J.
Year: 1977
Title: Archaeological Survey Report on Lot No's 1 and 44, Block 3, Tract 861 Located in the Dana Point Area of the County of Orange, California
Affiliation: Scientific Resource Surveys, Inc.
Resources:
Quads: DANA POINT
Pages:
Notes:

OR-00181

Author(s): Desautels, Roger J.
Year: 1977
Title: Archaeological Survey Report on Parcel 4-b of the Bear Brand Ranch Property Located in the Dana Point Area
Affiliation: Scientific Resource Surveys, Inc.
Resources:
Quads: DANA POINT
Pages:
Notes:

OR-00231

Author(s): Cottrell, Marie G.
Year: 1978
Title: Archaeological Resource Assessment Conducted for Areas C and D, Laguna Niguel, California
Affiliation: Archaeological Resource Management Corp.
Resources:
Quads: DANA POINT
Pages:
Notes:

OR-00296

Author(s): Van Horn, David M.
Year: 1978
Title: Archaeological Survey Report: Tentative Tract 10131 in Dana Point, Orange County, Ca.
Affiliation: Archaeological Associates, Ltd.
Resources:
Quads: DANA POINT
Pages:
Notes:

OR-00372

Author(s): Van Horn, David M.
Year: 1977
Title: Archaeological Test Report on Thunderbird Capistrano - Tract No. 6928, Parcel 3, Located in the Dana Point Area of the County of Orange
Affiliation: Archaeological Associates, Ltd.
Resources: 30-000434
Quads: DANA POINT
Pages:
Notes:

SCCIC Bibliography: McKenna et al. Job #1420

OR-00439

Author(s): Jertberg, Patricia R.
Year: 1979
Title: Report of the Archaeological Investigations of Site CA-ORA-642
Affiliation: Archaeological Resource Management Corp
Resources: 30-000642
Quads: DANA POINT
Pages:
Notes:

OR-00450

Author(s): Aasved, Mikal J.
Year: 1979
Title: Archaeological Survey Report: a 5+- Acre Parcel Located Near Dana Point in the County of Orange, Ca.
Affiliation: Archaeological Associates, Ltd.
Resources:
Quads: DANA POINT
Pages:
Notes:

OR-00490

Author(s): Murray, Johnny, Nancy A. Whitney, and David M. Van Horn
Year: 1977
Title: Excavations at Thunderbird Capistrano: ORA-434
Affiliation: Archaeological Associates, Ltd.
Resources: 30-000434
Quads: DANA POINT
Pages:
Notes:

OR-00540

Author(s): Anonymous
Year: 1977
Title: Archaeological Resource Survey of the Bear Brand Ranch
Affiliation: Archaeological Research, Inc.
Resources: 30-000129, 30-000567, 30-000568, 30-000569, 30-000570
Quads: DANA POINT, SAN JUAN CAPISTRANO
Pages:
Notes:

OR-00542

Author(s): Cottrell, Marie G.
Year: 1977
Title: Archaeological Survey of a Portion of Parcel 3 of Bear Brand Ranch.
Affiliation: Archaeological Research, Inc.
Resources: 30-000540
Quads: DANA POINT, SAN JUAN CAPISTRANO
Pages:
Notes:

SCCIC Bibliography: McKenna et al. Job #1420

OR-00733

Author(s): Brock, James P.
Year: 1984
Title: Report on Archaeological/paleontological Monitoring at the 21 Unit Condominium Project Located at 33692 Alta Vista Drive, Dana Point, Unincorporated Orange County, California
Affiliation: Archaeological Advisory Group
Resources:
Quads: DANA POINT
Pages:
Notes:

OR-00823

Author(s): Bissell, Ronald M.
Year: 1986
Title: Cultural Resources Assessment of Shea Company Property and Surface Collection of Sites CA-ORA-493 and CA-ORA-540, Laguna Niguel, Orange County, California
Affiliation: RMW Paleo Associates, Inc.
Resources: 30-000493, 30-000540
Quads: DANA POINT, SAN JUAN CAPISTRANO
Pages:
Notes:

OR-00850

Author(s): Bissell, Ronald M.
Year: 1986
Title: Archaeological Site CA-ORA-1108: a Seed and Vegetable Fiber Collecting and Processing Station in Laguna Niguel, Orange County, California
Affiliation: RMW Paleo Associates, Inc.
Resources: 30-001108
Quads: DANA POINT, SAN JUAN CAPISTRANO
Pages:
Notes:

OR-00902

Author(s): Bissell, Ronald M.
Year: 1987
Title: Cultural Resources Reconnaissance of a Small Parcel of Land Located in Dana Point Orange County, California
Affiliation: RMW Paleo Associates, Inc.
Resources: 30-000603
Quads: DANA POINT
Pages:
Notes:

SCCIC Bibliography: McKenna et al. Job #1420

OR-01014

Author(s): Anonymous
Year: 1976
Title: Archaeological Survey of Thunderbird Capistrano Planned Community
Affiliation: Westec Services, Inc.
Resources: 30-000434
Quads: DANA POINT
Pages:
Notes:

OR-01738

Author(s): Brechbiel, Brant A.
Year: 1998
Title: Cultural Resources Records Search and Literature Review Report for a Pacific Bell Mobile Services Telecommunications Facility: Cm 160-03 in the City of Dana Point, California
Affiliation: Chambers Group, Inc.
Resources:
Quads: DANA POINT
Pages:
Notes:

OR-02318

Author(s): Crabtree, Robert H.
Year: 1972
Title: Tentative Tract 8216 Near Dana Point, California a Final Archaeological Report
Affiliation: Archaeological Research, Inc.
Resources:
Quads: DANA POINT
Pages:
Notes:

OR-02567

Author(s): Patterson, Marie
Year: 1973
Title: Archaeological Research Inc. and an Archaeological Site Located in Dana Point, California Tentative Trace #8216
Affiliation: Archaeological Research, Inc.
Resources: 30-000642
Quads: DANA POINT
Pages:
Notes: No map included

SCCIC Bibliography: McKenna et al. Job #1420 - UNMAPPED

OR-00055

Author(s): Anonymous
Year: 1977
Title: A Report on Cultural/scientific Resources for County of Orange
Affiliation: Cultural/Scientific Resources Policy Task Force
Resources:
Quads:
Pages:
Notes: Indexed. Report covers all of Orange County.

OR-00286

Author(s): Bean, Lowell
Year: 1979
Title: Cultural Resources and the High Voltage Transmission Line From San Onofre to Santiago Substation and Black Star Canyon
Affiliation: Cultural Systems Research, Inc.
Resources: 30-000001, 30-000002, 30-000003, 30-000004, 30-000005, 30-000007, 30-000011, 30-000012, 30-000013, 30-000014, 30-000015, 30-000016, 30-000017, 30-000018, 30-000019, 30-000020, 30-000021, 30-000022, 30-000023, 30-000024, 30-000025, 30-000026, 30-000027, 30-000028, 30-000029, 30-000030, 30-000031, 30-000032, 30-000033, 30-000034, 30-000037
Quads: BLACK STAR CANYON, CANADA GOBERNADORA, TUSTIN, LAGUNA BEACH, EL TORO, SAN JUAN CAPISTRANO, DANA POINT, SANTIAGO PEAK, SAN CLEMENTE
Pages:
Notes: Not Mapped correctly on our Quads. (see page I-4 in report for description of survey area) UNMAPPABLE

OR-00564

Author(s): Cottrell, Marie G.
Year: 1977
Title: Archaeological Resource Survey and Assessment Conducted for the Proposed Prima Deshecha Regional Park, County of Orange, California
Affiliation: Archaeological Research, Inc.
Resources: 30-000700, 30-000701
Quads: CANADA GOBERNADORA, SAN CLEMENTE
Pages:
Notes: No map. Report contains insufficient locational information.

OR-01465

Author(s):
Year: 1990
Title: Archaeological, Paleontological and Historical Literature Search and Records Check for South Coastal Orange County Central Pool Relief
Affiliation: Scientific Resource Surveys, Inc.
Resources:
Quads: DANA POINT, SAN JUAN CAPISTRANO, LAGUNA BEACH
Pages:
Notes:

Appendix C
Geotechnical Report

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NMG
Geotechnical, Inc.

February 18, 2009

Project No. 08091-01

To: Capistrano Unified School District
33122 Valle Road
San Juan Capistrano, California 92675

Attention: Mr. John Forney

Subject: Geotechnical Investigation and Conceptual Plan Review, Performing Arts Facility, Dana Hills High School, City of Laguna Niguel, California

In accordance with your request and authorization, NMG Geotechnical, Inc. (NMG) has performed a geotechnical investigation for the proposed performing arts facility at the subject site (Figure 1). The purpose of our investigation was to evaluate the geologic site conditions in light of the proposed performing arts facility in order to provide geotechnical recommendations for foundations, remedial grading and construction. We utilized the 20-scale conceptual plan, prepared by WLC Architects (WLC), received by NMG on February 2, 2009, as the base map for the Geotechnical and Remedial Measures Map (Plate 1).

The geologic conditions at the subject area consist of native bedrock material with areas of shallow fill underlying the proposed performing arts facility. Based on our subsurface investigation and analysis of the collected data, the proposed performing arts facility is feasible from a geotechnical viewpoint, provided our recommendations are incorporated into the foundation design and implemented during grading and construction. This report includes our findings, conclusions and preliminary recommendations for design, rough grading, and construction.

If you have any questions regarding this report, please contact us. We appreciate the opportunity to provide our services.

Respectfully submitted,

NMG GEOTECHNICAL, INC.

William Goodman

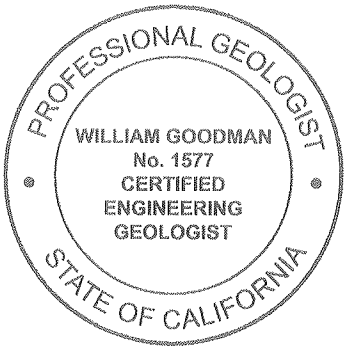
William Goodman, CEG 1577
Principal Geologist

Chester M. Burrous

Chester M. Burrous, GE 2124
Associate Engineer

CMB/WG/er

Distribution: (2) Addressee
(5) Mrs. Betty Sabol, WLC Architects (including copies for Agency submittal)
(1) Mr. Rick Byrd, Byrd and Associates, Inc



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Illustrations

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1.0 INTRODUCTION

1.1 Purpose and Scope of Work

The purpose of our investigation was to evaluate the existing geologic site conditions in light of the proposed performing arts center, in order to provide preliminary geotechnical recommendations for foundation design, grading and construction. The findings, conclusions and recommendations provided in this report are based upon our review of the 20-scale conceptual plan prepared by WLC, site reconnaissance, subsurface investigation, laboratory testing, analysis, our prior work on the site, and conversations with members of the project team (architect, structural engineer and civil engineer).

Our scope of work included the following:

- Review of historic stereographic pairs of historic aerial photographs pertinent to the site and surrounding area during the time period from 1952 to 1999 (referenced in Appendix A).
- Background review of available published and unpublished reports and maps (Appendix A), including our previous reports for the nearby two-story modular buildings (NMG, 2005, 2006 and 2007).
- Site reconnaissance to document existing site conditions and to coordinate clearance with school representatives and Underground Service Alert (USA) prior to subsurface exploration.
- Drilling, logging, sampling and backfilling of five hollow-stem-auger borings (H-5 through H-9) ranging in depth from 31.5 to 51.5 feet. Approximate boring locations are shown on Plate 1 and the boring logs are included in Appendix B. Boring logs from the nearby, previous investigation are also included in Appendix B.
- Laboratory testing of relatively undisturbed ring and bulk soil samples. Soil moisture and density test results are included on the boring logs (Appendix B). Additional test results are summarized in Appendix C, which also includes test results from nearby previous investigations.
- Review of the 20-scale conceptual plan prepared by WLC, received by NMG on February 2, 2009. The conceptual plan was utilized as the base map to present the location of borings and the recommended remedial grading measures (Plate 1).
- Geotechnical evaluation and analysis of the compiled data with respect to the proposed performing arts facility.
- Preparation of this report including our findings, conclusions and recommendations.

1.2 Site Location and Existing Conditions

The subject site is located on the east side of the existing Dana Hills High School, which is located to the northwest of the intersection of Avenue of the Golden Lantern and Stonehill Drive in Laguna Niguel, Orange County, California. The subject site lies within the USGS 7.5-minute Dana Point Quadrangle (Figure 1).

The area addressed by this report is roughly rectangular in shape and is in the area of the existing parking area, access road and tennis courts along the east side of the main school building. There are existing utilities (electrical and gas) within the area that will need to be relocated during future grading and construction.

1.3 Site History

Our review of historic stereographic aerial photographs dating back to the early 1950's (listed in Appendix A) revealed the following:

- In 1952, the site was vacant and characterized by relatively flat-topped low hills with incised, tributary canyons that drain to the west.
- By 1973 the high school had been constructed as well as Golden Lantern and Stonehill Road.
- By 1975 the pool had been constructed.
- Between 1975 and 1999 several temporary buildings existed in the area between the ball fields and paved play area, south of the main school building

1.4 Previous Investigations and Grading

Background review of available published and unpublished maps and reports indicate the subject site remained undeveloped until 1970 (Appendix A). The original topography consisted of relatively flat-topped low hills with incised tributary canyons that drain to the west. Between 1970 and 1973, rough grading for the high school was performed. Geotechnical investigations or grading reports documenting this work were not available within the City of Dana Point records. NMG conducted a prior geotechnical investigation for the two-story modular buildings that are currently located southwest of the main building (NMG, 2005 and 2006). NMG also provided services during grading and construction for the new buildings (NMG, 2007). Siltstone and claystone of the Capistrano Formation (Tc) were encountered at grade for the buildings and in the adjacent slope.

1.5 Proposed Development

The proposed performing arts center is located to the east of the existing main building within the area of the existing tennis court and portions of the asphalt paved parking area and access road. The proposed structure is to include a choral room, scenery shop, band room, orchestra room, black box theater, auditorium, stage and associated storage, restrooms and offices (Plate 1). It is our understanding that the auditorium is proposed to have a sloped floor with interior retaining walls up to 5 feet high. Our review and recommendations are based on the conceptual plan provided by WLC architects, and received by NMG on February 2, 2009.

Based on discussions with the architect and our review of the plan, it appears that the subject facilities will have slab-on-ground foundations. A retaining wall up to 10 feet high may be required along the eastern portion of the subject area adjacent to the existing baseball fields.

The planned grading is unknown at this time because no design grades have been provided. We anticipate both design cuts and fills, probably less than ±5 feet. In addition, remedial removals will be needed to remove any undocumented fills (such as anticipated under the tennis courts) and any weathered, loosened or porous bedrock that is exposed.

1.6 Field Investigation

Subsurface exploration was conducted on December 10, 2008 and January 12, 2009. Exploration consisted of five hollow-stem-auger borings (H-5 through H-9). The boring locations were staked and cleared with USA and personnel from the high school. The hollow-stem borings ranged in depth from 31.5 to 51.5 feet. The borings were geotechnically logged and sampled. Soil sampling in the borings was performed using the modified California ring sampler. Ring samples were obtained from the exploratory borings with a 2.5-inch-inside-diameter, split-barrel sampler. The sampler was driven with a 140-pound automatic-trip safety hammer, free-falling 30 inches. The sampling was used to assess soil types beneath the site, to obtain relatively undisturbed samples for laboratory testing and to obtain a measure of resistance of the soil to penetration (recorded as blows-per-foot on the geotechnical boring logs). The boring logs for these excavated borings are included in Appendix B, and the approximate locations are depicted on Plate 1. NMG boring logs from our prior investigation (NMG, 2005) are also included in Appendix B. However, they are located just beyond the limits of the Geotechnical Map (Plate 1).

1.7 Laboratory Testing

Laboratory tests performed on representative samples included:

- Moisture content and dry density on all relatively undisturbed samples;
- Consolidation tests;
- Grain-size distribution (sieve and hydrometer);
- Expansion Index;
- Corrosion Test (pH, resistivity and chloride content)
- Soluble Sulfate Content; and,
- Direct Shear.

Laboratory tests were conducted in general conformance with applicable ASTM test standards. Laboratory test results for this study and a nearby investigation (NMG, 2005) are presented in Appendix C, except for in-situ moisture and dry density results which are included on the geotechnical boring logs (Appendix B).

2.0 GEOTECHNICAL FINDINGS

2.1 Geologic Conditions and Earth Units

The site is located northwest of San Juan Creek in the southern San Joaquin Hills and is underlain by undocumented artificial fill and/or by the Pliocene Capistrano Formation (CDMG, 1974).

The Capistrano Formation **(Map Symbol Tc)** is anticipated to be encountered across the site and consists of massive to slightly laminated gray to very dark gray silty claystone/clayey siltstone. The bedrock is moist and stiff to hard with slight FeO/MnO staining along fractures.

The existing tennis courts are anticipated to be underlain by several feet of undocumented artificial fill **(Map Symbol Afu)** which likely consists of yellowish brown to olive silty sands that are in a relatively dense condition. It is anticipated that the fill is relatively shallow and will be fully removed during remedial grading

2.2 Regional Faulting and Seismicity

There are no known major or active faults mapped within the proposed development area, and no evidence of active faulting was observed during this exploration, or by prior work at the site (Appendix A). Our past investigations on the site (NMG, 2005) and geologic mapping shows that there are no geomorphic expressions or visible lineaments associated with active faulting at the site.

Regional Faults: The site is not located within a fault-rupture hazard zone as defined by the Alquist-Priolo Special Studies Zones Act (CDMG, 2003) and no evidence of active faulting was observed during this investigation. Also, based on mapping by the State (CDMG, 1974 and 2003), there are no active faults mapped at the site.

Utilizing the USGS computer program (USGS, 2002, updated 2008) and the site coordinates of 33.4778 degrees north latitude and 117.6993 degrees longitude, the closest major active faults to the site are the San Joaquin Hills Blind Thrust located below the site (9.6 km) and the Newport-Inglewood Fault (offshore) located approximately 4.9 km to the west of the site.

Buried thrust faults are often associated with active uplift and do not breach the ground surface. The San Joaquin Blind Thrust Fault is postulated as being located at depth (more than 2 km) beneath the site and the parameters for this fault are included in the USGS Program 2002 Interactive Deaggregations (USGS, 2002, updated 2008). These blind-thrust faults have been added to the State database for probabilistic seismic hazard assessment. The controlling fault for CBC seismic design at the site is the Newport-Inglewood Fault (offshore).

Seismicity: Properties in southern California are subject to seismic hazards of varying degrees depending upon the proximity, degree of activity, and capability of nearby faults. These hazards can be primary (i.e., directly related to the energy release of an earthquake such as surface rupture and ground shaking) or secondary (i.e., related to the effect of earthquake energy on the

physical world which can cause phenomena such as liquefaction and ground lurching). Since there are no known major or seismically active faults mapped at the site, the potential for ground rupture is considered very low to nil. The primary seismic hazard for this site is ground shaking due to a future earthquake on one of the major regional active faults, such as the San Joaquin Hills Blind Thrust, Newport-Inglewood, San Andreas, San Jacinto or Whittier-Elsinore Faults.

The computer program EQSEARCH (Version 3.00 updated 2004) (Blake, 2004) was utilized to review the estimates of the peak historic ground accelerations at the site based on historic earthquake events on regional faults. Based on historical data from this program and attenuation curves for Site Class D, the estimated maximum acceleration at the site during the time period 1800 to 2004 was 0.141g. This acceleration is attributed to the 6.3 magnitude Long Beach earthquake, which occurred in March of 1933, with the epicenter located approximately 7.7 miles northwest (offshore) of the site, on the Newport-Inglewood Fault.

The seismic design parameters presented in the Recommendations section of this report are based on the 2007 California Building Code (CBC), and were obtained for the site utilizing the computer programs EZFRISK (Risk Engineering, 2008) Seismic Hazard Curves and Uniform Hazard Response Spectra version 5.0.8-1 (USGS, 2007) and the 2002 Interactive Deaggregations (USGS, 2002 updated 2008).

The maximum moment magnitude for the Controlling Fault is 7.1 M_W, which would be generated from the Newport-Inglewood Fault. The site-specific seismic evaluation, including the output from EQSEARCH, EZFRISK and USGS (2007 and 2002 updated 2008), are included in Appendix E.

2.3 Secondary Seismic Hazards

Secondary seismic hazards such as tsunami and seiche need not be considered since the site is located away from the ocean or any confined bodies of water. The site is not located in an area classified by CDMG as susceptible to potential ground displacement as a result of seismic-induced slope movement or in an area mapped as having soils that are potentially liquefiable (CDMG, 2001 and Figure 1). Our Investigation confirmed that the conditions at the site are not conducive to liquefaction or seismic settlement (e.g., compacted fill over Capistrano bedrock). The generally cohesive soils beneath the site have high densities and high blow counts and the groundwater table is deeper than 50 feet.

2.4 Groundwater

Groundwater was not encountered during our subsurface exploration in the hollow-stem borings (51.5 feet). The groundwater table is not expected to be encountered during the proposed construction and should remain deep below the subject site.

2.5 Seismic Hazard Analysis

According to Section 1614A.1.2 of the 2007 California Building Code (CBC), a site-specific ground motion hazard analysis must be performed for structures that will be located within

10 kilometers (6.2 miles) of a known active fault. Ground motion hazard analyses were performed for the subject site utilizing the computer program EZFRISK, version 7.26 (Risk Engineering, 2008) in conjunction with data from the US Geological Survey National Seismic Hazards Mapping Program (NSHMP, 2007) and in accordance with the appropriate methods described in the American Society of Civil Engineers (ASCE) Standard 7-05 and the 2007 California Building Code (CBC).

Site Class and Attenuation Relationships

Based on our review of past investigations (NMG, 2005) and our subsurface investigation data, the subject site is underlain by undocumented fill and siltstone bedrock. Subsequent to grading, the building pad will be underlain by a few feet of compacted fill overlying siltstone/claystone bedrock. As a result, the subject site has been classified as Site Class D (very stiff soil profile), based on Table 1613A.5.2 of the 2007 CBC.

The regional attenuation relationships utilized in the analyses were developed by Abrahamson-Silva (2008), Boore-Atkinson (2007), and Campbell-Bozorgnia (2008). These relationships were selected based upon their compatibility with the site-specific earth materials and seismic source conditions. The average spectral acceleration values from these three attenuation relationships were used to generate the site-specific response spectra.

Probabilistic Analysis

A probabilistic seismic hazard analysis was performed to estimate the peak and spectral accelerations for the Maximum Considered Earthquake (MCE) ground motion values for all active faults within a 100-mile radius. The probabilistic analysis was conducted for the MCE having a 2 percent chance of exceedance in 50 years, with a statistical return period of 2,475 years.

Deterministic Analysis

A deterministic seismic hazard analysis, assumed to attenuate to the site per the same attenuation relationships as the probabilistic method, was performed by evaluating the ground motions generated by maximum earthquakes on each of the active faults within the same search radius. Using this methodology, the maximum earthquake resulting in the highest peak horizontal accelerations at the site would be a magnitude 7.1 event on the Newport-Inglewood Fault. The resultant accelerations were multiplied by 150 percent of the largest median 5-percent damped deterministic ground motions and compared to the results of the probabilistic analysis.

Site-Specific Design Response Spectra

The lesser of the probabilistic and 150-percent median deterministic ground motions is termed the Site-Specific MCE. The Site-Specific Design Response Spectrum is derived by taking 2/3 of the Site-Specific MCE spectral values (provided the results are not less than 80 percent of the Design Earthquake (DE) Response Spectrum determined in accordance with Section 11.4.5 of ASCE7-05).

Graphical representations of the analyses, including probabilistic and deterministic spectra and the final site-specific design response spectrum are presented in Appendix E.

2.6 Laboratory Test Results

The results of our laboratory tests are summarized in Appendix C, except for the moisture/density test results, which are included on the boring logs by NMG in Appendix B. In general, the subject area is made up of two geologic units; existing undocumented fill (Afu) and Capistrano Formation bedrock (Tc):

Undocumented Fill (Afu): The undocumented fill materials, encountered to the east of the proposed performing arts facility and anticipated to be beneath the existing tennis courts, are mixtures of fine grained soils and sand, generally consisting of silty sands. Remedial grading is expected to remove the anticipated fill beneath the tennis courts, therefore exposing bedrock beneath the entire performing arts facility. Additional remedial removals will be required to remove the upper weathered, loose or porous bedrock.

Capistrano Bedrock (Tc): The Capistrano Formation bedrock is exposed at the present ground surface of the main school building and adjacent parking area and underlies the fill beneath the existing tennis courts. The majority of the Capistrano bedrock encountered in our borings fell within the range of silty sandstone to sandy siltstone, with varying clay content.

Except for the upper few feet, our exploration and laboratory testing indicates that the existing Capistrano bedrock is relatively dense and stiff, and is suitable for the support of the proposed improvements. Where the upper few feet have been loosened due to weathering and contain varying amounts of pores, the porous, weathered material needs to be removed and replaced with compacted fill to make it suitable for support of the proposed improvements.

The expansion potential of the onsite Capistrano bedrock depends on the clay content and is typically of "medium" expansion potential. Weighted average soil values used for soil expansion design were determined from combined laboratory test results for samples in the upper 15 feet at Borings H-5, H-6 and H-7, in accordance with the requirements of the 2007 CBC using the weighting methods of WRI, 1996 and PTI, 2008, and are as follows:

- Plasticity Index (PI) = 32
- Passing No. 200 Sieve = 86%
- Finer than 2 Microns = 27%
- Dry Density = 102 psf (estimated)

2.7 Settlement Potential

The current design location implies that upon completion of grading the proposed performing arts facility will be located on a few feet of compacted fill that is underlain by bedrock of the Capistrano Formation. Our remedial removal recommendations are intended to remove the potentially collapsible and/or very compressible near-surface material in order to provide a uniform fill blanket under the performing arts facility. Due to the relatively heavy foundation loads that are anticipated (100-kip-column loads and 9-kip-per-foot line loads), the differential settlement might be as large as 0.5 inch over an approximately 40-foot span. Recommendations for remedial grading are provided in Section 3.2.

3.0 CONCLUSIONS AND RECOMMENDATIONS

3.1 General Conclusion

Based on our findings, the site is considered geotechnically acceptable for the proposed performing arts structure provided the recommendations of this report are incorporated in the design and implemented during future grading and construction. Please note that these recommendations are considered minimum and may be superseded by more stringent requirements of other members of the project team or by the governing agency. The grading and construction shall be performed in accordance with the General Earthwork and Grading Specifications provided in Appendix F, except as superseded below.

3.2 Remedial Removals and Fill Placement

Approximately one-third of the proposed performing arts facility will be located within an existing asphalt-covered parking lot and access road. Our borings within this area (H-5, H-6 and H-7) reveal Capistrano bedrock underlying 3 to 6 inches of asphalt pavement. The bedrock was apparently cut to the present grade during past grading. It appears that only the upper 2 to 3 feet has become loosened and/or porous due to weathering and needs to be removed and replaced with compacted fill.

The remaining approximately two-thirds of the performing arts facility is to be located within what is presently a complex of tennis courts. This tennis complex is about 2 to 3 feet higher than the adjacent parking lot. Unfortunately, access to the tennis complex was not available during our investigation. Therefore, our interpretation of the subsurface is based on the borings in the parking lot and those in the turf area immediately east of the tennis complex, and about 6 feet higher. Our estimate is that the tennis complex is probably underlain by 3 to 6 feet of undocumented silty sand fill that was placed over a previous cut into Capistrano bedrock. The undocumented fill should be removed, as should any loosened or porous bedrock.

Final recommendations regarding remedial grading, including the depth and extent of remedial removals, will be made by the geotechnical consultant during grading after the subsurface conditions are fully exposed. The removal bottoms should be observed, probed and/or tested, and accepted by the geotechnical consultants prior to placement of compacted fill.

For the portion of the proposed facilities within the present parking lot, we estimate remedial removals of 2 to 5 feet of Capistrano bedrock. For the portion within the present tennis complex, we estimate remedial removals of 3 to 6 feet of silty sand (undocumented fill) and 2 to 5 feet of Capistrano bedrock. The remedial removals shall extend to the full depth, a minimum of 8 feet outside of the building footprint, with the side slopes beyond the 8-foot boundary no steeper than 1H:1V. Shallower remedial removals may be appropriate under proposed hardscape/pavement that lies outside of the 8-foot boundary around the building. Undocumented fill shall be entirely removed, but removal depths for the bedrock might be on the order of 2 to 3 feet (below existing grade or design grade, whichever is deeper).

Prior to fill placement, any trash, vegetation or other deleterious material that may have accumulated, shall be removed and disposed of offsite. Most of the on-site soil from the remedial removals is considered suitable for placement as compacted fill. Any soils imported to the site for use as fill shall have engineering properties that are equal to or better than those of the on-site soil and shall be evaluated and accepted by the geotechnical consultant before being transported to the subject site.

If the silty sand undocumented fill that is expected to be found under the tennis complex is to be used as fill in combination with fill derived from Capistrano bedrock, the two soil types should not be simply placed at random under the proposed facilities. In particular, the silty sand (very low expansion) should not be placed under only a portion of the building slab while Capistrano fill (medium expansion) is placed under an adjacent portion. Such a non-uniform distribution would tend to increase the differential heave under the slab.

The combined silty sand fill and Capistrano derived fill may be placed together as follows:

- The silty sand may be stockpiled separately and then placed under the building slab in one or more layers of relatively uniform thickness, extending under all parts of the slab, or placed in a similar way elsewhere.
- The silty sand may be mixed with the Capistrano silty clay/clayey silt material to provide a relatively uniform mixture of sand, silt and clay everywhere under the building slab.

Approved fill material should be moisture-conditioned, as necessary, to obtain relatively uniform moisture content that is at or above the optimum moisture content as determined by ASTM Test Method D1557. The fill material shall be placed in near-horizontal layers not exceeding 8 inches in loose thickness and uniformly compacted to not less than 90 percent of the maximum dry density as determined by ASTM Test Method D1557. Additional recommendations for earthwork and grading are included an Appendix F.

3.3 Foundation Design

The maximum allowable bearing pressure may be determined from the following equation:

$$q = 1{,}500 + 500\ D + 150\ B \leq 4{,}000 \text{ psf}$$

Where:

q is the maximum allowable bearing pressure in psf, but not greater than 4,000 psf. The allowable bearing pressure may be increased by one-third when wind or seismic loading is included, but not greater than 5,333 psf.

D is the depth of footing embedment, in feet, as measured vertically from the lowest adjacent grade to the bottom of the footing.

B is the width of the footing, in feet.

A friction coefficient of 0.35 may be used at the foundation-soil interface to resist lateral movement. (See the section on lateral earth pressure if passive resistance is also included.)

Because of the relatively heavy foundation loads anticipated, we recommend that the depth of building footings be at least 2 feet, as measured from the lowest adjacent grade to the bottom of the footing.

The site soils are expansive under the definition of the 2007 CBC, Section 1802A.3.2. If slab-on-ground foundations are to be used, they should meet the requirements of the 2007 CBC, Section 1805A.8, Design for Expansive Soils. This section indicates two acceptable design methods: the method of WRI/CRSI (WRI, 1996) and the method of PTI (PTI, 2008). The geotechnical parameter required for the WRI/CRSI method is the effective plasticity index (PI). The geotechnical parameters required for the PTI method are the edge distance moisture penetration (e_m) and the edge or center lift (y_m). The two parameters are provided for two separate conditions, edge lift (or edge swelling) and center lift (or edge shrinking).

Effective Plasticity Index, PI = 32

Edge Lift Condition (Edge Swelling)
Edge Distance Moisture Penetration, e_m = 4.10 feet
Edge Lift, y_m = 1.11 inches

Center Lift Condition (Edge Shrinking)
Edge Distance Moisture Penetration, e_m = 7.80 feet
Center Lift, y_m = 0.84 inch

In addition, if slab-on-ground foundations are to be used, the building pads should be presaturated, as needed, to obtain a minimum moisture content down to a depth of at least 18 inches. The approximate minimum moisture content will have to be determined after completion of grading because of the potentially different types of fill that might be placed in the upper 18 inches. The recommended minimum moisture values may range between 1.1 to 1.3 times optimum moisture content. Consideration should be given to placing and compacting the fill at appropriate moisture content to avoid the inconvenience and time delay of presaturation.

The slabs in offices or similar occupied areas or in areas with moisture-sensitive floor covering shall be underlain by a moisture barrier. Use of sand layers (typically, each layer 2 inches thick) above and below the moisture barrier has been common local practice. However, recently this practice has come under criticism by some in the concrete materials profession. Because this is not a geotechnical issue, we do not make a specific recommendation, but we do include a brief discussion on the matter. A decision should be made before completing the precise grading plans, since the thickness of any sand layers should be considered when specifying the precise pad grades.

3.4 Slab Design Related to Moisture Mitigation

In addition to geotechnical and structural considerations, the project owner should also consider moisture mitigation when designing and constructing slabs-on-grade. Ever present moisture

emissions from the concrete itself, as well as subgrade moisture potentially passing through the slab can affect flooring and items in contact with the floor.

The intended use of the interior space, type of flooring, and the type of goods in contact with the floor may dictate the need for and design of measures to mitigate potential effects of concrete moisture emission from and/or moisture vapor transmission through the slab. Typically for habitable structures, a vapor retarder or barrier has been recommended under the slab to help mitigate moisture transmission through slabs. The most recent guidelines by the American Concrete Institute (ACI 302.1R-96) recommend that the vapor retarder be placed directly under the slab (no sand layer). Specifying the strength of the retarder to resist puncture and its permeance rating is very important. These qualities are not necessarily a function of the retarder thickness. A minimum of 10-mil is typical but some materials, such as 10-mil polyethylene ("Visqueen") may not meet the desired standards for toughness and permeance. "Stego Wrap" vapor retarder is considered suitable for this application.

The vapor retarder, when used, shall be installed in accordance with standards such as ASTM E1643-98 and/or those specified by the manufacturer.

Concrete mix design and curing are also significant factors in mitigating slab moisture problems. Concrete with lower water/cement ratios results in denser, less permeable slabs. They also "dry" faster with regard to when flooring can be installed (reduced moisture emissions quantities and rates). Rewetting of the slab following curing shall be avoided since this can result in additional drying time required prior to flooring installation. Proper concrete slab testing prior to flooring installation is also important.

Concrete mix design, and the appropriate location of the vapor retarder must be determined in coordination with all parties involved in the finished product, including the project owner, architect, structural engineer, geotechnical consultant, concrete subcontractors, and flooring subcontractors.

3.5 Soluble Sulfates and Concrete in Contact with Site Soils

Our laboratory test of the Capistrano bedrock (Appendix C) indicates negligible soluble sulfate content as classified by ACI 318-05, Table 4.3.1. Even though ACI 318-05, Table 4.3.1 does not require any special mitigation for negligible sulfate exposure, at a minimum we recommend the use of Type II cement for concrete in contact with soil having only a negligible exposure.

3.6 Corrosion of Metal in Contact with Site Soils

The results of our laboratory test results indicate that the site soils are expected to be corrosive to buried metallic structures. A specialized corrosion report is included as Appendix D, which provides a detailed evaluation with recommendations for mitigation.

3.7 Subsurface Drainage

Surface drainage shall be carefully taken into consideration during all grading, landscaping, and building construction. Positive surface drainage must be provided to direct surface water toward the street or suitable drainage devices and away from structures and slopes. Ponding of water adjacent to the structures shall be avoided. Run-off water shall be carried to parking lot/street gutters by area drain pipes or by sheet flow over paved areas. Paved areas must be provided with adequate drainage devices, gradients, and curbing to prevent run-off flowing from paved areas onto any adjacent unpaved areas.

The performance of foundations is also dependent upon maintaining adequate surface drainage away from structures. The minimum gradient within 5 feet of the building will depend upon surface landscaping. In general, we suggest that any unpaved lawn and landscape areas have a minimum gradient of 2 percent away from structures.

3.8 Exterior Concrete Construction

Heavy-duty exterior concrete slabs, such as driveways or driveway approaches or fire access pathways, shall be a minimum of 0.5 foot thick and provided with construction or weakened plane joints every 15 feet (in compliance with ACI specifications) or less. The concrete may be placed directly on properly compacted native subgrade. When this is done, the upper 12 inches of the native subgrade should be moisture-conditioned to at least 1.1 times optimum moisture content and compacted to a minimum of 90 percent relative compaction. Concrete curbs and gutters shall be a minimum of 6 inches thick and provided with construction or weakened plane joints every 15 feet or less.

Light-duty exterior concrete flatwork (such as sidewalks or lightly loaded patio slabs) shall be a minimum of 4 inches thick and provided with construction or weakened plane joints at frequent intervals (e.g., every 15 feet or less for sidewalks and slabs). The upper 12 inches of subgrade shall be moisture-conditioned to at least 1.1 times optimum moisture content and recompacted, as needed, to a minimum of 90 percent relative compaction. These recommendations are to be considered minimum. Additional procedures may further reduce the tendency for unsightly cracking, where esthetics is important, or to reduce the possibility of a trip hazard from differential heaving. Some steps that may be considered are increasing the thickness of the slab or reinforcement of the slab. Suitable reinforcement would be No. 3 bars at 24 inches on center, each way, combined with slip-dowel-type reinforcement across construction joints where reinforcement does not extend across the joint.

3.9 Seismic Design Parameters

According to Section 1614A.1.2 of the 2007 California Building Code (CBC), a site-specific ground motion hazard analysis must be performed for structures that will be located within 10 kilometers (6.2 miles) of a known active fault. Ground motion hazard analyses were performed for the subject site utilizing the computer program EZFRISK, version 7.26 (Risk Engineering, 2008) in conjunction with data from the US Geological Survey National Seismic Hazards Mapping Program (NSHMP, 2007) and in accordance with the appropriate methods

described in the American Society of Civil Engineers (ASCE) Standard 7-05 and the 2007 California Building Code (CBC).

The following table summarizes the seismic design criteria. The site-specific design response spectrum was developed in accordance with Chapter 21 of ASCE 7-05. The mapped spectral values were determined by using the computer program Seismic Hazard Curves and Uniform Hazard Response Spectra, provided by the USGS (2007).

Selected Seismic Design Parameters	Seismic Design Values
Latitude	33. 4778 North
Longitude	117. 6993 West
Controlling Fault	Newport-Inglewood Fault (offshore)
Distance to Controlling Fault	3.0 miles (4.9 km)
Site Class per Table 1613A.5.2	D
Mapped spectral acceleration for short periods (S_S)	1.577g
Mapped spectral acceleration for 1-second periods (S_1)	0.570g
Site coefficient for short periods (F_a, Site Class D)	1.0
Site coefficient for 1-second period (F_v, Site Class D)	1.5
Maximum Considered Earthquake spectral response acceleration for short periods (S_{MS}) *from site-specific analysis* (Site Class D)	1.262g
Maximum considered earthquake spectral response acceleration for 1-second periods (S_{M1}) *from site-specific analysis* (Site Class D)	0.684g
Five-percent damped design spectral response acceleration at short periods (S_{DS}) *from site-specific analysis* (Site Class D)	0.841g
Five-percent damped Design spectral response acceleration at 1-second period (S_{D1}) *from site-specific analysis* (Site Class D)	0.456g

The principle seismic source that contributes to the seismic hazard potential at the site is the Newport-Inglewood Fault with a maximum magnitude (M_W) of 7.1.

3.10 Lateral Earth Pressure and Retaining Walls

No retaining walls are shown on the subject plan. However, it is our understanding that retaining walls up to 5 feet high may be incorporated into the interior building design and that a retaining wall up to 10 feet high may be needed along the eastern side of the project.

Retaining walls retaining more than about 3 feet of soil should be provided with a subdrain system as indicated on the attached Retaining Wall Drainage Detail. Our recommended lateral earth pressures do not contain an appreciable margin of safety, but are intended to be used for

design with appropriate load/resistance factors or a factor of safety. The lateral earth pressures provided below are for the native, onsite soil with the recommended wall drainage.

DRAINED BACKFILL CASE (STATIC LOADING)
Equivalent Fluid Unit Weight (psf/ft)

Conditions	*Level Adjacent Ground*	*2:1 Slope*
Active	43	72
At-Rest	64	100
Passive	346	128 (sloping down)

In addition to the above lateral forces due to retained earth, the influence of surcharge due to other loads, such as adjacent structures, vehicular traffic, stockpiles of materials, or lateral loads acting on freestanding walls above the retaining wall, should be considered during design of retaining structures.

The active earth pressures are typically used for design of retaining walls or other lateral supports that can deflect. The at-rest earth pressures are for structures that are restrained from deflecting, such as a basement wall or a wall restrained at corners. An actual soil dead load unit weight of 120 pcf may be used for design purposes. The passive earth pressure may be used to provide resistance to lateral loads provided it is ensured that the soil will bear firmly against the embedded structure and will remain intact with time. In addition, a friction coefficient of 0.35 may be used for the foundation-soil interface. If combined for total lateral resistance, either the passive pressure or frictional resistance should be reduced by 50 percent.

The 2007 CBC requires a determination of lateral pressures on basement and retaining walls due to earthquake motions (seismic force or pressure).

The values are given below in terms of equivalent fluid unit weight (psf/ft) and are for determination of the additional thrust due to earthquake motion.

- Level Adjacent Ground: 14 psf/ft
- 2:1 Slope: 30 psf/ft

The additional thrust due to the earthquake should be combined with the static thrust of the retained soil. Conventional practice is to consider the static thrust of the soil as an equivalent hydrostatic pressure with the resultant acting at 1/3 of the retained soil height. However, the resultant force from the seismic thrust is usually considered to act at about 0.6 of the retained soil height. The corresponding pressure distribution is 1.6 P/H at the top and 0.4 P/H at the bottom, where H is the retained soil height and P is the seismic force per unit width, obtained by multiplying ½ of the equivalent fluid unit weight by the square of the retained soil height.

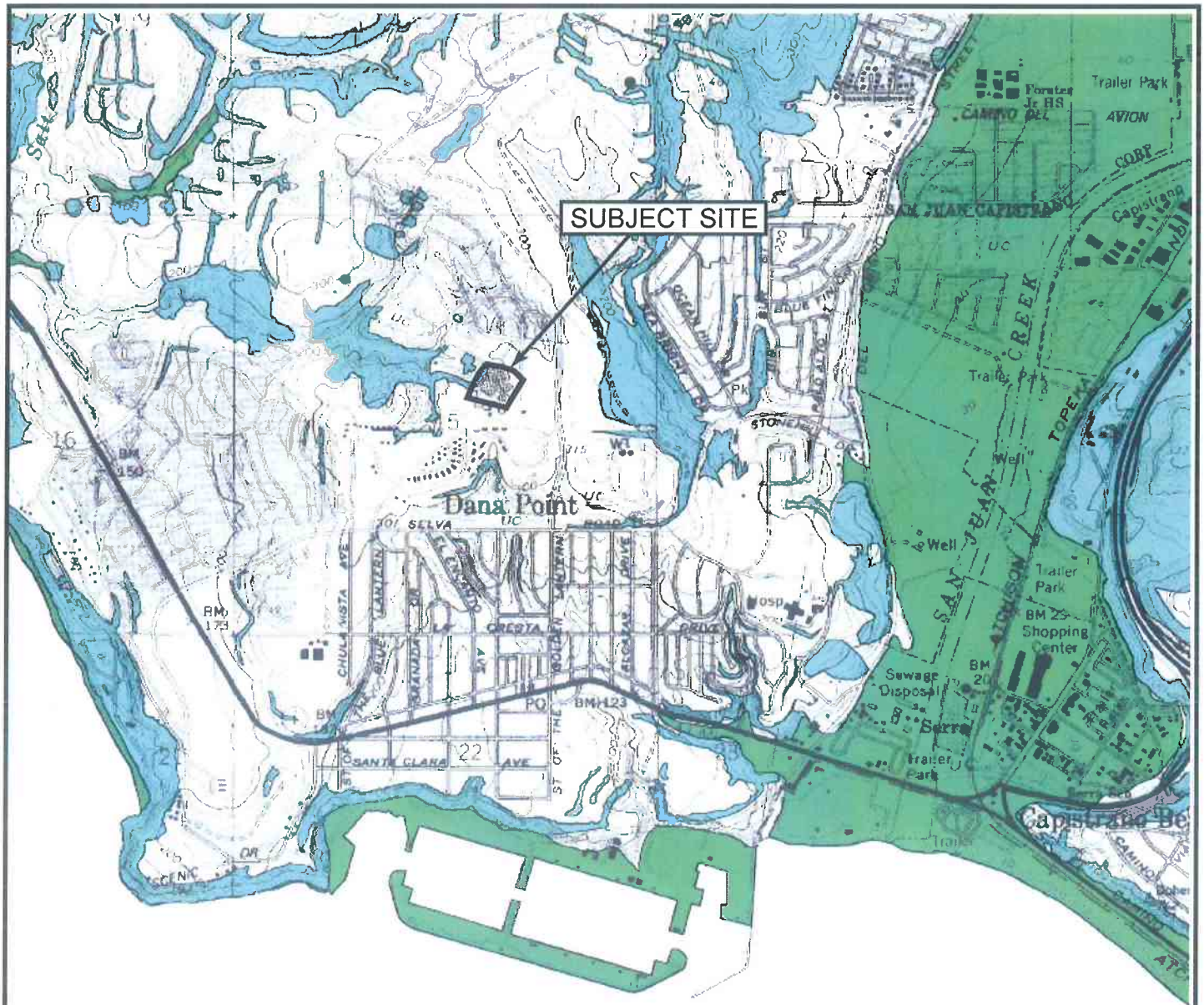
3.11 Additional Geotechnical Review

The geotechnical consultant should review any revised or updated grading plans and/or construction plans in light of the findings of this report. Additional geotechnical recommendations may be required based on these reviews.

3.12 Observation and Testing during Grading and Construction

Geotechnical observation and testing should be performed by the geotechnical consultant during the following phases of grading and construction:

- During site preparation and clearing;
- During all earthwork, including remedial removals and fill placement;
- Upon completion of any building foundation and retaining wall foundation excavation prior to pouring concrete;
- During concrete flatwork subgrade preparation (including presoaking), prior to pouring concrete;
- During and after installation of any retaining wall subdrains;
- During placement of backfill for utility trenches and retaining walls;
- During placement of aggregate base under pavements, if any;
- During placement of asphalt concrete; and
- When any unusual soil conditions are encountered.



Liquefaction

Areas where historic occurrence of liquefaction, or local geological, geotechnical and groundwater conditions indicate a potential for permanent ground displacements such that mitigation as defined in Public Resources Code Section 2693(c) would be required.

Earthquake-Induced Landslides

Areas where previous occurance of landslide movement, or local topographic, geological, geotechnical and subsurface water conditions indicate a potential for permanent ground displacements such that mitigation as defined in Public Resources Code Section 2693(c) would be required.

SITE LOCATION AND SEISMIC HAZARDS MAP

BASE: SEISMIC HAZARD ZONE REPORT FOR THE DANA POINT 7.5 MINUTE QUADRANGLE
RELEASED: DECEMBER 21, 2001
SCALE: 1"=2000'

N

PROPOSED PERFORMING ARTS FACILITY
DANA HILLS HIGH SCHOOL
CITY OF LAGUNA NIGUEL, CALIFORNIA

Project Number: 08091-01

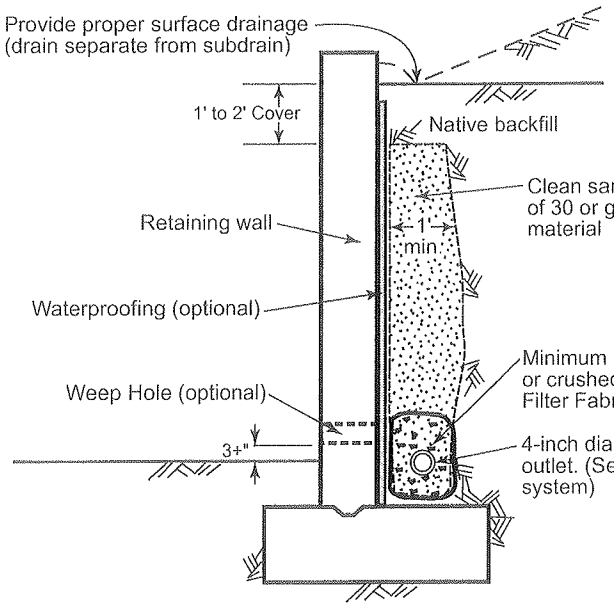
Project Name: CUSD/Dana Hills

Date: 2/18/09 Figure No. 1

NMG Geotechnical, Inc.

OPTION 1:

AGGREGATE SYSTEM DRAIN



Clean sand vertical drain having sand equivalent of 30 or greater or other free-draining granular material

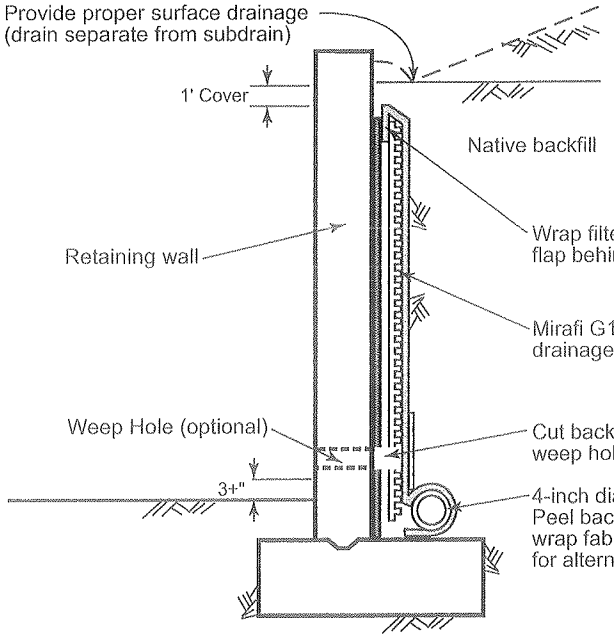
Minimum 1 ft.^{3}/ft. of 1/4 to 1 1/2" size gravel or crushed rock encased in approved Filter Fabric

4-inch diameter perforated pipe with proper outlet. (See Notes below for alternate discharge system)

Alternative: Class 2 permeable filter material (Per Caltrans specifications) may be used for vertical drain and around perforated pipe (without filter fabric)

OPTION 2:

COMPOSITE DRAINAGE SYSTEM



Wrap filter fabric flap behind core

Mirafi G100N, Contech C-Drain 15K, or equivalent drainage composite.

Cut back of core to match size of weep hole. Do not cut fabric.

4-inch diameter perforated pipe with proper outlet. Peel back the bottom fabric flap,place pipe next to core, wrap fabric around pipe and tuck behind core. (See Notes for alternate weep hole discharge system)

NOTES:

1. PIPE TYPE SHOULD BE PVC OR ABS, SCHEDULE 40 OR SDR35 SATISFYING THE REQUIREMENTS OF ASTM TEST STANDARD D1527, D1785, D2751 , OR D3034.
2. FILTER FABRIC SHALL BE APPROVED PERMEABLE NON-WOVEN POLYESTER, NYLON, OR POLYPROPYLENE MATERIAL.
3. DRAIN PIPE SHOULD HAVE A GRADIENT OF 1 PERCENT MINIMUM.
4. WATERPROOFING MEMBRANE MAY BE REQUIRED FOR A SPECIFIC RETAINING WALL (SUCH AS A STUCCO OR BASEMENT WALL).
5. WEEP HOLES MAY BE PROVIDED FOR LOW RETAINING WALLS (LESS THAN 3 FEET IN HEIGHT) IN LIEU OF A VERTICAL DRAIN AND PIPE AND WHERE POTENTIAL WATER FROM BEHIND THE RETAINING WALL WILL NOT CREATE A NUISANCE WATER CONDITION. IF EXPOSURE IS NOT PERMITTED, A PROPER SUBDRAIN OUTLET SYSTEM SHOULD BE PROVIDED.
6. IF EXPOSURE IS PERMITTED, WEEP HOLES SHOULD BE 2-INCH MINIMUM DIAMETER AND PROVIDED AT 25-FOOT MAXIMUM SPACING ALONG WALL. WEEP HOLES SHOULD BE LOCATED 3+ INCHES ABOVE FINISHED GRADE.
7. SCREENING SUCH AS WITH A FILTER FABRIC SHOULD BE PROVIDED FOR WEEP HOLES/OPEN JOINTS TO PREVENT EARTH MATERIALS FROM ENTERING THE HOLES/JOINTS.
8. OPEN VERTICAL MASONRY JOINTS (I.E., OMIT MORTAR FROM JOINTS OF FIRST COURSE ABOVE FINISHED GRADE) AT 32-INCH MAXIMUM INTERVALS MAY BE SUBSTITUTED FOR WEEP HOLES.
9. THE GEOTECHNICAL CONSULTANT MAY PROVIDE ADDITIONAL RECOMMENDATIONS FOR RETAINING WALLS DESIGNED FOR SELECT SAND BACKFILL.

RETAINING WALL DRAINAGE DETAIL

NMG Geotechnical, Inc.

3/05 RETAINING WALL DRAINAGE.ai

FIGURE 2

GEOTECHNICAL MAP
DANA HILLS HIGH SCHOOL
CAPISTRANO UNIFIED SCHOOL DISTRICT
CITY OF LAGUNA NIGUEL, CALIFORNIA

Project No.: 08091-01 By: CMB/WG
Project Name: CUSD / DANA HILLS
Date: 2/ 18 /09 SCALE: 1" = 20'

NMG Geotechnical, Inc.

PLATE 1

LEGEND

EARTH UNITS - CIRCLED WHERE BURIED

Afu — ARTIFICIAL FILL, UNDOCUMENTED

Tc — CAPISTRANO FORMATION

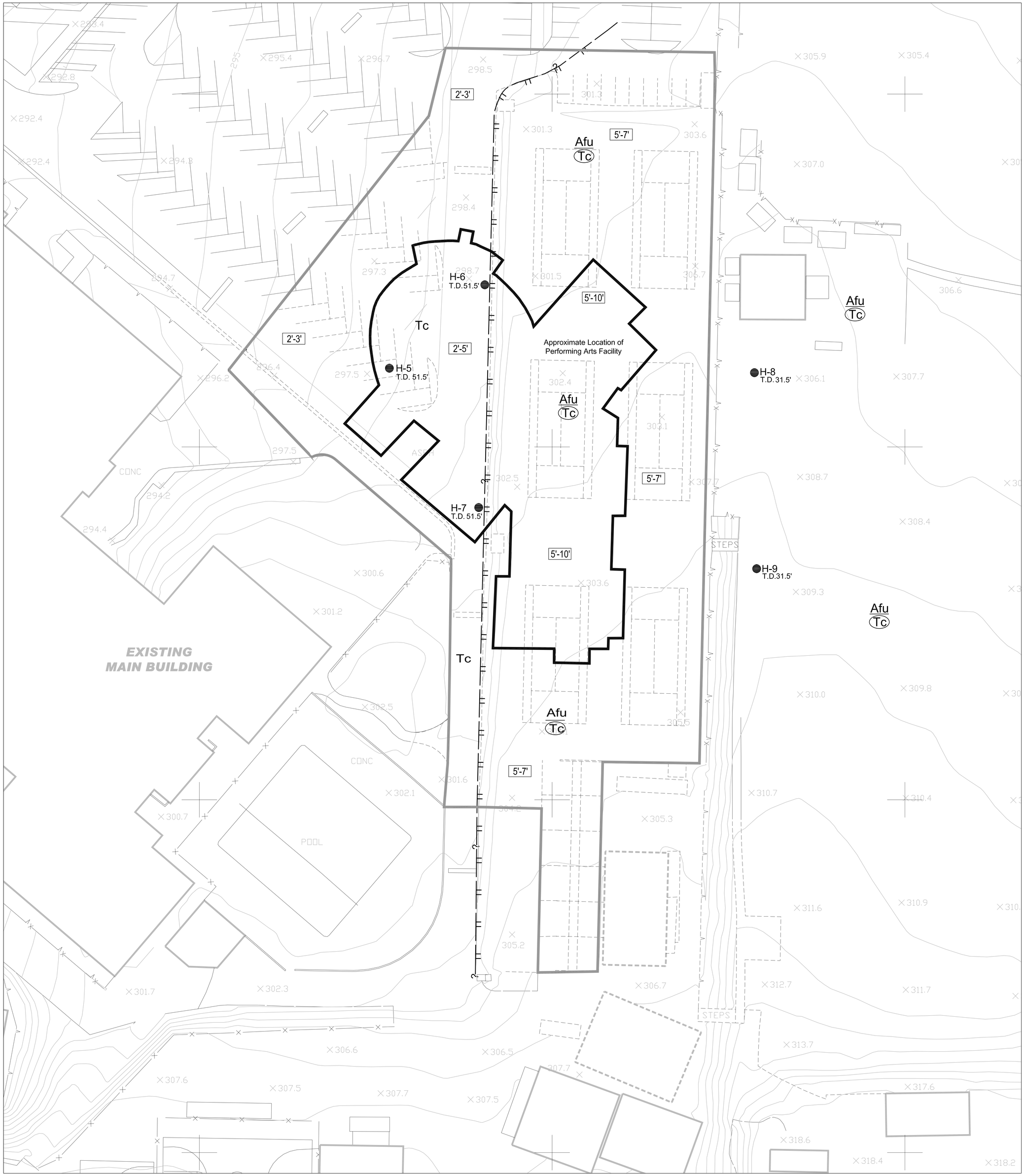
OTHER SYMBOLS - LOCATIONS ARE APPROXIMATE

LIMITS OF EXISTING FILL

H-9 T.D.31.5' — HOLLOW STEM AUGER BORING, THIS INVESTIGATION, SHOWING TOTAL DEPTH

2'-5' — RECOMMENDED DEPTH OF REMOVAL

LIMITS OF THIS REPORT



Appendix D
Phase I Environmental Site Assessment

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PHASE I ENVIRONMENTAL SITE ASSESSMENT FOR:

DANA HILLS HIGH SCHOOL PERFORMING ARTS THEATER

prepared for:

CAPISTRANO UNIFIED SCHOOL DISTRICT

Contact:
Mr. Cary Brockman,
Director, Facilities

prepared by:

THE PLANNING CENTER

Contact:
Denise Clendening,
Ph.D., REA II,
Director of Site Assessment Services

MARCH 3, 2009

PHASE I ENVIRONMENTAL SITE ASSESSMENT FOR:

DANA HILLS HIGH

SCHOOL

PERFORMING ARTS

THEATER

prepared for:

CAPISTRANO UNIFIED SCHOOL DISTRICT

33122 Valle Road
San Juan Capistrano, CA 92675
Phone: 949.234.9200

Contact:
Mr. Cary Brockman,
Director, Facilities

prepared by:

THE PLANNING CENTER

2131 S. Grove Avenue, Suite A
Ontario, CA 91761
Phone: 909.930.1380, ext. 200
Fax: 909.930.1365

Contact:
Denise Clendening, Ph.D., REA II,
Director of Site Assessment Services

CVS-04.0E
MARCH 3, 2009

March 3, 2009
Project No. CVS-03.0E

Capistrano Unified School District
33122 Valle Road
San Juan Capistrano, California 92675

Attention: Mr. Cary Brockman

Subject: Phase I Environmental Site Assessment
Dana Hills High School Performing Arts Theater
Dana Point, California

Dear Mr. Brockman:

Enclosed please find one copy of the Phase I Environmental Site Assessment (Phase I) report for the proposed Dana Hills High School Performing Arts Theater located in Dana Point, California.

This assessment has not revealed evidence of any recognized environmental conditions in connection with the property following the ASTM standard and the DTSC recommended school guidance for Phase I assessments.

Sincerely yours,
THE PLANNING CENTER

Denise Clendening, Ph.D., REA II 20130
Director of Site Assessment Services

Michael Watson, PG 8177, REA 30041
Geologist

Enclosures

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Executive Summary

The Planning Center has performed a Phase I Environmental Site Assessment (Phase I) for an approximately 0.7-acre proposed theater site located on the campus of Dana Hills High School, in the City of Dana Point, Orange County, California (Figure 1). Capistrano Unified School District (District) intends to build a performing arts theater on the site.

The scope of work is described and conditioned by our proposal dated October 7, 2008. As indicated in our proposal, this Phase I was performed in general conformance with the scope and limitations of the American Society for Testing and Materials (ASTM) E 1527-05 Standard Practice for Environmental Site Assessments: Phase I Environmental Site Assessment Process and following the California Environmental Protection Agency Department of Toxic Substances Control (DTSC) guidelines for Phase I evaluations for proposed school sites. Exceptions to, or deletions from, this practice are described in Section 1 of this report. Our conclusions are intended to help the user evaluate the "environmental risk" associated with the site, as defined in the ASTM E 1527-05 Standard and discussed in the Introduction section of this report.

The site is located on the east side of the existing Dana Hills High School Campus and currently consists of tennis courts, racquetball courts, portable classrooms, storage bins and part of a parking area. The site has not been used historically for agricultural purposes. In general, the surrounding area is primarily residential.

RECOGNIZED ENVIRONMENTAL CONDITIONS

The goal of the ASTM E 1527-05 Standard practice is to identify Recognized Environmental Conditions (RECs), as defined in the Standard and in Section 1 of this report.

This assessment has not revealed evidence of any recognized environmental conditions in connection with the property following the ASTM standard and the DTSC recommended school guidance for Phase I assessments.

HISTORICAL RECS AND KNOWN OR SUSPECT ENVIRONMENTAL CONDITIONS

The ASTM E 1527-05 Standard also requires that historical RECs (HRECs) and other known or suspect environmental conditions, as defined in the Standard and in Section 1 of this report are identified in the Phase I.

This assessment has not revealed evidence of any historical recognized environmental conditions, in connection with the property following the ASTM standard and the DTSC recommended school guidance for Phase I assessments. The District is requesting a no further action determination.

SUMMARY

Based on the results of this assessment, RECs and HRECs were not identified. The District is requesting a no further action determination.

The remainder of this report contains additional information regarding the Phase I work performed, the resulting findings summarized above, and limitations affecting this report.

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1. Introduction

1.1 PURPOSE

This Phase I Environmental Site Assessment (Phase I) was performed in conformance with the scope and limitations of the American Society for Testing and Materials (ASTM) E 1527-05 Standard. Capistrano Unified School District (District) intends to build a performing arts theater on the existing Dana Hills High School. The approximately 0.7-acre project site is located at the east side of the Dana Hills High School campus at 33333 Street of the Golden Lantern in the City of Dana Point, Orange County, California (Figure 1). The project's development would entail the construction of 28,247 square feet of building space. The project area includes the classroom building footprint and surrounding area for a total of approximately 31,072 square feet.

The site currently consists of tennis courts, racquetball courts, portable classrooms, storage bins and part of a parking area. The site has not been used historically for agricultural purposes. In general, the surrounding area is primarily residential.

The purpose of this assessment was to evaluate site history, existing observable conditions, current site use, and current and historic uses of surrounding properties to identify the potential presence of Recognized Environmental Conditions (RECs) in connection with the subject site. RECs are defined by ASTM as "the presence or likely presence of any hazardous substances or petroleum products on a property under conditions that indicate an existing release, a past release, or a material threat of a release of any hazardous substances or petroleum products into structures on a property or into the ground, groundwater, or surface water of the property. The term includes hazardous substances or petroleum products even under conditions in compliance with laws. The term is not intended to include de minimis conditions that generally do not present a threat to human health or the environment and that generally would not be the subject of an enforcement action if brought to the attention of appropriate governmental agencies. Conditions determined to be de minimis are not recognized environmental conditions."

In addition, the Standard requires that historical RECs (HRECs) and known or suspect environmental conditions are identified in the Phase I report. The standard defines historical RECs as environmental conditions "which in the past would have been considered a recognized environmental condition, but which may or may not be considered a recognized environmental condition currently." The term "known or suspected environmental condition" is not specifically defined in the standard, but is used by The Planning Center to highlight environmentally related information that is not anticipated to adversely affect the subject site and/or does not rise to the level of an REC.

Our conclusions are intended to help the user evaluate the "environmental risk" associated with the site, defined by ASTM as "a risk which can have a material environmental or environmentally driven financial impact on the business associated with the current or planned use of a parcel of commercial real estate. Consideration of environmental risk issues may involve addressing one or more non-scope considerations."

Beginning November 1, 2006, real estate transactions are subject to federal regulations establishing environmental due diligence standards. Compliance with the new regulations is a requirement for insulating purchasers from potential liability under the federal Comprehensive Environmental Response, Compensation, and Liability Act ("CERCLA," also known as "Superfund"). CERCLA imposes liability, without regard to fault or negligence, on past and present owners for any environmental contamination found on the property. A purchaser of land contaminated by the activities of others is nonetheless liable under CERCLA - unless it qualifies for one of few statutory defenses, such as those for bona fide prospective purchasers, innocent landowners and contiguous property owners. In order to qualify for any of these defenses, a prospective purchaser must conduct "all appropriate inquiry" on or before the date of acquiring the property.

1.2 SITE IDENTIFICATION

The project site is located at the eastern portion of the existing Dana Hills High School located at 33333 Street of the Golden Lantern in the City of Dana Point, Orange County, California (Figure 1). The project's development would entail the construction of 28,247 square feet of building space. The project area includes the classroom building footprint and surrounding area for a total of approximately 31,072 square feet.

The area is currently developed with tennis courts, racquetball courts, portable classrooms, storage bins and part of a parking area on the east side of the existing school. Prior to the construction of the Dana Hills High School in 1973, the site was not used for agricultural purposes and was vacant land. In general, the surrounding area is primarily residential. The existing site conditions and surrounding area are depicted in Figure 2. The District intends to build a theater on the site.

1.3 DETAILED SCOPE OF SERVICES

The Planning Center performed the following detailed scope of services to complete our Phase I assessment:

1. Visual observations of site conditions, and of abutting property use, to evaluate the nature and type of activities that have been or are being conducted at and adjacent to the site, in terms of the potential for release or threat of release of hazardous substances or petroleum products.

2. Review of federal and state environmental database information within the ASTM-specified radii from the subject property using a database service to access records. Use of 7.5-minute topographic maps to evaluate the site's physical setting.

3. Review of federal and state environmental files pertaining to the subject site and nearby sites with the potential to impact the subject site.

4. Review of previous reports (if any) prepared for the subject site.

5. Review of the following sources of historical use information:

    - Aerial Photographs

    - Historical Topographic Maps

6. Contacts with state and local agencies regarding the site and surrounding properties and structures.

7. Interviews with the Key Site Manager and property tenant representatives (if any).

8. Interpretation of information and data assembled as a result of the above work tasks, and formulation of conclusions regarding the potential presence and impact of RECs as defined by the ASTM E 1527-05 Standard.

1.4 NON-SCOPE CONSIDERATIONS

The ASTM E 1527-05 Standard includes the following list of "additional issues" that are non-scope considerations outside of the scope of the ASTM Phase I practice: Asbestos-containing building materials, Radon, Lead in Drinking Water, Wetlands, Regulatory Compliance, Cultural and Historic Risks,

Industrial Hygiene, Health and Safety, Ecological Resources, Endangered Species, Indoor Air Quality, Biological agents, and mold. The additional issues included in this Phase I include the following:

- A review of agency records to identify high-pressure gas lines and fuel transmission lines in the vicinity of the subject property;
- A review of Division of Oil and Gas records;
- The vicinity of the subject site was assessed for high voltage power lines;
- A review of geological references for the presence of naturally occurring asbestos;
- The use of fill material on the subject site;
- Prior usage of subject property for agricultural purposes, mining activities, illegal drug manufacturing and disposal, and U.S. Government ownership; and
- The possibility of lead-based paint used in building construction.

1.5 EXCEPTIONS AND DEVIATIONS

1.5.1 Exceptions

The Planning Center has completed this assessment in substantial conformance with ASTM E 1527-05. In our opinion, there were no exceptions made to the ASTM work scope. The Planning Center also included additional information that the DTSC has indicated as being of potential concern for school sites (DTSC 2001).

1.5.2 Deviations

The Planning Center completed this assessment in substantial conformance with the ASTM E 1527-05 Standard. In our opinion there were no deviations and deletions made from the ASTM work scope in completing this Phase I.

1.6 LIMITATIONS

Our work for this project was performed generally consistent with the ASTM E 1527-05 Standard for Phase I Environmental Site Assessments. Several organizations other than ASTM, such as professional associations (e.g. ASFE and AGWSE) have also developed "guidelines" or "standards" for environmental site assessments. The Phase I presented herein is consistent with the ASTM E 1527-05 Standard, which may vary from the specific "guidelines" or "standards" required by other organizations.

This report was prepared pursuant to an agreement dated in October 2008 between Capistrano Unified School District (District) and The Planning Center. All uses of this report are subject to, and deemed acceptance of, the conditions and restrictions contained in the Agreement. The observations and conclusions described in this Report are based solely on the Scope of Services provided pursuant to the Agreement. The Planning Center has not performed any additional observations, investigations, studies or other testing not specified in the Agreement. The Planning Center shall not be liable for the existence of any condition the discovery of which would have required the performance of services not authorized under the Agreement.

1. Introduction

This Report is prepared for the exclusive use of the Capistrano Unified School District (District) in connection with the proposed development of Dana Hills High School Performing Arts Theater. There are no intended beneficiaries other than the District. The Planning Center shall owe no duty whatsoever to any other person or entity on account of the Agreement or the Report. Use of this Report by any person or entity other than the District for any purpose whatsoever is expressly forbidden unless such other person or entity obtains written authorization from the District and from The Planning Center. Use of this Report by such other person or entity without the written authorization of the District and The Planning Center shall be at such other person's or entity's sole risk, and shall be without legal exposure or liability to The Planning Center.

Use of this Report by any person or entity, including by the District, for a purpose other than the proposed theater project, is expressly prohibited unless such person or entity obtains written authorization from The Planning Center indicating that the Report is adequate for such other use. Use of this Report by any person or entity for such other purpose without written authorization by The Planning Center shall be at such person's or entity's sole risk and shall be without legal exposure or liability to The Planning Center.

This Report reflects site conditions observed and described by records available to The Planning Center as of the date of report preparation. The passage of time may result in significant changes in site conditions, technology, or economic conditions, which could alter the findings and/or recommendations of the report. Accordingly, the District and any other party to whom the report is provided recognize and agree that The Planning Center shall bear no liability for deviations from observed conditions or available records after the time of report preparation.

Use of this Report by any person or entity in violation of the restrictions expressed in this Report shall be deemed and accepted by the user as conclusive evidence that such use and the reliance placed on this Report, or any portions thereof, is unreasonable, and that the user accepts full and exclusive responsibility and liability for any losses, damages or other liability which may result.

Figure 1 Site Location

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Figure 2 Existing Site Conditions

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2. Site Description

2.1 SITE OWNERSHIP AND LOCATION

2.1.1 Name of Site Owners

Capistrano Unified School District
33122 Valle Road
San Juan Capistrano, CA 92675

2.1.2 Name of Site Operator

Capistrano Unified School District operates the high school.

2.1.3 Site Location Map

The United States Geological Survey (USGS) topographic map for the site is the Dana Point, California Quadrangle. The USGS topographic maps were used as the source for site setting information. The site is located in Orange County at approximately 33.4778° north latitude and 117.6991° west longitude.

2.2 SITE AND VICINITY DESCRIPTION

- The subject site is approximately 0.7 acres in size. Figure 2 shows relevant site and immediately adjacent property features. The site includes Orange County Assessor's Parcel Number (APN) 673-091-08.
- The site currently consists of tennis courts, racquetball courts, portable classrooms, storage bins and part of a parking area on the east portion of the Dana Hills High School campus.
- The project area includes the classroom building footprint and surrounding area for a total of approximately 31,072 square feet.
- The adjoining area surrounding the subject property is characterized as a school.

2.3 PHYSICAL SETTING

Subsurface explorations were not performed for this evaluation; therefore site geology and hydrology were evaluated on the basis of readily-available public information or references, and/or based upon our experience and understanding of subsurface conditions in the subject property area.

2.3.1 Topography

Topographically, the site gently slopes to the west. Based on a review of the United States Geological Survey (USGS) 7.5-minute Topographic Series, Dana Point, California Quadrangle Map (USGS 1975), surface elevation of the subject property is approximately 300 feet above mean sea level (msl).

2.3.2 Geologic Information

The proposed school site is located in the southernmost part of the San Joaquin Hills, in the northern part of the Peninsular Ranges Geomorphic Province. The Peninsular Ranges Geomorphic Province extends approximately 900 miles southward from the Los Angeles-Pomona-San Bernardino Basins to Baja California, Mexico and is characterized by elongated northwest-trending mountain ranges separated by sediment-floored valleys (Yerkes *et al.* 1965).

The most dominant structural features of the province are the northwest-trending fault zones, most of which die out, merge with, or are terminated by the steep reverse faults at the southern margin of the San Gabriel-San Bernardino Mountains within the Transverse Ranges Geomorphic Province far to the north of the Site. The property itself sits atop a graded pad derived from middle to early Pleistocene paralic (shoreline) deposits (Tan 1999; Kennedy and Tan 2005; Kennedy and Tan 2007).

2.3.3 Naturally Occurring Asbestos Containing Minerals

According to the California Geological Survey (formerly the California Division of Mines and Geology [CDMG]), no naturally-occurring serpentine rock or rock formations that may contain a significant quantity of asbestos are located within a ten-mile radius or upstream of the site (CDMG 2000).

2.3.4 Ground Water and Surface Water Information

Based on surface topography, surface water at the site generally flows to the west. Hydrogeologic investigations were not performed on the site for this investigation; therefore, it is unknown to what extent localized variations in groundwater presence and flow occur on the site.

Federal Emergency Management Agency (FEMA 2004) created a Flood Insurance Rate Map (FIRM) for the area, which indicates that the Site is not within a 100-year or 500-year flood zone.

The South Coast Water District (SCWD) presently provides the high school with water service. SCWD's water supply is a blend of imported water from the Colorado River and State Water Project. There are no wells located on the site.

The subject site is located near the San Juan Valley Groundwater Basin. Local groundwater flow is expected to follow the direction of the ground slope toward the closest open body of water or intermittent stream, in this case an unnamed tributary to Salt Creek to the west. According to the California Regional Water Quality Board Geotracker website (2009), the closest wells are located about 0.7 miles east of the site. A well located at a Mobil gas station, east of the site, was last measured on August 12, 2008 with a groundwater elevation of approximately 49 feet above sea level, flowing southeast. Another site was identified by Geotracker approximately 0.8 miles south of the site with an estimated groundwater elevation of 30 feet above sea level. Hydrogeologic investigations were not performed on the Site for this investigation; therefore, it is unknown to what extent localized variations in groundwater presence and flow occur on the site.

3. Previous Reports

The Planning Center was not provided with previous reports for the site but were provided with proposed site plans.

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4. Site History

4.1 PAST USAGE OF THE SITE

Past usage of the site was assessed through a file review and review of aerial photographs and historical topographic maps. Copies of historical references reviewed are included in Appendix A.

Based on a review of historical aerial photographs and topographic maps, the site was vacant land from at least 1902 to about the 1970s. The site has been part of the Dana Hills High School campus since at least 1973. Portable classrooms have been located east of the racquetball courts since at least 1989. Storage bins have been located north of the portable classrooms since at least 1994.

4.1.1 Aerial Photographs

Aerial photographs, obtained from EDR for the years of 1938, 1946, 1952, 1968, 1977, 1989, 1994, 2002 and 2005, were reviewed for the subject site and are included in Appendix A.

- 1938 – The subject site appears to be vacant land covered with native vegetation.
- 1946 – The subject site appears relatively unchanged in comparison to the 1938 aerial photograph.
- 1952 – The subject site appears relatively unchanged in comparison to the 1946 aerial photograph.
- 1968 – The subject site appears relatively unchanged in comparison to the 1952 aerial photograph.
- 1977 – Tennis courts and part of a parking lot are apparent on the site. The site appears to be part of Dana Hills High School.
- 1989 – Portable classrooms are apparent east of the racquetball courts. The remainder of the subject site appears relatively unchanged in comparison to the 1977 aerial photograph.
- 1994 – Storage bins appear to be located north of the portable classrooms. The remainder of the subject site appears relatively unchanged in comparison to the 1989 aerial photograph.
- 2002 – The subject site appears relatively unchanged in comparison to the 1994 aerial photograph.
- 2005– The subject site appears relatively unchanged in comparison to the 2002 aerial photograph.

4.1.2 Historical Topographic Maps

Historical topographic maps, obtained from EDR for the years of 1902, 1904, 1947, 1949, 1968 and 1975, were reviewed for the subject site. Copies of the historic topographic maps are included in Appendix A.

- 1902 – No structures or discerning features are depicted on the subject site.
- 1904 – The subject site is unchanged in comparison to the 1902 topographic map.

- 1947 – The subject site is unchanged in comparison to the 1904 topographic map.
- 1949 – The subject site is unchanged in comparison to the 1947 topographic map.
- 1968 – The subject site is unchanged in comparison to the 1949 topographic map.
- 1975 – The subject site is developed with Dana Hills High School.

4.1.3 Prior Agricultural Use

Based on a review of aerial photographs and topographic maps, the subject site was not used for agricultural purposes.

4.1.4 Mines

Based on the review of historical sources (aerial photographs and historic topographic maps) and the database search report, there is no evidence to indicate that the site was ever utilized for mining operations.

4.1.5 Illegal Drug Manufacturing

The proposed site was not identified by the California Hazardous Material Incident Report System (CHMIRS), which is maintained by the California Office of Emergency Services and contains information regarding hazardous material incidents such as accidental releases or spills. Drug-related waste was not observed on the site during the site inspection. Drug labs were not identified in the database search within a mile from the site.

4.1.6 Prior U.S. Government Ownership

According to historical aerial photographs and topographic maps, the subject site was vacant land from 1901 to the early 1970s, followed by a school. There is no indication that the property was owned by the U.S. Government or utilized for military operations.

4.2 PAST USE OF ADJOINING PROPERTIES

Based on review of historical aerial photographs and topographic maps, adjoining properties have been primarily vacant land until the 1970s. Residential dwellings have been located to the north, south and east since the 1970s with additional dwellings in the southeast since the 1980s.

4.2.1 Aerial Photographs

Aerial photographs obtained from EDR for the years of 1938, 1946, 1952, 1968, 1977, 1989, 1994, 2002 and 2005 were reviewed for the adjoining properties and are included in Appendix A.

- 1938 – Surrounding properties are vacant land. Dirt roads are located west and east of the site. A gulch is located west of the site.
- 1946 – The adjoining properties appear relatively unchanged in comparison to the 1938 aerial photograph.

- 1952 – An additional dirt road is located southeast of the site. The remaining adjoining properties appear relatively unchanged in comparison to the 1946 aerial photograph.

- 1968 – Erratic dirt tracks from off-road activities are located on surrounding land. Street of the Golden Lantern is being paved east of the site. The remaining adjoining properties appear relatively unchanged in comparison to the 1952 aerial photograph.

- 1977 – Dana Hills High School surrounds the site. Acapulco Drive is located north of the campus. Residential dwellings are located north and southwest of the campus. Adjoining properties are under construction south, east and southeast of the campus.

- 1989 – Stonehill Drive is located south of the campus. Additional residential dwellings are located south and east of the campus. Residential dwellings are under construction southeast of the campus. The remaining adjoining properties appear relatively unchanged in comparison to the 1977 aerial photograph.

- 1994 – Residential dwellings are located southeast of the campus. The remaining adjoining properties appear relatively unchanged in comparison to the 1989 aerial photograph.

- 2002 – The adjoining properties appear relatively unchanged in comparison to the 1994 aerial photograph.

- 2005 – The adjoining properties appear relatively unchanged in comparison to the 2002 aerial photograph.

4.2.2 Historical Topographic Maps

Historical topographic maps, obtained from EDR for the years 1902, 1904, 1947, 1949, 1968 and 1975 were reviewed for the adjoining properties. Copies of the historic topographic maps are included in Appendix A.

- 1902 – No structures or roads are depicted on adjoining land surrounding the site.

- 1904 – The adjoining properties appear unchanged in comparison to the 1901 topographic map.

- 1947 – The town of Dana Point is depicted south of the site. A creek is depicted west of the site. A dirt road is depicted east of the site. The remaining adjoining properties appear unchanged in comparison to the 1904 topographic map.

- 1949 – The adjoining properties appear unchanged in comparison to the 1947 topographic map.

- 1968 – The adjoining properties appear unchanged in comparison to the 1949 topographic map.

- 1975 – The existing building adjacent to the west of the site is depicted. Street of the Golden Lantern is depicted east of the campus. Acapulco Drive is depicted to the north. Residential dwellings are depicted southwest of the campus. The area north of campus is depicted with house omission tint. The remaining adjoining properties appear unchanged in comparison to the 1968 topographic map.

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5.1 STANDARD ENVIRONMENTAL RECORDS REVIEW

The Planning Center utilized the electronic database service EDR to complete the environmental records review. The database search was used to identify properties that may be listed in the referenced agency records, located within the ASTM-specified search radii indicated below:

- NPL sites ..... 1 mile
- CERCLIS sites..... 0.5 mile
- CERCLIS NFRAP sites ..... Site and Adjoining
- Federal ERNS ..... Site only
- RCRA non-CORRACTS TSD facilities ..... 0.5 mile
- RCRA CORRACTS TSD facilities ..... 1 mile
- RCRA Generators ..... Site & Adjoining
- State Hazardous Waste Sites ..... 1 mile
- Registered Underground Storage Tanks ..... Site & Adjoining
- State Landfills and Solid Waste Disposal Sites ..... 0.5 mile
- State Leaking Underground Storage Tanks..... 0.5 mile

A review of selected regulatory agency databases for documented environmental concerns on the site, or in close proximity to the site, was conducted by EDR.

A copy of the radius report, dated January 12, 2009 is included in Appendix B.

The campus was identified on three of the databases that were searched. The school was identified on FINDS for educational statistics. The school was also identified on the HAZNET database for waste manifests and CHMIRS for an incident in 2000 involving the Orange County Sheriff's Bomb Squad. Following is a summary of information provided for each of the above-listed databases.

5.1.1 NPL Sites

The National Priorities List (NPL) is a list of contaminated sites that are considered the highest priority for cleanup by the EPA.

- The subject site is not listed on the NPL List.
- The database search did not identify any NPL sites within a one-mile radius of the subject site.

5.1.2 CERCLIS Sites

The Comprehensive Environmental Response, Compensation, and Liability Act Information System (CERCLIS) list identifies sites which are suspected to have contamination and require additional investigation to assess if they should be considered for inclusion on the NPL.

- The subject site is not listed on the CERCLIS List.

- The database search did not identify any CERCLIS sites within a one-half mile radius of the subject site.

5.1.3 CERCLIS-NFRAP Sites

CERCLIS-NFRAP status indicates that a site was once on the CERCLIS List but has No Further Response Actions Planned (NFRAP). Sites on the CERCLIS-NFRAP List were removed from the CERCLIS List in February 1995 because, after an initial investigation was performed, no contamination was found, contamination was removed quickly, or the contamination was not significant enough to warrant NPL status.

- The subject site is not listed on the CERCLIS-NFRAP List.
- The database search did not identify any CERCLIS-NFRAP sites adjacent to the subject site.

5.1.4 Federal ERNS List

The Federal Emergency Response Notification System (ERNS) list tracks information on reported releases of oil and hazardous materials.

- The subject site is not identified on the Federal ERNS list.

5.1.5 RCRA Non-CORRACTS TSD Facilities

The Resource Conservation and Recovery Act (RCRA) non-CORRACTS TSD Facilities List tracks facilities which treat, store, or dispose of hazardous waste and are not associated with corrective action activity.

- The subject site is not listed as a RCRA non-CORRACTS TSD facility.
- The database search did not identify any RCRA non-CORRACTS TSD facilities within a one-half-mile radius of the subject site.

5.1.6 RCRA CORRACTS TSD Facilities

The RCRA CORRACTS TSD Facilities list catalogues facilities that treat, store, or dispose of hazardous waste and have been associated with corrective action activity.

- The subject site is not listed as a RCRA CORRACTS TSD facility.
- The database search did not identify any RCRA CORRACTS TSD facilities within a one-mile radius of the subject site.

5.1.7 RCRA Generators

The RCRA Generator list is maintained by the EPA to track facilities that generate hazardous waste.

- The subject site is not listed as a RCRA generator.
- The database search did not identify any RCRA Generators near the subject site.

5.1.8 State Sites and State Spill Sites

The EnviroStor database, maintained by the DTSC, contains both known and potential hazardous substance sites. The California Hazardous Material Incident Report System, maintained by the California Office of Emergency Services, contains information on reported hazardous material incidents.

- The campus is not listed as a State Site, but is listed as a State Spill Site.
    - CUSD, Dana Hills High School is listed on the CHMIRS database. During house cleaning on January 6, 2000, the district found a 20-year-old can of material that had transformed into crystallized ether, which was feared to be explosive. The Bomb Squad reported to the scene, and school was closed for the day. Half of the building where the can was found was evacuated.

Based on the location of the can on campus and the substance involved, this listing is not expected to impact the subject site.

- The database search did not identify any State Sites or State Spill Sites within a one mile radius of the subject site.

5.1.9 Cortese List

The Cortese list database identifies hazardous waste sites selected for remedial action and underground storage tank (UST) properties having a reportable release and is maintained by the EPA/Office of Emergency Information.

- The subject site is not listed on the Cortese list.
- The database search did not identify any Cortese sites within a ½-mile radius of the subject property.

5.1.10 Registered Underground Storage Tanks (USTs)

The State Water Resources Control Board's Underground Storage Tanks Database maintains a list of USTs that store hazardous substances.

- The subject site is not listed as having USTs.
- The adjoining properties were not listed on the UST list.

5.1.11 State Landfills and Solid Waste Disposal Sites

The database search did not identify any Solid Waste Disposal Site within a ½ mile radius of the subject site.

5.1.12 State Leaking Underground Storage Tanks

The State Water Resources Control Board Leaking Underground Storage Tank Information System contains an inventory of Leaking Underground Storage Tank (LUST) Incident Reports.

- The subject site is not listed on the LUST list.
- The database search did not identify any LUST facilities within a ½-mile radius of the subject site.

5.1.13 FINDS

The United States Environmental Protection Agency's Facility Index System contains both facility information and other sources that contain more detail.

- The campus was identified on the FINDS database.
    - Dana Hills High is listed on the National Center for Education Statistics (NCES). NCES is the primary federal entity for collecting and analyzing data related to education in the United States and other nations.

5.1.14 HAZNET

The California Environmental Protection Agency Department of Toxic Substances Control's HAZNET Facility and Manifest Database contains copies of hazardous waste manifest received each year by the DTSC.

- The campus was identified on the HAZNET database.
    - CUSD, Dana Hills High School is listed twelve times on the HAZNET database. About 0.15 tons of off-specification, aged, or surplus organics, 0.01 tons of laboratory waste chemicals, 0.2251 tons of liquids with more than 1000 milligrams per liter halogenated organic compounds, 0.32 tons of paint sludge, 0.8428 tons of asbestos-containing waste, 0.125 tons of other inorganic solid waste, 0.3544 tons of unspecified oil-containing waste, 0.0208 tons of laboratory waste chemicals, 0.0525 tons of asbestos-containing waste, an unspecified amount of laboratory waste chemicals, 0.01 tons of off-specification, aged, or surplus organics and 0.03 tons of laboratory waste chemicals were identified to have been manifested offsite.

5.2 ADDITIONAL ENVIRONMENTAL RECORDS REVIEW

In conformance with ASTM, inquiry was made with representatives of the agencies described below and with the user of this Phase I.

5.2.1 Proximity to High-Pressure Gas Lines or Fuel Transmission Lines

The Underground Service Alert (USA) website was accessed on January 16, 2009, to request a list of utility companies in the vicinity of the subject property that may operate transmission lines. USA provided a list of ten companies, including the Southern California Gas Company (SCGC). A letter was sent to the State Fire Marshal on January 9, 2009 to evaluate what types of pipelines are in the area.

No petroleum pipelines were identified in the vicinity of the site. The State Fire Marshal responded that there are no pipelines in their jurisdiction near the site. Agency records are included in Appendix C.

5.2.2 State of California Division of Oil and Gas Records

A review of California Division of Oil and Gas Field Map, Wildcat Map W1-4, Orange, Riverside and San Bernardino Counties (California Department of Conservation 2004) indicates that there are no oil or gas fields in the vicinity of the Site. The oil gas map pages showing the vicinity of the closest oil wells are included in Appendix C.

The environmental databases reviewed as part of this Phase I include the Former Manufactured Gas Sites database (Coal Gas). The subject site and surrounding sites were not identified on the Coal Gas database, thereby providing additional information on the absence of gas fields in the immediate area of the subject site (Appendix B).

5.2.3 User-Provided Information

The ASTM Standard requires disclosure in the Phase I report whether the user of the report has specialized knowledge about previous ownership or uses of the property that may be material to identifying RECs or HRECs, or whether the user has determined that the property's Title contains environmental liens or other information related to environmental condition of the property, including engineering and institutional controls and Activity and Use Limitations, as defined by ASTM. In addition, we are required by the ASTM Standard to inquire whether the user of the report has prior knowledge that the price of the property has been reduced for environmentally related reasons.

The Planning Center has not been informed by the user that there are liens or other information about the environmental condition of the property in the Title. In addition, the user has not indicated specialized knowledge about previous ownership or uses of the property that may be material to identifying RECs with the exception of the information provided above, and has not indicated that the price of the property has been reduced for environmentally related reasons.

6. Site Reconnaissance and Key Personnel Interview(s)

A site visit to observe site conditions was conducted by Elizabeth Kim of The Planning Center on February 25, 2009. Ms. Kim was not accompanied during the site visit. The Planning Center personnel observed the exterior portions of the property, including the property boundaries. No weather-related conditions or other conditions that would limit our ability to observe the site occurred during our site reconnaissance. The findings of the site visit and interviews are discussed below. Site photographs are included in Appendix D.

ASTM Section 9.8 requires that, prior to the site visit**,** the current site owner or Key Site Manager and user, if different from the current owner or Key Site Manager, be asked if there are any helpful documents or information that can be made available for review. These consist of environmental site assessment reports, audits, permits, tank registrations, Material Safety Data Sheets, Community Right-to-Know plans, safety plans, hydrogeologic or geotechnical reports, or hazardous waste generator reports. We were provided with site maps.

6.1 CURRENT USE OF THE PROPERTY

The subject site consists of tennis courts, racquetball courts, portable classrooms and part of a parking area on the east side of the Dana Hills High School campus located at 33333 Street of the Golden Lantern in Dana Point, California.

6.2 SITE VISIT OBSERVATIONS

6.2.1 General Description of Structures

Tennis courts and racquetball courts are located on the site. Portable classrooms are located on hardscape east of the racquetball courts. Storage bins are located north of the portable classrooms and south of the tennis courts. A portion of a parking lot is located on the northwest part of the site. No foundations were observed during the site visit.

6.2.2 Heating and Cooling System

Electricity is provided to the campus by San Diego Gas & Electric (SDG&E). Natural gas is provided to the campus by SDG&E.

6.2.3 Potable Water Supply and Sewage Disposal System or Septic Systems

Potable water is provided to the site by the South Coast Water District (SCWD). Sewage disposal is provided by SCWD.

6.2.4 Use of Petroleum Products and Hazardous Materials

Use of petroleum products and hazardous materials was not observed at the subject site.

6.2.5 Storage of Petroleum Products and Hazardous Materials (Storage Tanks, Drums)

Storage of petroleum products and hazardous materials was not observed at the subject site.

6.2.6 Disposal of Petroleum Products and Hazardous Materials

No evidence of disposal of petroleum products or hazardous materials was observed at the

subject site.

6.2.7 Hydraulic Elevators

No hydraulic elevators were observed at the subject site.

6.2.8 Vehicle Maintenance Lifts

No vehicle maintenance lifts were observed at the subject site.

6.2.9 Emergency Generators and Sprinkler System Pumps

No emergency generators or sprinkler system pumps were observed on the subject site.

6.2.10 Polychlorinated Biphenyls (PCBs) Associated with Electrical or Hydraulic Equipment

No hydraulic equipment or transformers were observed at the subject site.

6.2.11 Floor Drain and Sumps

No sumps or floor drains were observed at the subject site.

6.2.12 Catch Basins

No catch basins were observed at the subject site.

6.2.13 Dry Wells

No dry wells were observed at the subject site.

6.2.14 Pits, Ponds, Lagoons, and Pools of Liquid

No pits, ponds, lagoons, or pools of liquid were observed at the subject site.

6.2.15 Odors

No odors were observed at the subject site.

6.2.16 Stains or Corrosion on Floors, Walls, or Ceilings

No staining or corrosion was observed on floors, walls or ceilings at the subject site.

6.2.17 Stained Soil or Pavement

No stained soil or pavement was observed at the subject site.

6.2.18 Stressed Vegetation

No stressed vegetation was observed at the subject property.

6.2.19 Solid Waste and Evidence of Waste Filling

No evidence of solid waste or waste filling was observed on the subject property.

6.2.20 Wastewater and Stormwater Discharge

No wastewater or stormwater discharge was observed on the subject property. Stormwater is expected to be collected by the City of Dana Point Stormwater Collection System. Stormwater is also expected to percolate through open spaces.

6.2.21 Monitoring, Water Supply, or Irrigation Wells

No monitoring, water supply, or irrigation wells were observed at the subject property.

6.2.22 Sanitary Sewer and Septic Systems

Sewage disposal is provided to the site by SCWD. No septic systems were observed on the subject property.

6.2.23 Non-Scope Considerations

- No evidence of fill material was observed on the subject property.
- Railroad tracks are not located within 1,500 feet of the subject site (USGS 1975).
- Potentially high-voltage power lines were not observed in the vicinity of the subject site.
- Based on a review of aerial photographs and a site visit, portable classrooms have been located on the site since at least 1989. However, the portable classrooms have been located on hardscape continuously, with no open spaces or planters nearby. In addition, the District stated that they have not ever used termiticides. Therefore, lead-based paint and organochlorine pesticides related to termiticides are not likely to have been used on the subject site.

6.3 INTERVIEWS

Interviews were conducted with Mr. Cary Brockman on February 27, 2009. Mr. Brockman indicated that no pesticides have ever been used on the site. Mr. Brockman stated that the storage bins north of the portable classrooms store extra furniture and emergency supplies. Mr. Brockman indicated that the school opened in 1973. Mr. Brockman was not aware of any environmental issues with the site. The questionnaire that Mr. Brockman of the District completed is included as Appendix E.

6. Site Reconnaissance and Key Personnel Interview(s)

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7. Data Gap Identification

No adjacent land owners beside the principal of the school were interviewed for this Phase I Environmental Site Assessment. In addition, chain-of-title documents were not obtained for the parcel.

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8. Findings and Conclusions

On behalf of Capistrano Unified School District, The Planning Center has performed a Phase I Environmental Site Assessment (Phase I) for the approximately 0.7-acre site located on the east side of the Dana Hills High School campus at 33333 Street of the Golden Lantern in the City of Dana Point, Orange County, California. Capistrano Unified School District (District) intends to build a performing arts theater on the site. The subject site consists of tennis courts, racquetball courts, portable classrooms, storage bins and part of a parking lot. The theater will be located on the east side of the school site, immediately east of the school's main building. The project's development would entail the construction of 28,247 square feet of building space. The project area includes the classroom building footprint and surrounding area for a total of approximately 31,072 square feet.

The scope of work is described and conditioned by our proposal dated October 2008. As indicated in our proposal, this Phase I was performed in conformance with the scope and limitations of the American Society for Testing and Materials (ASTM) E 1527-05 Standard Practice for Environmental Site Assessments: Phase I Environmental Site Assessment Process and following the California Environmental Protection Agency Department of Toxic Substances Control (DTSC) guidelines for Phase I evaluations for proposed school sites. Exceptions to, or deletions from, this practice are described in Section 1 of this report. Our conclusions are intended to help the user evaluate the "environmental risk" associated with the site, as defined in the ASTM E 1527-05 Standard and discussed in the Introduction section of this report.

RECOGNIZED ENVIRONMENTAL CONDITIONS

The goal of the ASTM E 1527-05 Standard practice is to identify Recognized Environmental Conditions (RECs), as defined in the Standard and in Section 1 of this report.

This assessment has not revealed evidence of any recognized environmental conditions in connection with the property following the ASTM standard and the DTSC recommended school guidance for Phase I assessments.

HISTORICAL RECS AND KNOWN OR SUSPECT ENVIRONMENTAL CONDITIONS

The ASTM E 1527-05 Standard also requires that historical RECs (HRECs) and other known or suspect environmental conditions, as defined in the Standard and in Section 1 of this report are identified in the Phase I.

This assessment has not revealed evidence of any historical recognized environmental conditions, in connection with the property following the ASTM standard and the DTSC recommended school guidance for Phase I assessments.

SUMMARY

Based on the results of this assessment, RECs and HRECs were not identified. The District is requesting a no further action determination.

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Appendix E
Noise Data

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Noise Appendix

Characteristics of Sound

Sound is a pressure wave transmitted through the air. When an object vibrates, it radiates part of its energy as acoustical pressure in the form of a sound wave. Sound can be described in terms of amplitude (loudness), frequency (pitch), or duration (time). The standard unit of measurement of the loudness of sound is the decibel (dB). The human hearing system is not equally sensitive to sound at all frequencies. Sound waves below 16 Hz are not heard at all and are "felt" more as a vibration. Similarly, while people with extremely sensitive hearing can hear sounds as high as 20,000 Hz, most people cannot hear above 15,000 Hz. In all cases, hearing acuity falls off rapidly above about 10,000 Hz and below about 200 Hz. Since the human ear is not equally sensitive to sound at all frequencies, a special frequency-dependent rating scale is usually used to relate noise to human sensitivity. The A-weighted decibel scale (dBA) performs this compensation by discriminating against frequencies in a manner approximating the sensitivity of the human ear.

Because of the physical characteristics of noise transmission and noise perception, the relative loudness of sound does not closely match the actual amounts of sound energy. Table 1, Change in Sound Pressure Level, dB, presents the subjective effect of changes in sound pressure levels. Typical human hearing can detect changes of approximately 3 dBA or greater under normal conditions. Changes of 1 to 3 dBA are detectable under quiet, controlled conditions and changes of less than 1 dBA are usually indiscernible. A change of 5 dBA or greater is typically noticeable to most people in an exterior environment and a change of 10 dBA is perceived as a doubling (or halving) of the noise.

Table 1
Change in Sound Pressure Level, dB

Change in Apparent Loudness	
± 3 dB	Threshold of human perceptibility
± 5 dB	Clearly noticeable change in noise level
± 10 dB	Half or twice as loud
± 20 dB	Much quieter or louder

Source: Bies and Hansen, Engineering Noise Control, 1988.

Point and Line Sources

Noise may be generated from a point source, such as a piece of construction equipment, or from a line source, such as a road containing moving vehicles. Because noise spreads in an ever-widening pattern, the given amount of noise striking an object, such as an eardrum, is reduced with distance from the source. This is known as "spreading loss." The typical spreading loss for point source noise is 6 dBA per doubling of the distance from the noise source.

A line source of noise, such as vehicles proceeding down a roadway, would also be reduced with distance, but the rate of reduction is affected by of both distance and the type of terrain over

which the noise passes. Hard sites, such as developed areas with paving, reduce noise at a rate of 3 dBA per doubling of the distance while soft sites, such as undeveloped areas, open space and vegetated areas reduce noise at a rate of 4.5 dBA per doubling of the distance. These represent the extremes and most areas would actually contain a combination of hard and soft elements with the noise reduction placed somewhere in between these two factors. Unfortunately the only way to actually determine the absolute amount of attenuation that an area provides is through field measurement under operating conditions with subsequent noise level measurements conducted at varying distances from a constant noise source.

Objects that block the line of sight attenuate the noise source if the receptor is located within the "shadow" of the blockage (such as behind a sound wall). If a receptor is located behind the wall, but has a view of the source, the wall would do little to reduce the noise. Additionally, a receptor located on the same side of the wall as the noise source may experience an increase in the perceived noise level, as the wall would reflect noise back to the receptor compounding the noise.

Noise Metrics

Several rating scales (or noise "metrics") exist to analyze adverse effects of noise, including traffic-generated noise, on a community. These scales include the equivalent noise level (L_{eq}), the community noise equivalent level (CNEL) and the day/night noise level (L_{dn}). L_{eq} is a measurement of the sound energy level averaged over a specified time period.

The CNEL noise metric is based on 24 hours of measurement. CNEL differs from L_{eq} in that it applies a time-weighted factor designed to emphasize noise events that occur during the evening and nighttime hours (when quiet time and sleep disturbance is of particular concern). Noise occurring during the daytime period (7:00 AM to 7:00 PM) receives no penalty. Noise produced during the evening time period (7:00 to 10:00 PM) is penalized by 5 dB, while nighttime (10:00 PM to 7:00 AM) noise is penalized by 10 dB. The L_{dn} noise metric is similar to the CNEL metric except that the period from 7:00 to 10:00 PM receives no penalty. Both the CNEL and L_{dn} metrics yield approximately the same 24-hour value (within 1 dB) with the CNEL being the more restrictive (i.e., higher) of the two.

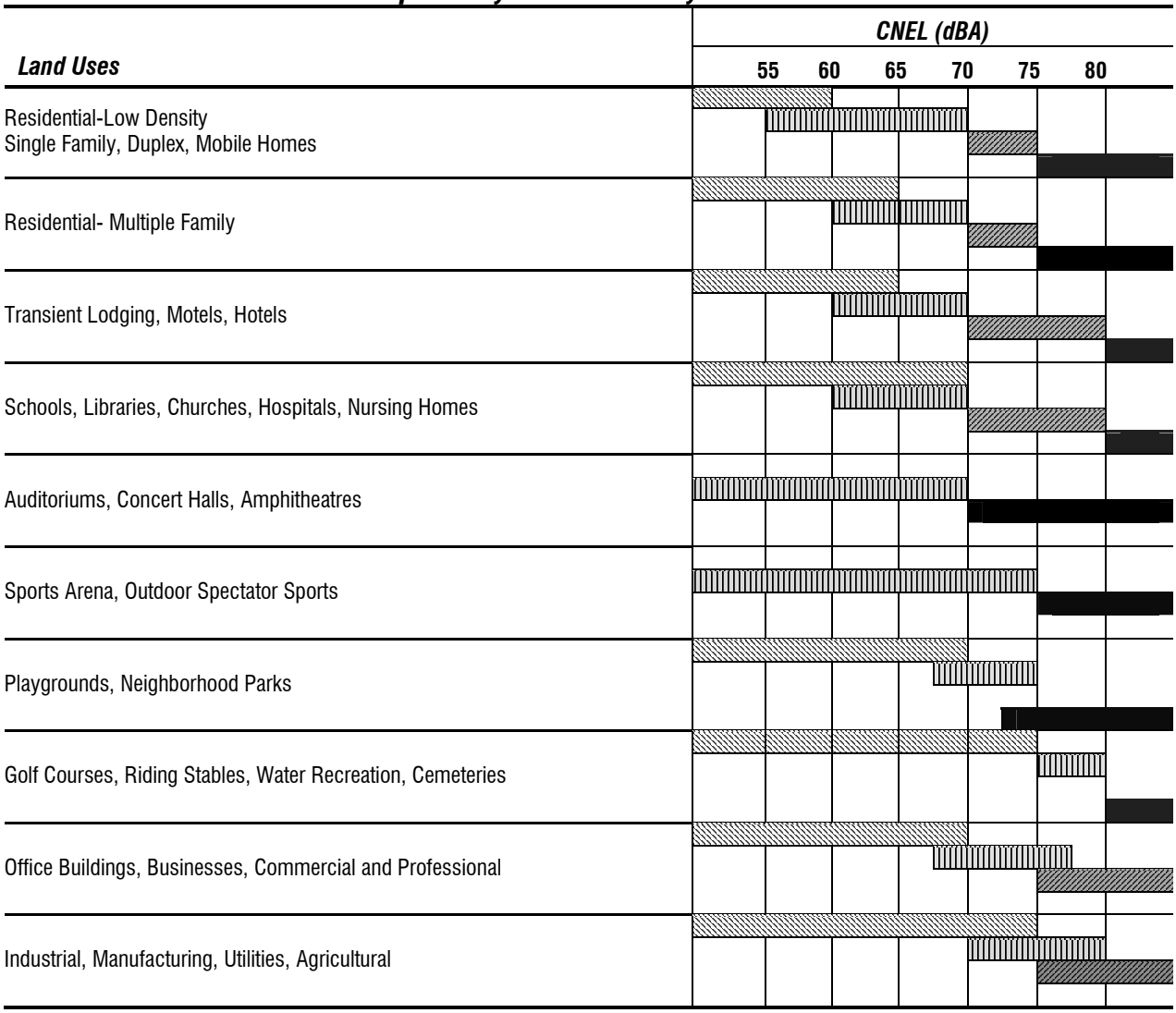
Regulatory Environment

State of California

Noise Compatibility

Table 2, presents a land use compatibility chart for community noise adopted by the California Office of Noise Control. This Table provides urban planners with a tool to gauge the compatibility of land uses relative to existing and future noise levels. Sensitive-type land uses, such as schools and homes, are "normally acceptable" in exterior noise environments up to 65 dBA CNEL and "conditionally acceptable" in areas up to 70 dBA CNEL. A "conditionally acceptable" designation implies that new construction or development should be undertaken only after a detailed analysis of the noise reduction requirements for each land use type is made and needed noise insulation features are incorporated in the design. By comparison, a "normally acceptable" designation indicates that standard construction can occur with no special noise reduction requirements.

Table 2
Land Use Compatibility for Community Noise Environments



Normally Acceptable:
Specified land use is satisfactory based upon the assumption that any buildings involved are of normal conventional construction, without any special noise insulation requirements.

Conditionally Acceptable:
New construction or development should be undertaken only after a detailed analysis of the noise reduction requirements is made and the needed noise insulation features included in the design. Conventional construction, but with closed windows and fresh air supply systems or air conditioning will normally suffice.

Normally Unacceptable:
New construction or development should generally be discouraged. If new construction does proceed, a detailed analysis of the noise reduction requirements must be made and needed noise insulation features included in the design.

Clearly Unacceptable:
New construction or development generally should not be undertaken.

Source: California Office of Noise Control. Guidelines for the Preparation and Content of Noise Elements of the General Plan. February 1976. Adapted from the US EPA Office of Noise Abatement Control, Washington D.C. Community Noise. Prepared by Wyle Laboratories. December 1971.

California Building Code

The state of California's noise insulation standards are codified in the California Code of Regulations, Title 24, Building Standards Administrative Code, Part 2, California Building Code. These noise standards are applied tor new construction in California for the purpose of interior noise compatibility from exterior noise sources. The regulations specify that acoustical studies must be prepared when noise-sensitive structures, such as residential buildings, schools, or hospitals, are located near major transportation noise sources, and where such noise sources create an exterior noise level of 60 dBA CNEL or higher. Acoustical studies that accompany building plans must demonstrate that the structure has been designed to limit interior noise in habitable rooms to acceptable noise levels. For new residential buildings, schools, and hospitals, the acceptable interior noise limit for new construction in 45 dBA CNEL.

City of Dana Point Noise Standards

Stationary Noise Standards

The project site is not subject to noise restrictions of the City of Dana Point Municipal Code because the project is under the jurisdiction of the Capistrano Unified School District. However, the City of Dana Point Municipal Code is used as the basis for defining stationary-source noise impacts on residents within the City. Table 3 identifies the maximum permissible noise limits generated by stationary sources of noise at the boundary of a property. Pursuant to the Noise Control Ordinance, the City restricts noise levels generated at a property from exceeding certain noise levels for extended periods of time. The standards (summarized in Table 3) are applied to nontransportation fans, blowers, pumps, turbines, saws, engines, and other like machinery. These standards do not gauge the compatibility of developments in the noise environment, but provide restrictions on the amount and duration of noise generated at a property, as measured at the property line of the noise receptor. The City's Noise Ordinance is designed to protect people from objectionable nontransportation noise sources such as music, construction activity, machinery, pumps, and air conditioners. However, activities conducted at elementary, intermediate, secondary schools and colleges are exempt from the noise limitations of the Municipal Code.

Table 3
City of Dana Point – Maximum Sound Level Limits for Land Uses[1,2]

Time of Day	dBA L_{50}	dBA L_{25}	dBA L_8	dBA L_2	L_{max}
7:00 AM to 10:00 PM	55	60	65	70	75
10:00 PM to 7:00 AM	50	55	60	65	70

Source: City of Dana Point Municipal Code. Title 11, *Peace, Morals, and Safety*, Chapter 11.10, *Noise Control*, Section 11.10.010, *Exterior Noise Standards*.

[1] In the event the noise offense consists entirely of impact noise, simple tone noise, speech, music, or any combination thereof, maximum permissible noise levels shall be reduced by 5 dBA.

[2] In the event the ambient noise levels exceed the maximum permissible noise limits, the ambient noise levels shall become the maximum permissible noise level.

Construction Hours

The City of Dana Point regulates construction activities in the Municipal Code. The City limits construction activities to 7:00 AM to 8:00 PM Monday through Saturday (except for Federal holidays).

Federal Transit Administration

The human reaction to various levels of vibration is highly subjective. The FTA provides criteria, shown in Table 4, for acceptable levels of groundborne vibration for various types of land uses that are sensitive to vibration based on the relative perception of a vibration event.

Table 4
Groundborne Vibration and Noise Impact Criteria – Human Annoyance

Land Use Category	*Max L_v (VdB)[1]*	*Description*
Workshop	90	Distinctly felt vibration. Appropriate to workshops and nonsensitive areas
Office	84	Felt vibration. Appropriate to offices and non-sensitive areas.
Residential – Daytime	78	Barely felt vibration. Adequate for computer equipment.
Residential – Nighttime	72	Vibration not felt, but groundborne noise may be audible inside quiet rooms.

Source: United States Department of Transportation Federal Transit Administration (FTA), *Transit Noise and Vibration Impact Assessment,* May 2006
[1] As measured in 1/3 octave bands of frequency over the frequency ranges of 8 to 80 Hz.

In addition to the vibration annoyance standards presented above, the FTA also applies standards for construction vibration damage, as shown in Table 5. Structural damage is possible for typical residential construction when the peak particle velocity (PPV) exceeds 0.2 inch per second. This criterion is the threshold at which there is a risk of damage to normal dwelling houses.

Table 5
Groundborne Vibration and Noise Impact Criteria – Structural Damage

Building Category	*PPV (in/sec)*	*VdB*
I. Reinforced concrete, steel, or timber (no plaster)	0.5	102
II. Engineered concrete and masonry (no plaster)	0.3	98
III. Nonengineered timber and masonry buildings	0.2	94
IV. Buildings extremely susceptible to vibration damage	0.12	90

Source: FTA, *Transit Noise and Vibration Assessment,* May 2006.
Notes: RMS velocity calculated from vibration level (VdB) using the reference of one microinch/second.

Noise and Vibration Sensitive Receptors

Noise and vibration sensitive uses include residential land uses where quiet environments are necessary for enjoyment and public health and safety.

Noise Monitoring: Dana Hills High School

Location	Number	Date	Time	Duration	Leq	SEL	Lmax	Lmin	Peak	Uwpk	L(2)	L(8)	L(16)	L(25)	L(50	L(90)
1	0	9-Jun	8:26:46	60	62.7	80.5	69.1	48.8	88.4	91.7	68.2	66.7	65.5	64.5	61	53.3
1	0	9-Jun	8:27:46	60	56.8	74.6	66.5	46.5	78.9	90.5	65.2	61.2	58.7	57.3	53.8	47.4
1	0	9-Jun	8:28:46	60	63.7	81.5	71.7	55.7	87.7	95.9	69.7	67.8	65.3	63.8	62.3	58.6
1	0	9-Jun	8:29:46	60	59.1	76.9	65.5	44.2	81	87.7	65	63.8	62.5	60.9	56.5	46.2
1	0	9-Jun	8:30:46	60	62.4	80.2	69.2	43.7	84.7	90.5	68.6	67.2	65.8	64.1	59.9	48.1
1	0	9-Jun	8:31:46	60	63.1	80.9	73	48.5	85.2	95.2	71	66	65	63.9	60.9	53.3
1	0	9-Jun	8:32:46	60	59.8	77.6	67	50.3	80.7	88.5	65.9	64	61.8	60.7	58.4	52.4
1	0	9-Jun	8:33:46	60	60.1	77.9	67	50.3	82.3	89.2	66.1	64.2	62.4	61.4	58.1	51.9
1	0	9-Jun	8:34:46	60	61.6	79.3	67.3	51.2	82.3	93.7	66.8	65.7	64.6	63.7	59.5	52.3
1	0	9-Jun	8:35:46	60	60	77.7	67.7	49.7	80.5	92.3	66.5	63.9	62.1	60.8	58.3	50.9
1	0	9-Jun	8:36:46	60	63.4	81.2	69	51.5	84.1	91.7	68.7	67.7	66	64.7	61.8	54.6
1	0	9-Jun	8:37:46	60	60.7	78.4	66.7	45.6	80.3	90.5	65.7	64.5	63.4	62.5	59.9	48.1
1	0	9-Jun	8:38:46	60	62.2	80	69.6	51.7	83	90.5	68.3	67.4	65.8	63.8	58	52.9
1	0	9-Jun	8:39:46	60	60.7	78.5	69.1	47.6	83	89.2	67.7	64.1	62.4	61.4	59	53.8
1	0	9-Jun	8:40:46	60	61.3	79.1	66.8	52.7	81.4	90.5	66.4	65.2	62.9	61.7	60.4	57.2
1	0	9-Jun	8:41:46	60	58.6	76.4	64.6	48	84.6	89.2	63.7	62.3	61.4	60.4	57	49.7
1	0	9-Jun	8:42:46	60	61	78.7	68	50.2	83.3	87.7	66.8	65.3	63.4	62.4	59.6	52.6
1	0	9-Jun	8:43:46	60	63.1	80.8	70.5	48.2	86.1	92.8	69.6	67.6	66.1	63.9	60.9	50.7
1	0	9-Jun	8:44:46	60	60.6	78.3	66.6	50.5	79.3	90.5	66.3	64.8	63	62.1	58.7	54.2
1	0	9-Jun	8:45:46	60	58.8	76.6	66.2	49.2	81.8	85.7	64.8	63	61.9	60.7	56.3	50.9
					61.3		**73.0**	**43.7**								

Description: Sound Level Meter No. 1 was placed approximately 11.5 feet from the edge of the roadway and approximately 52 feet west from the centerline of Golden Lantern Street and approximately 41 feet north of the gate entrance at the southeast corner of the southern softball/multipurpose field. The SLM height was placed at 5 feet from the ground with a microphone orientation to the east toward Golden Lantern Street. The primary noise sources were from traffic on Golden Lantern Street. Approxmately 387 light duty autos (LDA), 6 medium duty trucks (MDT), and 2 heavy duty trucks (HDT) were counted during the 20 min monitoring period traveling at an average cruise speed of 39 miles per hour.

FHWA Traffic Noise Model Worksheets - Dana Hills High School

Assuming Fleet mix of:

CARS	M-TRUCK	H-TRUCK
97%	2%	1%

	MPH	ADT	Lanes	Traffic/Lane
Golden Lantern Street				
n/o Acapulco Drive	45	19,400	4	4,850
n/o Stonehill Drive	45	19,800	4	4,950
s/o Stonehill Drive	45	14,300	4	3,575
Acapulco Drive (25 mph)				
w/o Golden Lantern Street	30	6,600	4	1,650
e/o Golden Lantern Street	25	1,200	2	600
Stonehill Drive (40 mph)				
w/o Golden Lantern Street	40	10,000	4	2,500
e/o Golden Lantern Street	40	16,000	4	4,000

Traffic Volumes based on Kunzman Associates Traffic Report (2009). Roadway configuration and speed limits based on Google Earth and Google Street view.

Centerline for TNM	Golden Lantern	Acapulco (w)	Acapulco (e)	Stonehill
SB/WB_Right Lane	20	24		24
SB/WB_Left Lane	8	7	6	9
Centerlane	0	0	0	0
NB/EB_Right Lane	20	7	6	9
NB/EB_Left Lane	32	16		24
onstreet parking	both sides (10ft)	Not at school	yes	No
Total roadway width	82	68	40	76
Receptor Locations				
N/W	51	39	30	43
S/E	51	39	30	43

Traffic Noise Levels

The Planning Center

1-Apr-09
TNM 2.5
Calculated with TNM 2.5

RESULTS: SOUND LEVELS
PROJECT/CONTRACT: Dana Hills High School

BARRIER DESIGN: INPUT HEIGHTS

ATMOSPHERICS: 68 deg F, 50% RH
Average pavement type shall be used unless
a State highway agency substantiates the use
of a different type with approval of FHWA.

Golden Lantern Street	Lden
Receiver	Calculated dBA
GL_N_Acapulco_E	65.9
GL_N_Acapulco_W	65.9
GL_N_Stonehill_E	65.9
GL_N_Stonehill_W	65.9
GL_S_Stonehill_E	64.5
GL_S_Stonehill_W	64.5

Acapulco Drive	Lden
Receiver	Calculated dBA
A_W_GoldenLantern_N	66.4
A_W_GoldenLantern_S	66.4
A_E_GoldenLantern_N	57.9
A_E_GoldenLantern_S	57.9

Stonehill Drive	Lden
Receiver	Calculated dBA
SH_W_GoldenLantern_N	70.8
SH_W_GoldenLanter_S	70.8
SH_E_GoldenLantern_N	72.9
SH_E_GoldenLantern_S	72.9

Entire Site	Lden	
Receiver	Calculated dBA	Interior
Performing Arts Building	60.0	36.0
Relocated Tennis Courts	62.1	na
Tennis Courts at 110 feet (centerline)	62.1	na

Receivers

The Planning Center
9-Jun-09
TNM 2.5
Calculated with TNM 2.5

INPUT: Receivers
PROJECT/CONTRACT: Dana Hills High School
RUN:

Receiver Name	Coordinates (ground) X ft	Y ft	Z ft	Height above Ground ft
Golden Lantern Street				
GL_N_Acapulco_E	-1000.0	51.0	0.0	4.92
GL_N_Acapulco_W	-1000.0	-51.0	0.0	4.92
GL_N_Stonehill_E	0.0	51.0	0.0	4.92
GL_N_Stonehill_W	0.0	-51.0	0.0	4.92
GL_S_Stonehill_E	1000.0	51.0	0.0	4.92
GL_S_Stonehill_W	1000.0	-51.0	0.0	4.92
Acapulco Drive				
A_W_GoldenLantern_N	0.0	39.0	0.0	4.92
A_W_GoldenLantern_S	0.0	-39.0	0.0	4.92
A_E_GoldenLantern_N	1000.0	30.0	0.0	4.92
A_E_GoldenLantern_S	1000.0	-30.0	0.0	4.92
Stonehill Drive				
SH_W_GoldenLanter_N	0.0	43.0	0.0	4.92
SH_W_GoldenLanter_S	0.0	-43.0	0.0	4.92
SH_E_GoldenLantern_N	1000.0	43.0	0.0	4.92
SH_E_GoldenLantern_S	1000.0	-43.0	0.0	4.92
On-Site Receptors				
Performing Arts Building	200.0	-370.0	0	4.92
Relocated Tennis Courts	270.0	-88.0	0	4.92
Tennis Courts at 110 Feet (centerli	270.0	-110.0	0	4.92
Relocated Tennis Courts No. 2	180.0	-88.0	0	4.92

Roadway

The Planning Center 9-Jun-09

TNM 2.5

INPUT: ROADWAYS

PROJECT/CONTRACT: Dana Hills High School

RUN:

Average pavement type shall be used unless
a State highway agency substantiates the use
of a different type with the approval of FHWA

Roadway Name	Width	Points Name	Coordinates (pavement) X ft	Y ft	Z ft	Segment Pvmt Type
GL_N_Stonehill_NBLeft	10.0	Point 9	500.0	20.0	0	Average
		Point 10	-447.0	20.0	0	
GL_N_Stonehill_SBLeft	10.0	Point 11	-447.0	-8.0	0	Average
		Point 12	500.0	-8.0	0	
GL_N_Stonehill_NBRight	14.0	Point 13	500.0	32.0	0	Average
		Point 14	-447.0	32.0	0	
GL_N_Stonehill_SBRight	14.0	Point 15	-447.0	-20.0	0	Average
		Point 16	500.0	-20.0	0	
A_WB_Left	8.0	Point 25	-526.0	0.0	0	Average
		Point 26	-526.0	-900.0	0	
A_EB_Left	8.0	Point 28	-519.0	-900.0	0	Average
		Point 29	-519.0	0.0	0	
A_WB_Right	16.0	Point 30	-550.0	0.0	0	Average
		Point 31	-550.0	-900.0	0	
A_EB_Right	16.0	Point 32	-512.0	-900.0	0	Average
		Point 33	-512.0	0.0	0	
SH_WBLeft	12.0	Point 34	542.0	0.0	0	Average
		Point 35	542.0	-900.0	0	
SH_EBLeft	12.0	Point 36	533.0	-900.0	0	Average
		Point 37	533.0	0.0	0	
SH_WBRight	18.0	Point 38	566.0	0.0	0	Average
		Point 39	566.0	-900.0	0	
SH_EBRIght	18.0	Point 40	524.0	-900.0	0	Average
		Point 41	524.0	0.0	0	

Traffic

The Planning Center DATE 9-Jun-09
TNM 2.5

INPUT: TRAFFIC FOR Lden
PROJECT/CONTRACT: Dana Hills High School
RUN:

		ADT veh/24 hrs	Auto				Mtrucks				Htrucks				Buses				Motorcycles			
Roadway	Points	Future	% D	% E	% N	S	% D	% E	% N	S	% D	% E	% N	S	% D	% E	% N	S	% D	% E	% N	S
Name	Name	With Project				mph				mph				mph				mph				mph
GL_N_Stonehill_NBLeft	Point 9	4,950	98	98	98	40	2	2	2	40	0	0	0	0	0	0	0	0	0	0	0	0
	Point 10																					
GL_N_Stonehill_SBLeft	Point 11	4,950	98	98	98	40	2	2	2	40	0	0	0	0	0	0	0	0	0	0	0	0
	Point 12																					
GL_N_Stonehill_NBRight	Point 13	4,950	98	98	98	40	2	2	2	40	0	0	0	0	0	0	0	0	0	0	0	0
	Point 14																					
GL_N_Stonehill_SBRight	Point 15	4,950	98	98	98	40	2	2	2	40	0	0	0	0	0	0	0	0	0	0	0	0
	Point 16																					
A_WB_Left	Point 25	1650	97	97	97	30	2	2	2	30	1	1	1	30	0	0	0	0	0	0	0	0
	Point 26																					
A_EB_Left	Point 28	1650	97	97	97	30	2	2	2	30	1	1	1	30	0	0	0	0	0	0	0	0
	Point 29																					
A_WB_Right	Point 30	1650	97	97	97	30	2	2	2	30	1	1	1	30	0	0	0	0	0	0	0	0
	Point 31																					
A_EB_Right	Point 32	1650	97	97	97	30	2	2	2	30	1	1	1	30	0	0	0	0	0	0	0	0
	Point 33																					
SH_WBLeft	Point 34	2500	97	97	97	40	2	2	2	40	1	1	1	40	0	0	0	0	0	0	0	0
	Point 35																					
SH_EBLeft	Point 36	2500	97	97	97	40	2	2	2	40	1	1	1	40	0	0	0	0	0	0	0	0
	Point 37																					
SH_WBRight	Point 38	2500	97	97	97	40	2	2	2	40	1	1	1	40	0	0	0	0	0	0	0	0
	Point 39																					
SH_EBRIght	Point 40	2500	97	97	97	40	2	2	2	40	1	1	1	40	0	0	0	0	0	0	0	0
	Point 41																					

K-Factor Calculation

Date	Measurement	Leq	Traffic Volume			Average Speed
			LDA	MDT	HDT	
6/9/2009	Monitored	61.3	387	6	2	39.0
	Modeled	67.5	1161	18	6	39.0
	k-factor	**-6.2**				

Adjustment Values

The Planning Center
9-Jun-09
TNM 2.5
Calculated with TNM 2.5

INPUT: Receiver Adjustment Factors
PROJECT/CONTRACT: Dana Hills High School
RUN: Golden Lantern Street

Receiver Name	No.	Individual Roadway Segment Adjustment Factors			
		Roadway Name	Segment Name	No.	Adj. Factor dB
Performing Arts Building	8	GL_N_Stonehill_NBLeft	Point 9	9	-6.2
		GL_N_Stonehill_SBLeft	Point 11	11	-6.2
		GL_N_Stonehill_NBRight	Point 13	13	-6.2
		GL_N_Stonehill_SBRight	Point 15	15	-6.2
Relocated Tennis Courts	10	GL_N_Stonehill_NBLeft	Point 9	9	-6.2
		GL_N_Stonehill_SBLeft	Point 11	11	-6.2
		GL_N_Stonehill_NBRight	Point 13	13	-6.2
		GL_N_Stonehill_SBRight	Point 15	15	-6.2
Tennis Courts at 110 ft (centerline)	17	GL_N_Stonehill_NBLeft	Point 9	9	-6.2
		GL_N_Stonehill_SBLeft	Point 11	11	-6.2
		GL_N_Stonehill_NBRight	Point 13	13	-6.2
		GL_N_Stonehill_SBRight	Point 15	15	-6.2
Relocated Tennis Courts No. 2	19	GL_N_Stonehill_NBLeft	Point 9	9	-6.2
		GL_N_Stonehill_SBLeft	Point 11	11	-6.2
		GL_N_Stonehill_NBRight	Point 13	13	-6.2
		GL_N_Stonehill_SBRight	Point 15	15	-6.2

Adjustment Values

The Planning Center
9-Jun-09
TNM 2.5
Calculated with TNM 2.5

INPUT: Receiver Adjustment Factors
PROJECT/CONTRACT: Dana Hills High School
RUN: Golden Lantern Street

Receiver Name	No.	Individual Roadway Segment Adjustment Factors			
		Roadway Name	Segment Name	No.	Adj. Factor dB
GL_N_Acapulco_E	1	GL_N_Acapulco_NBLeft	Point 1	1	-6.2
		GL_N_Acapulco_SBLeft	Point 3	3	-6.2
		GL_N_Acapulco_NBRight	Point 5	5	-6.2
		GL_N_Acapulco_SBRight	Point 7	7	-6.2
		GL_N_Stonehill_NBLeft	Point 9	9	-6.2
		GL_N_Stonehill_SBLeft	Point 11	11	-6.2
		GL_N_Stonehill_NBRight	Point 13	13	-6.2
		GL_N_Stonehill_SBRight	Point 15	15	-6.2
		GL_S_Stonehill_NBLeft	Point 17	17	-6.2
		GL_S_Stonehill_SBLeft	Point 19	19	-6.2
		GL_S_Stonehill_NBRight	Point 21	21	-6.2
		GL_S_Stonehill_SBRight	Point 23	23	-6.2
GL_N_Acapulco_W	2	GL_N_Acapulco_NBLeft	Point 1	1	-6.2
		GL_N_Acapulco_SBLeft	Point 3	3	-6.2
		GL_N_Acapulco_NBRight	Point 5	5	-6.2
		GL_N_Acapulco_SBRight	Point 7	7	-6.2
		GL_N_Stonehill_NBLeft	Point 9	9	-6.2
		GL_N_Stonehill_SBLeft	Point 11	11	-6.2
		GL_N_Stonehill_NBRight	Point 13	13	-6.2
		GL_N_Stonehill_SBRight	Point 15	15	-6.2
		GL_S_Stonehill_NBLeft	Point 17	17	-6.2
		GL_S_Stonehill_SBLeft	Point 19	19	-6.2
		GL_S_Stonehill_NBRight	Point 21	21	-6.2
		GL_S_Stonehill_SBRight	Point 23	23	-6.2
GL_N_Stonehill_E	3	GL_N_Acapulco_NBLeft	Point 1	1	-6.2
		GL_N_Acapulco_SBLeft	Point 3	3	-6.2
		GL_N_Acapulco_NBRight	Point 5	5	-6.2
		GL_N_Acapulco_SBRight	Point 7	7	-6.2
		GL_N_Stonehill_NBLeft	Point 9	9	-6.2
		GL_N_Stonehill_SBLeft	Point 11	11	-6.2
		GL_N_Stonehill_NBRight	Point 13	13	-6.2
		GL_N_Stonehill_SBRight	Point 15	15	-6.2
		GL_S_Stonehill_NBLeft	Point 17	17	-6.2
		GL_S_Stonehill_SBLeft	Point 19	19	-6.2
		GL_S_Stonehill_NBRight	Point 21	21	-6.2
		GL_S_Stonehill_SBRight	Point 23	23	-6.2
GL_N_Stonehill_W	4	GL_N_Acapulco_NBLeft	Point 1	1	-6.2
		GL_N_Acapulco_SBLeft	Point 3	3	-6.2
		GL_N_Acapulco_NBRight	Point 5	5	-6.2
		GL_N_Acapulco_SBRight	Point 7	7	-6.2
		GL_N_Stonehill_NBLeft	Point 9	9	-6.2
		GL_N_Stonehill_SBLeft	Point 11	11	-6.2
		GL_N_Stonehill_NBRight	Point 13	13	-6.2
		GL_N_Stonehill_SBRight	Point 15	15	-6.2
		GL_S_Stonehill_NBLeft	Point 17	17	-6.2
		GL_S_Stonehill_SBLeft	Point 19	19	-6.2
		GL_S_Stonehill_NBRight	Point 21	21	-6.2
		GL_S_Stonehill_SBRight	Point 23	23	-6.2
GL_S_Stonehill_E	5	GL_N_Acapulco_NBLeft	Point 1	1	-6.2
		GL_N_Acapulco_SBLeft	Point 3	3	-6.2
		GL_N_Acapulco_NBRight	Point 5	5	-6.2
		GL_N_Acapulco_SBRight	Point 7	7	-6.2
		GL_N_Stonehill_NBLeft	Point 9	9	-6.2
		GL_N_Stonehill_SBLeft	Point 11	11	-6.2
		GL_N_Stonehill_NBRight	Point 13	13	-6.2
		GL_N_Stonehill_SBRight	Point 15	15	-6.2
		GL_S_Stonehill_NBLeft	Point 17	17	-6.2
		GL_S_Stonehill_SBLeft	Point 19	19	-6.2
		GL_S_Stonehill_NBRight	Point 21	21	-6.2
		GL_S_Stonehill_SBRight	Point 23	23	-6.2
GL_S_Stonehill_W	6	GL_N_Acapulco_NBLeft	Point 1	1	-6.2
		GL_N_Acapulco_SBLeft	Point 3	3	-6.2
		GL_N_Acapulco_NBRight	Point 5	5	-6.2
		GL_N_Acapulco_SBRight	Point 7	7	-6.2
		GL_N_Stonehill_NBLeft	Point 9	9	-6.2
		GL_N_Stonehill_SBLeft	Point 11	11	-6.2
		GL_N_Stonehill_NBRight	Point 13	13	-6.2
		GL_N_Stonehill_SBRight	Point 15	15	-6.2
		GL_S_Stonehill_NBLeft	Point 17	17	-6.2
		GL_S_Stonehill_SBLeft	Point 19	19	-6.2
		GL_S_Stonehill_NBRight	Point 21	21	-6.2
		GL_S_Stonehill_SBRight	Point 23	23	-6.2

Noise Modeling of Tennis Courts

Outdoor Play Areas	Initial Sound Pressure						Initial number of noise sources	Measurement Distance	Based on Noise Monitoring of:
	Leq	L50	L25	L16	L8	Lmax			
Tennis Courts	59.5	58.6	60.0	60.8	62.1	73.3	10	22	Tennis

Source: Noise monitoring of sports activities taken at Miles Square Park in Fountain Valley California.

Tennis Court Noise Levels

Outdoor Play Areas	New number of noise sources	Hard (0) or Soft Site (0.5)	Distance to Property Line	Future Sound Pressure Level					
				Leq	L50	L25	L16	L8	Lmax
Existing Location	60	0	448	41.1	40.2	41.6	42.4	43.7	54.9
Relocation of Tennis Courts	60	0	146	50.8	49.9	51.3	52.1	53.4	64.6

Noise Measurements of Sports Activities

Site	Date	Time	Duration (seconds)	Leq	SEL	Lmax	Lmin	Peak	Uwpk	L(2)	L(8)	L(16)	L(25)	L(50)	L(90)
Tennis	10-Oct-05	5:27 PM	1200	59.5	90.3	73.3	51	101.8	101.4	64.8	62.1	60.8	60	58.6	55.9

Source: Noise monitoring of sports activities taken at Miles Square Park in Fountain Valley California.

Noise Monitoring was conducted at 5:30 p.m. on October 10, 2005 at the tennis court area of Mile Square Park. Noise monitoring was conducted in the center isle between two tennis court activity areas. The noise meter was placed 20 feet from the single-player tennis court area and 22 feet from the multiple player tennis court area. There were 2 single player tennis courts and 3 multiple player tennis courts within a 50-foot radius of noise monitoring, although this area is part of a much larger tennis court complex of Mile Square Park, which includes 12 multiple-player tennis courts and 2 single player tennis courts.. There were 4 tennis players within the single court tennis area (2 to a court) and 6 tennis players within the team tennis court area located within the general vicinity of the noise monitoring location. Primary noise from tennis court activities was tennis balls hitting the hardcourt, wall and tennis racket. Secondary noise included noise from children playing on the playfields to the east of the tennis court complex area and noise from Brookhurst Street, located to the west of the tennis court complex

Noise Measurements of Sports Activities and the Parking Garage			
Monitoring Site	**Lmax**	**Leq**	**Lmin**
Boys Football Practice[1]	72.7	57.0	46.3
Tennis Court Activity[1]	73.3	59.5	51.0
Basketball Activity[2]	77.1	63.6	53.9
Parking Garage[3]	79.1	61.7	50.5

[1] Noise monitoring of boys football practice and tennis court activity was conducted on October 10, 2005 between the hours of 5:00 p.m. and 6:1700 p.m. at Miles Square Park sports fields.

[2] Noise monitoring of Sunday basketball activity was conducted on October 16, 2005 between the hours of 10:30 a.m. and 11:00 a.m. at Miles Square Park sports fields

[3] Noise monitoring of the parking garage was conducted on October 10, 2005 between the hours of 3:10 and 3:30 p.m. at the University of California, Irvine, Social Sciences Parking Garage.

All noise measurements were 20 minutes in duration.

Boys Football Practice

Noise monitoring was conducted at 5:00 p.m. on October 10, 2005 approximately 50 feet from a boys football team practice at the southwest end of the playfield in Mile Square Park. The boys football team consisted of 17 players. Football practice took place in a large area with 2 baseballs fields. There were a total of three football teams, and 2 cheerleading squads located in this area. The two other football teams were practicing at the far east end of the playfield. The girls cheerleading squad was practicing at the far north end of the playfield. These other teams were located over 100 feet from monitoring activity. Primary noise during noise monitoring was football players screaming plays and exercises. Secondary noise included parking lot noise and other sports activities occurring farther from the practice field.

Tennis Court Activity

Noise Monitoring was conducted at 5:30 p.m. on October 10, 2005 at the tennis court area of Mile Square Park. Noise monitoring was conducted in the center isle between two tennis court activity areas. The noise meter was placed 20 feet from the single-player tennis court area and 22 feet from the multiple player tennis court area. There were 2 single player tennis courts and 3 multiple player tennis courts within a 50-foot radius of noise monitoring, although this area is part of a much larger tennis court complex of Mile Square Park, which includes 12 multiple-player tennis courts and 2 single player tennis courts.. There were 4 tennis players within the single court tennis area (2 to a court) and 6 tennis players within the team tennis court area located within the general vicinity of the noise monitoring location. Primary noise from tennis court activities was tennis balls hitting the hardcourt, wall and tennis racket. Secondary noise included noise from children playing on the playfields to the east of the tennis court complex area and noise from Brookhurst Street, located to the west of the tennis court complex.

Basketball Court

Noise monitoring was conducted at 10:30 a.m. on October 16, 2005, 5 feet from the central courts and eight feet from the southern courts. The noise meter was placed on the southwest side of the basketball court area. The basketball court area consists of 6 full basketball courts; or 12 half-court basketball

courts. Primary noise during monitoring was basketball activity on the courts. Noise from basketball games and practice include sound of the basketball hitting the backboard and hardcourt area, noise from the hoop chain, and noise from players talking. The loudest single event noise from basketball activity is the basketball hitting the backboard. The noise meter was approximately 27 feet from two basketball hoops/ backboards that were in use. A 2 player half-court game was in progress approximately 5 feet from the noise monitoring location. A 10-player full-court basketball game was in progress 8 feet from the noise monitoring location. Other activity on the courts included a basketball game with 10 people and single player to the east (approximately 59 feet away). In addition, a 3 player game was in progress in the southeastern corner. Secondary noise included traffic from Brookhurst Street, which borders the western side of the basketball court area and small craft airplane overflights from the John Wayne International Airport.

Parking Garage

Noise monitoring was conducted at 3:10 p.m. on October 10, 2005 at the University of California, Irvine, Social Sciences Parking Structure. Noise monitoring was conducted approximately 10 feet from Pereira Drive and 42 feet from the parking structure. The Social Science Parking Lot accommodates 1,824 vehicles and is a seven story structure. The Social Sciences Parking Structure has two entrances/exits, one on the lower level, which provides ingress/egress to Campus Drive, and one on the second level, which provides ingress/egress to Pereira Drive. Noise measurements were taken near the Pereira Drive entrance, approximately 100 feet west of the entrance/exit. The meter was located southeast and one story above the Campus Drive entrance/exit. Monitoring was conducted at the end of the 2:00 pm to 3:20 pm. Monday/ Wednesday class period, and was apparent as large increases in pedestrian activity to the parking structure occurred during noise monitoring. Primary noise environment at the Social Sciences Parking Structure was noise from Pereira Drive and construction equipment noise from campus renovations further to the west. While the Social Sciences Parking Structure added to the noise environment, it was not the primary noise source. Noise sources during noise monitoring from the parking structure included car horns, car engines, brakes and tires, automatic lock beeps, car alarms, and car radios. Secondary noise environment in the vicinity of noise monitoring included students talking on their way to/back-from class. Although Campus Drive was located directly north of the noise monitoring, noise from traffic on this roadway was blocked by the placement of the Social Sciences Parking Structure between the roadway and the noise monitoring location. During noise monitoring, there were 35 light duty autos that entered/exited the parking structure through the Pereira Drive entrance/exit. Traffic volume on Pereira Drive during noise monitoring included 95 light duty autos, 1 medium duty truck, and 8 campus shuttle busses (heavy duty truck).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Monitored Speed Calculation

	Direction	Distance	Time	f/sec	m/f	m/sec	sec/h	m/h	
	NB	344	5.39	63.82	0.00018939	0.01208748	3600	44	
	NB	344	6.60	52.12	0.00018939	0.00987144	3600	36	
	NB	344	6.82	50.44	0.00018939	0.00955301	3600	34	
	NB	344	6.98	49.28	0.00018939	0.00933403	3600	34	
	NB	344	5.89	58.40	0.00018939	0.01106138	3600	40	
	NB	344	6.00	57.33	0.00018939	0.01085859	3600	39	
	NB	344	5.82	59.11	0.00018939	0.01119442	3600	40	
	NB	344	6.02	57.14	0.00018939	0.01082251	3600	39	38
	SB	185	2.86	64.69	0.00018939	0.01225101	3600	44	
	SB	185	2.75	67.27	0.00018939	0.01274105	3600	46	
	SB	185	3.00	61.67	0.00018939	0.01167929	3600	42	
	SB	185	3.12	59.29	0.00018939	0.01123009	3600	40	
	SB	185	3.28	56.40	0.00018939	0.01068228	3600	38	
	SB	185	3.65	50.68	0.00018939	0.00959942	3600	35	
	SB	185	3.83	48.30	0.00018939	0.00914827	3600	33	
	SB	185	3.40	54.41	0.00018939	0.01030526	3600	37	39
						Average Speed----->		**39**	

Construction Generated Noise

Construction Noise at 50 Feet (dBA Leq)			50
Construction Phase	All Applicable Equipment in Use[1]	Minimum Required Equipment in Use[1]	
Ground Clearing/Demolition	84	84	
Excavation	89	79	
Foundation Construction	78	78	
Building Construction	85	76	
Finishing and Site Cleanup	89	76	

Construction Noise at Nearest Off-Site Residences (dBA Leq) - Average Distance			340
Construction Phase	All Applicable Equipment in Use[1]	Minimum Required Equipment in Use[1]	
Ground Clearing/Demolition	67	67	
Excavation	72	62	
Foundation Construction	61	61	
Building Construction	68	59	
Finishing and Site Cleanup	72	59	

Construction Noise at Classroom Buildings (dBA Leq) - Average Distance			150
Construction Phase	All Applicable Equipment in Use[1]	Minimum Required Equipment in Use[1]	Interior
Ground Clearing/Demolition	74	74	50
Excavation	79	69	55
Foundation Construction	68	68	44
Building Construction	75	66	51
Finishing and Site Cleanup	79	66	55

Source: Bolt, Beranek and Newman, "Noise from Construction Equipment and Operations, Building Equipment, and Home Appliances," prepared for the USEPA, December 31, 1971.
Based on analysis for Office Building, Hotel, Hospital, School, and Public Works

Construction Generated Vibration

Vibration Annoyance Criteria

	Approximate Velocity Level at 25 ft, VdB	Approximate Velocity Level, VdB	
Nearest Off-Site Receptor		**Closest Distance (feet):**	**140**
Small bulldozer	58	43	
Nearest Off-Site Receptor		**Average Distance (feet)**	**340**
Small bulldozer	58	35	
	Criteria	**78**	
Classroom Building		**Closest Distance (feet):**	**40**
Small bulldozer	58	54	
Classroom Building		**Average Distance (feet):**	**150**
Small bulldozer	58	42	

Structural Damage Criteria

	Approximate RMS a Velocity at 25 ft, inch/second	Approximate RMS Velocity Level, inch/second	
Nearest Off-Site Receptor		**Closest Distance (feet):**	**140**
Small bulldozer	0.003	0.000	
	Criteria	**0.200**	
Classroom Building		**Closest Distance (feet):**	**40**
Small bulldozer	0.003	0.001	
	Criteria	**0.200**	

[1.] Determined based on use of jackhammers or pneumatic hammers that may be used for pavement demolition at a distance of 25 feet

Notes: RMS velocity calculated from vibration level (VdB) using the reference of one microinch/second.

Impact Assessment (2006).

Appendix F
Traffic Study

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CITY OF DANA POINT

DANA HILLS HIGH SCHOOL PERFORMING ARTS THEATER

TRAFFIC IMPACT ANALYSIS

Prepared by:

Robert Kunzman,
Carl Ballard, and
William Kunzman, P.E.

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March 25, 2009

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City of Dana Point

Dana Hills High School
Performing Arts Theater

Traffic Impact Analysis

This report contains the traffic impact analysis for the proposed Dana Hills High School Performing Arts Theater. Dana Hills High School is located west of Golden Lantern Street between Acapulco Drive and Stonehill Drive in the City of Dana Point. The existing high school is proposed to construct a 470 seat performing arts theater. The addition of the performing arts theater will not increase the student population or provide additional capacity for new students. The addition of the performing arts theater will increase the number of currently provided on-site parking spaces by four (4).

The traffic report contains documentation of existing traffic conditions, traffic generated by the project, and proposed mitigation measures. Each of these topics is contained in a separate section of the report. The first section is "Findings", and subsequent sections expand upon the findings. In this way, information on any particular aspect of the study can be easily located by the reader.

Although this is a technical report, every effort has been made to write the report clearly and concisely. To assist the reader with those terms unique to transportation engineering, a glossary of terms is provided within Appendix A.

I. Findings

This section summarizes the Existing traffic conditions, project traffic impacts, and the proposed mitigation measures.

A. Definition of Deficiency and Significant Impact

The following definitions of deficiencies and significant impacts have been developed in accordance with the City of Dana Point requirements:

> The definition of an intersection deficiency has been obtained from the City of Dana Point Transportation Department Staff. In the City of Dana Point mitigation is required if the intersection operates at an Intersection Capacity Utilization of 0.801 or worse.

B. Existing Traffic Conditions

1. The project site is currently developed and generating significant traffic.

2. Existing roadways in the vicinity of the project include Golden Lantern Street, Acapulco Drive, and Stonehill Drive.

3. The study area intersections currently operate at acceptable Levels of Service during the peak hours.

C. Traffic Impacts

1. The existing high school is proposed to construct a 470 seat performing arts theater. The addition of the performing arts theater will not increase the student population or provide additional capacity for new students.

2. The proposed development is not projected to generate any additional traffic during the morning or evening peak hours.

D. Parking Impacts

1. The addition of the performing arts theater will increase the number of currently provided on-site parking spaces by four (4).

E. Mitigation Measures

The following measures are recommended to mitigate the impact of the project on traffic circulation:

1. Site-specific circulation and access recommendations are depicted on Figure 10.

2. On-site traffic signing and striping should be implemented in conjunction with detailed construction plans for the project.

3. The project site shall guarantee access for emergency services, trash services, and performing arts theater equipment deliveries by verifying truck turning movements on the proposed performing arts theater portion of the site.

4. During the construction of the performing arts theater the project site should maintain the existing number of available on-site parking spaces. Temporary parking on a designated area of the field or the future location of the tennis courts may be necessary to maintain the existing on-site parking supply.

5. The high school shall coordinate all major performing arts theater events to guarantee that other major school events do not coincide creating potential additional congestion off-site and a potential parking shortage on-site.

6. The project site should avoid start and end times of major performing arts theater events that are within 30 minutes of the morning peak period (7:00 AM to 9:00 AM) or the evening peak period (4:00 PM to 6:00 PM). Avoiding the peak hours will greatly reduce the potential for off-site intersection Level of Service degradation.

7. The project site should maintain the number of currently provided on-site parking spaces.

8. The project site should maintain the existing on-site pedestrian access to serve the proposed performing arts theater.

9. As is the case for any roadway design, the City of Dana Point should periodically review traffic operations in the vicinity of the project once the project is constructed to assure that the traffic operations are satisfactory.

II. Project Description

This section discusses the project's location and proposed development. Figure 1 shows the project location map, Figure 2 illustrates the current site plan, and Figure 3 illustrates the proposed performing arts theater site plan.

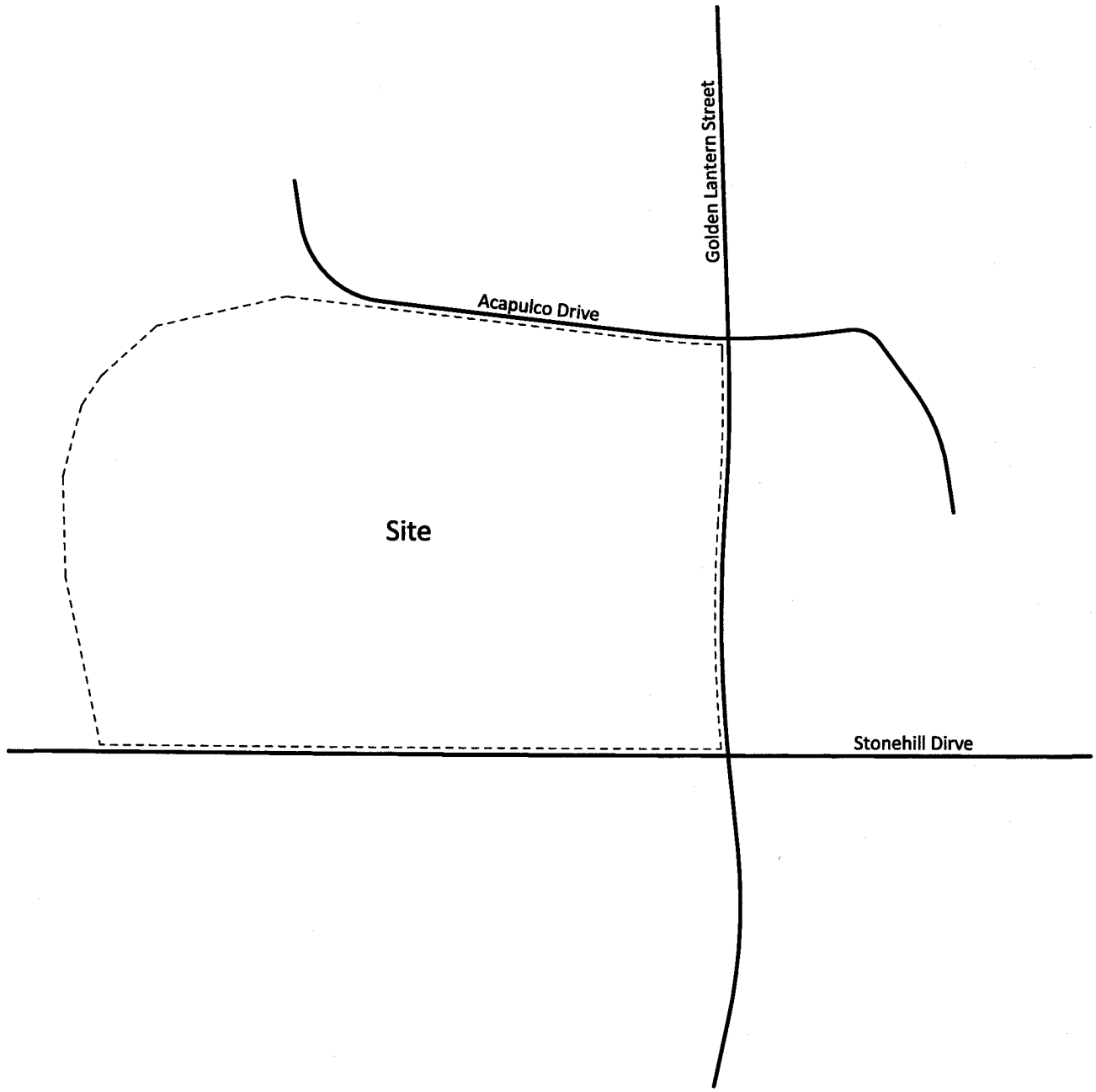
A. Location

The project site is located west of Golden Lantern Street between Acapulco Drive and Stonehill Drive in the City of Dana Point on the existing Dana Hills High School campus.

B. Proposed Development

The existing high school is proposed to construct a 470 seat performing arts theater. The addition of the performing arts theater will not increase the student population or provide additional capacity for new students. The addition of the performing arts theater will increase the number of currently provided on-site parking spaces by four (4).

Figure 1
Project Location Map



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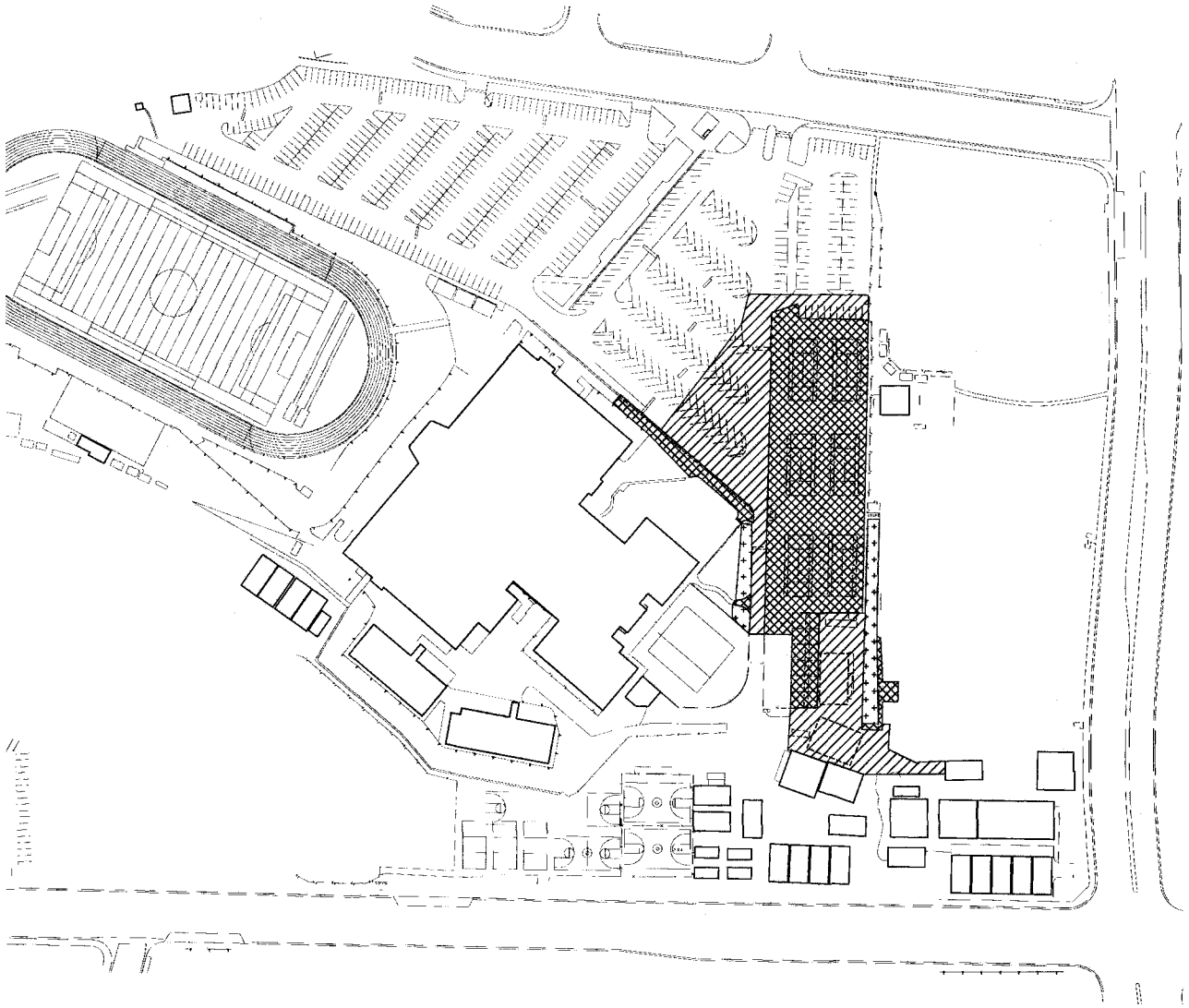
OVER 30 YEARS OF EXCELLENT SERVICE

Figure 2
Site Plan - Current



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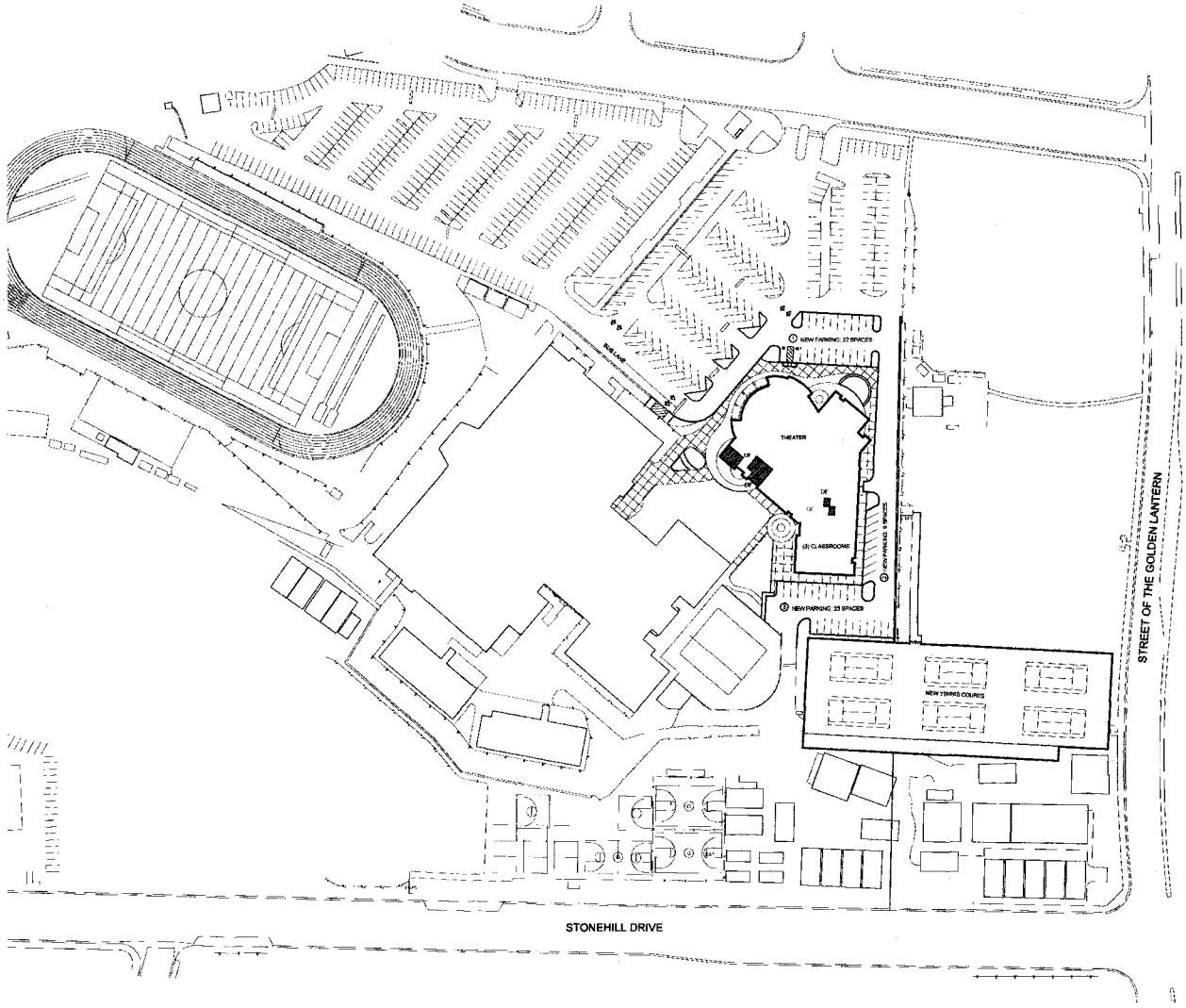
OVER 30 YEARS OF EXCELLENT SERVICE

Figure 3
Site Plan - Proposed



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III. Existing Traffic Conditions

The traffic conditions as they exist today are discussed below and illustrated on Figures 4 to 9.

A. Study Area

Pursuant to the scoping meeting with City of Dana Point staff, the study area includes the following intersections:

Golden Lantern Street (NS) at:
- Acapulco Drive (EW) - #1
- Stone Hill Drive (EW) - #2

B. Surrounding Street System

Roadways that will be utilized by the development or included in the study area include: Golden Lantern Street, Acapulco Drive, and Stonehill Drive.

Golden Lantern Street: This north-south four lane divided to five lane divided roadway is classified as a Major Arterial (120 foot right-of-way) on the City of Dana Point General Plan Circulation Element. It currently carries approximately 14,300 to 19,800 vehicles per day in the study area.

Acapulco Drive: This east-west two lane undivided to four lane divided roadway is not classified on the City of Dana Point General Plan Circulation Element. It currently carries approximately 1,200 to 6,600 vehicles per day in the study area.

Stonehill Drive: This east-west four lane divided roadway is classified as a Primary Arterial (100 foot right-of-way) on the City of Dana Point General Plan Circulation Element. It currently carries approximately 10,000 to 16,000 vehicles per day in the study area.

C. Existing Travel Lanes and Intersection Controls

Figure 4 identifies the existing roadway conditions for study area roadways. The number of through lanes for existing roadways and the existing intersection controls are identified.

D. Existing Average Daily Traffic Volumes

Figure 5 depicts the existing average daily traffic volumes. The existing average daily traffic volumes have been factored from peak hour counts (see Appendix B) obtained by Kunzman Associates using the following formula for each intersection leg:

PM Peak Hour (Approach Volume + Exit Volume) x 10 = Leg Volume.

E. Existing Level of Service

The technique used to assess the operation of an intersection is known as Intersection Capacity Utilization, as described in Appendix C. To Calculate an Intersection Capacity Utilization value, the volume of traffic using the intersection is compared with the capacity of the intersection. An Intersection Capacity Utilization value is usually expressed as a decimal. The decimal represents that portion of the hour required to provide sufficient capacity to accommodate all intersection traffic if all approaches operate at capacity.

The Intersection Capacity Utilization for the existing traffic conditions have been calculated and are shown in Table 1. Existing Intersection Capacity Utilization is based upon manual morning and evening peak hour intersection turning movement counts made for Kunzman Associates in March 2009 (see Figure 6 and 7). Traffic count worksheets are provided in Appendix B.

There are two peak hours in a weekday. The morning peak hour is between 7:00 AM and 9:00 AM, and the evening peak hour is between 4:00 PM and 6:00 PM. The actual peak hour within the two hour interval is the four consecutive 15 minute periods with the highest total volume when all movements are added together. Thus, the evening peak hour at one intersection may be 4:45 PM to 5:45 PM if those four consecutive 15 minute periods have the highest combined volume.

The study area intersections currently operate at acceptable Levels of Service during the peak hours. Existing Intersection Capacity Utilization worksheets are provided in Appendix C.

F. Existing City of Dana Point Circulation Plan

Figure 8 shows the current City of Dana Point General Plan Circulation Element. Both existing and future roadways are included in the Circulation Element of the General Plan and are graphically depicted on Figure 8. This figure shows the nature and extent of arterial highways that are needed to adequately serve the ultimate development depicted by the land use element of the General Plan. The City of Dana Point General Plan roadway cross-sections are illustrated on Figure 9.

Table 1

Existing Intersection Capacity Utilization and Level of Service

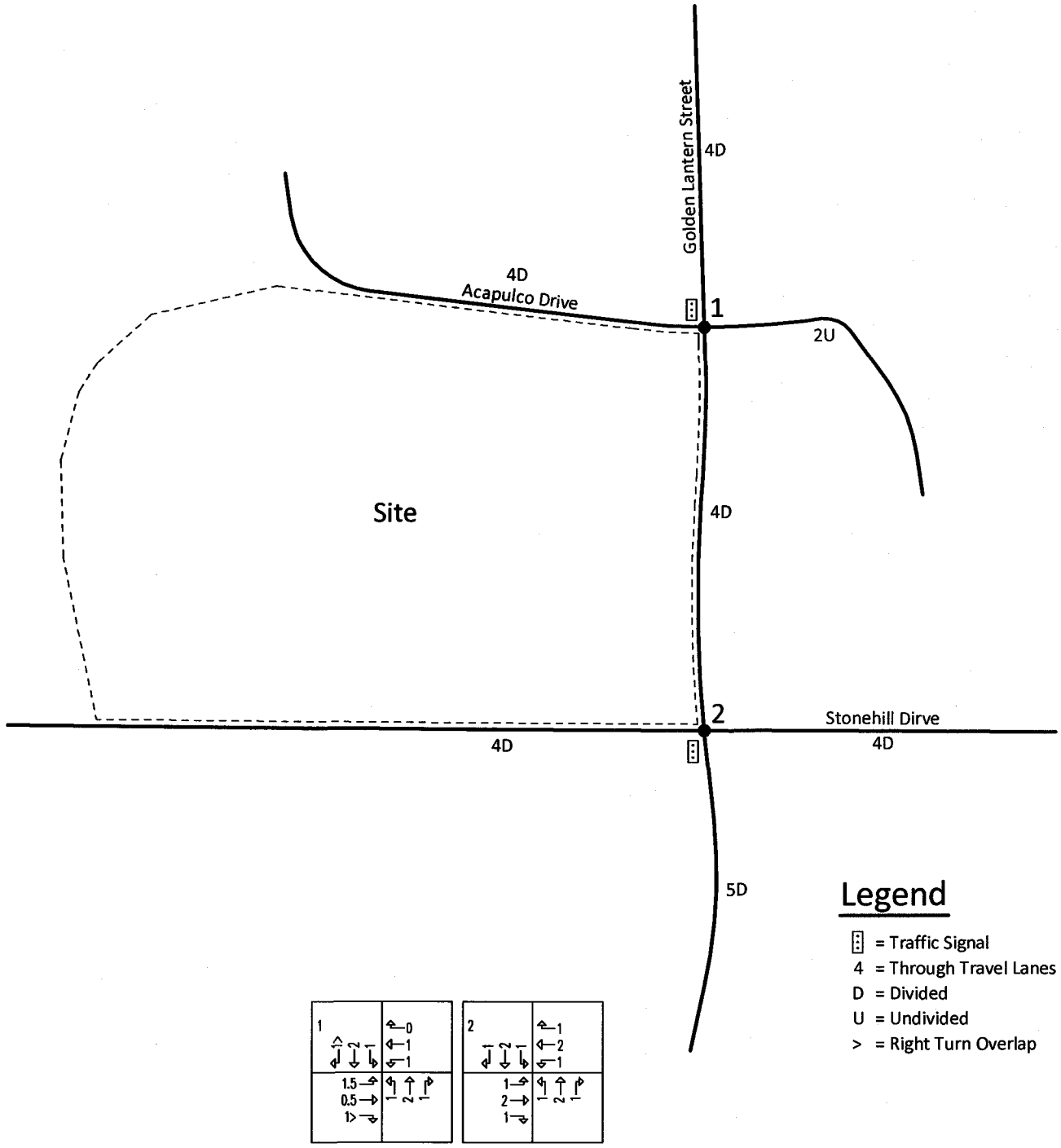
Intersection	Traffic Control[3]	Intersection Approach Lanes[1]												Peak Hour ICU-LOS[2]	
		Northbound			Southbound			Eastbound			Westbound				
		L	T	R	L	T	R	L	T	R	L	T	R	Morning	Evening
Golden Lantern Street (NS) at:															
Acapulco Drive (EW) - #1	TS	1	2	1	1	2	1>	1.5	0.5	1>	1	1	0	0.674-B	0.473-A
Stonehill Drive (EW) - #2	TS	1	2	1	1	2	1	1	2	1	1	2	1	0.568-A	0.663-B

[1] When a right turn lane is designated, the lane can either be striped or unstriped. To function as a right turn lane, there must be sufficient width for right turning vehicles to travel outside the through lanes. L = Left; T = Through; R = Right; > = Right Turn Overlap

[2] ICU-LOS = Intersection Capacity Utilization - Level of Service

[3] TS = Traffic Signal

Figure 4
Existing Through Travel Lanes and Intersection Controls



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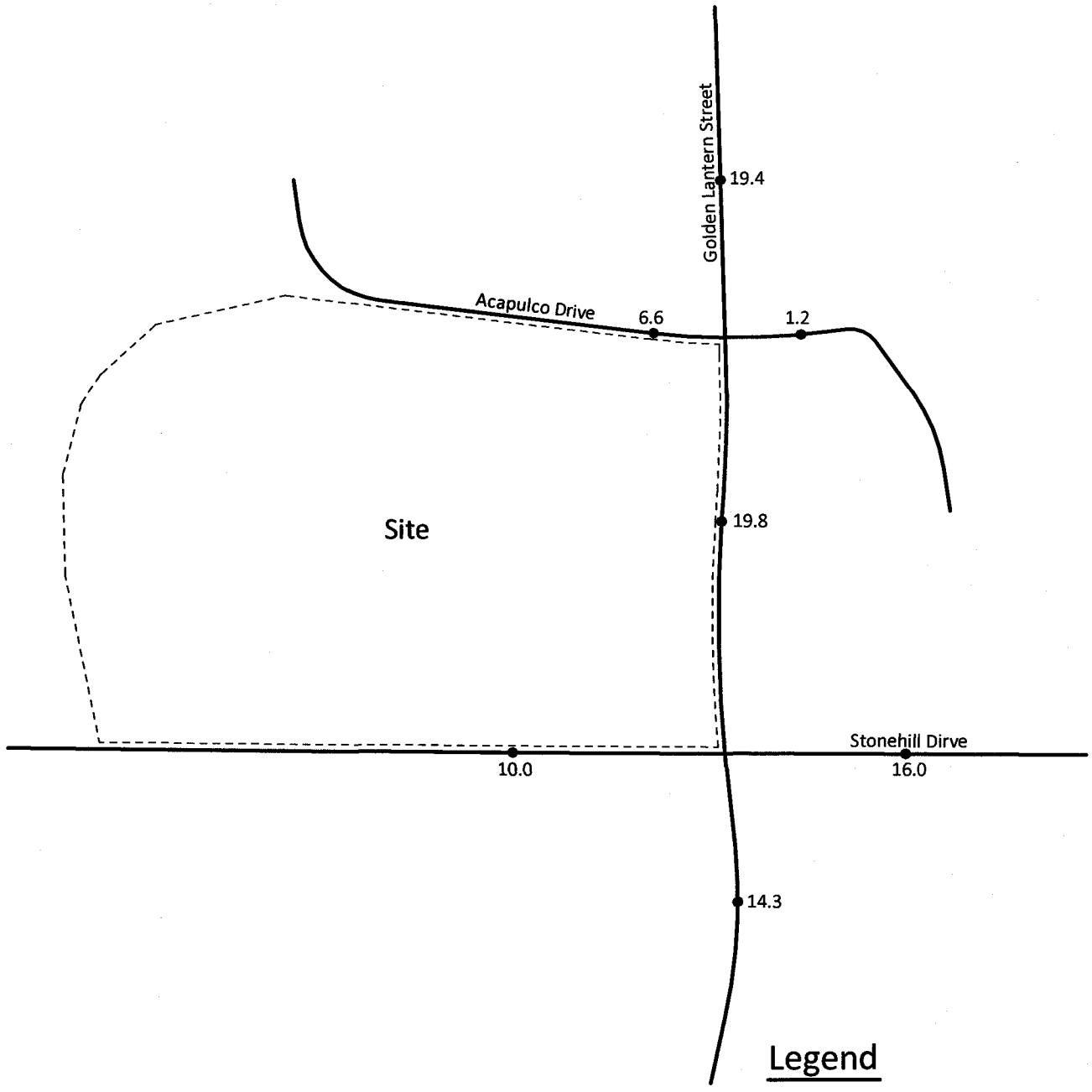
KUNZMAN ASSOCIATES Intersection reference numbers are in upper left corner of turning movement boxes.

OVER 30 YEARS OF EXCELLENT SERVICE

Figure 5
Existing Average Daily Traffic Volumes



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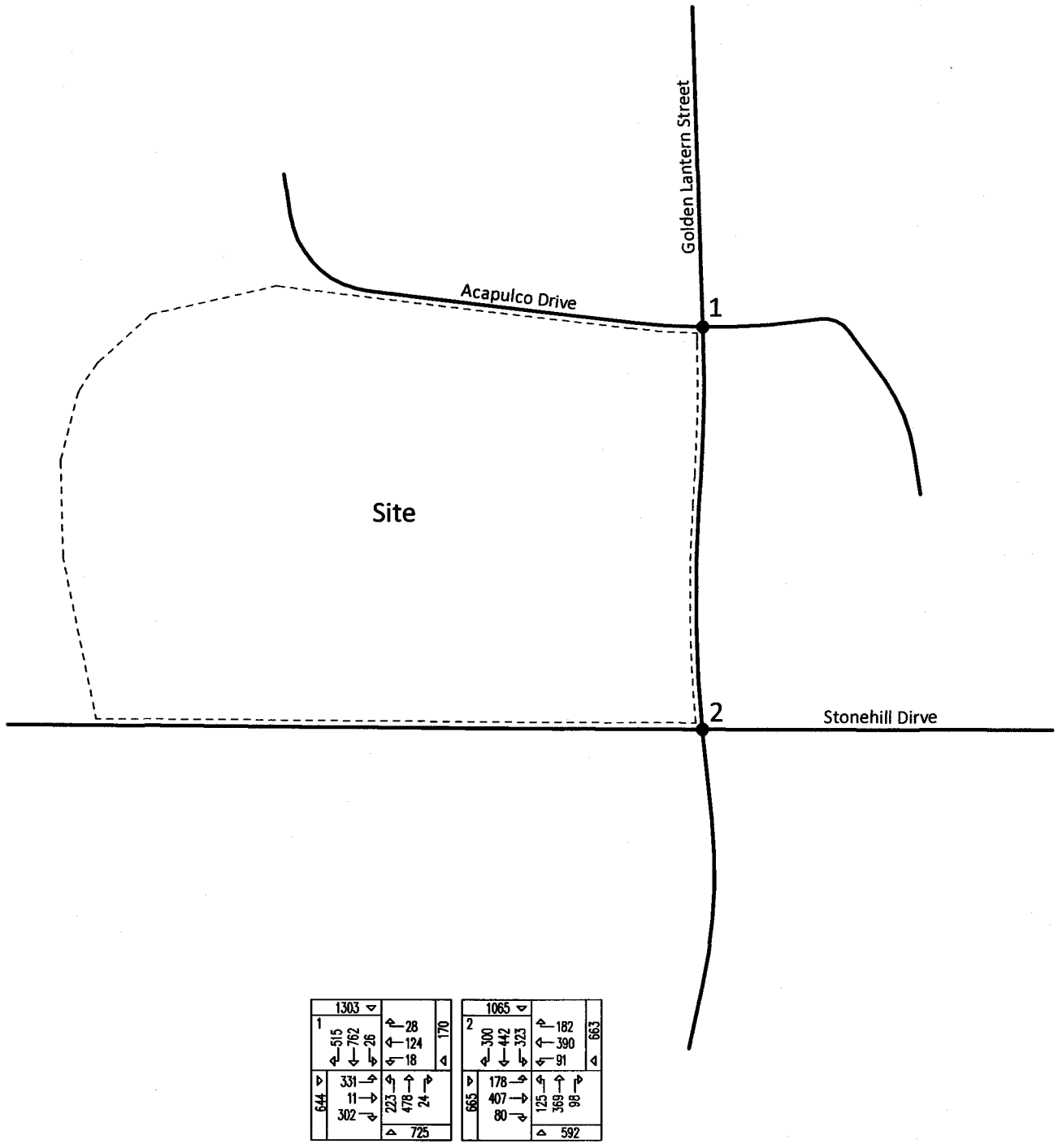
KUNZMAN ASSOCIATES
OVER 30 YEARS OF EXCELLENT SERVICE

Figure 6
Existing Morning Peak Hour Turning Movement Volumes



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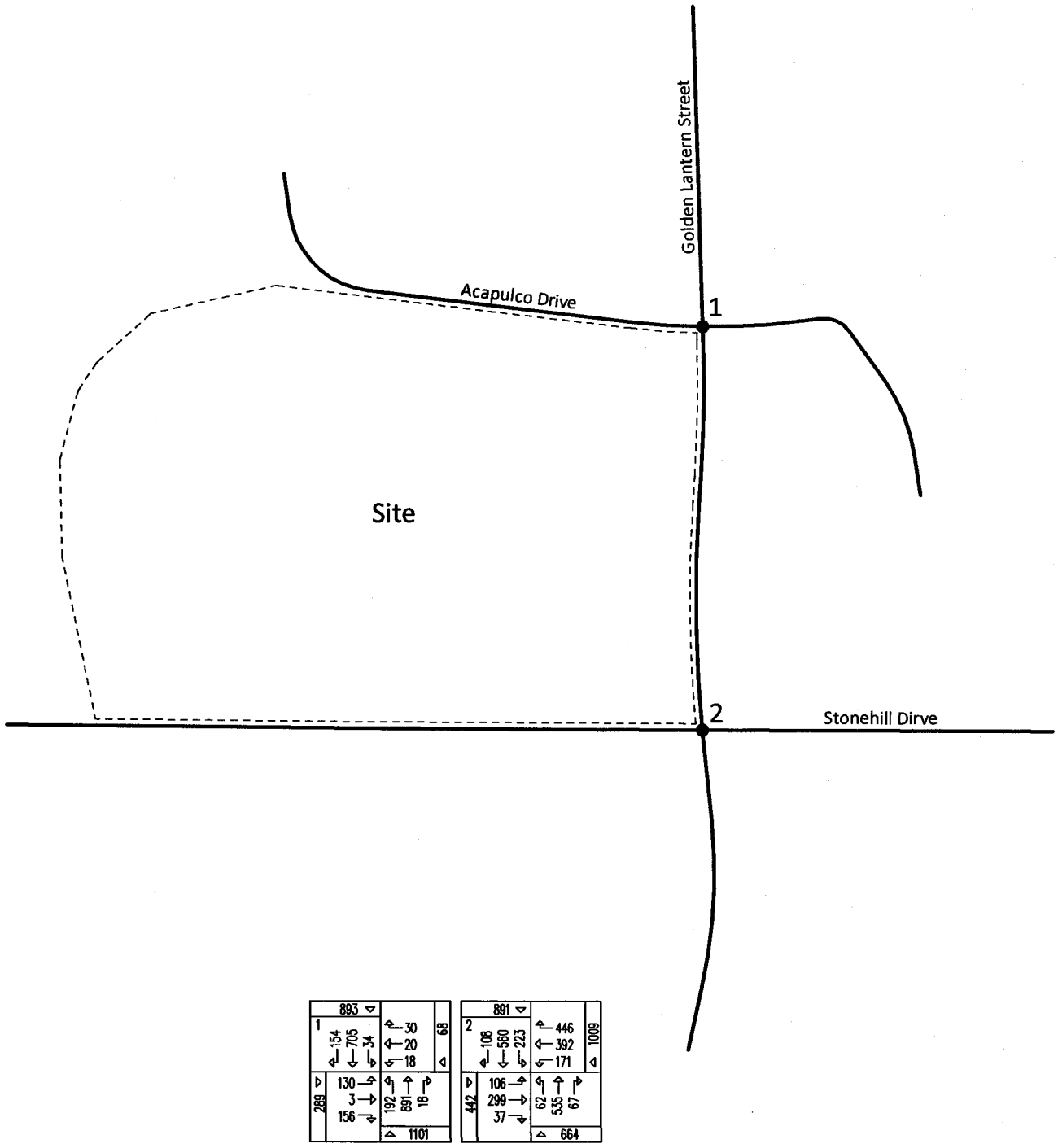
KUNZMAN ASSOCIATES Intersection reference numbers are in upper left corner of turning movement boxes.

OVER 30 YEARS OF EXCELLENT SERVICE

Figure 7
Existing Evening Peak Hour Turning Movement Volumes



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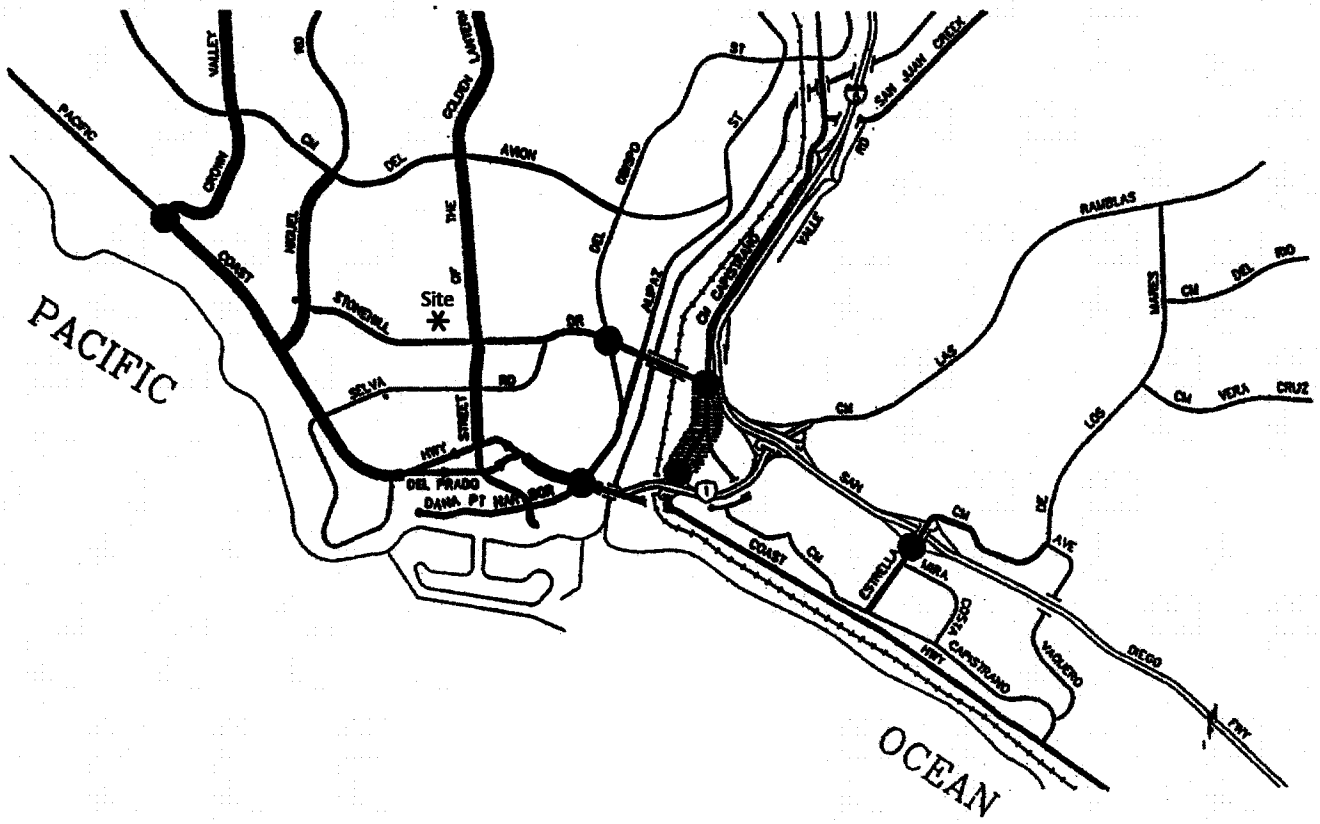
KUNZMAN ASSOCIATES Intersection reference numbers are in upper left corner of turning movement boxes.

OVER 30 YEARS OF EXCELLENT SERVICE

Figure 8
City of Dana Point General Plan Circulation Element



Legend

- CRITICAL INTERSECTION
- FREEWAY
- MAJOR (6 LANES)
- AUGMENTED PRIMARY (6 LANES)
- PRIMARY (4 LANES)
- SECONDARY (4 OR 2 LANES)
- COLLECTOR (2 LANES)

N

Source: City of Dana Point

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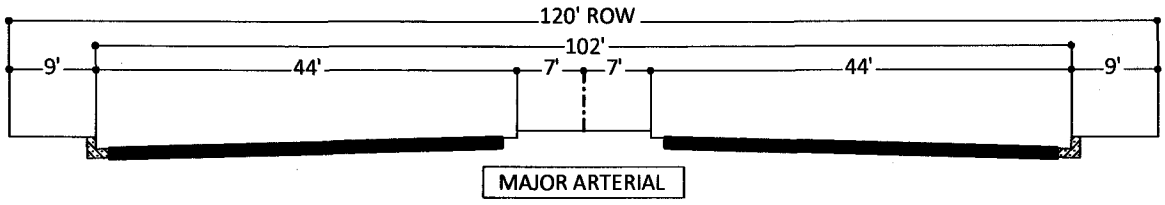
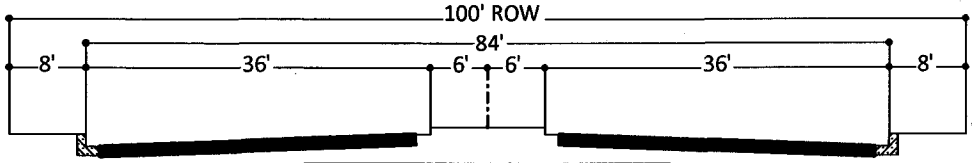
OVER 30 YEARS OF EXCELLENT SERVICE

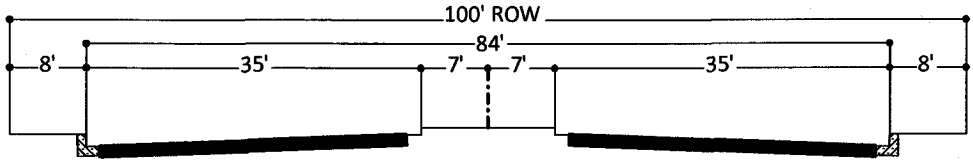
Figure 9
City of Dana Point General Plan Roadway Cross-Sections



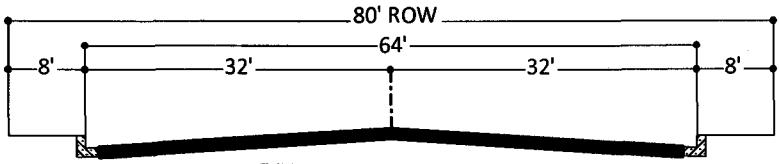
MAJOR ARTERIAL



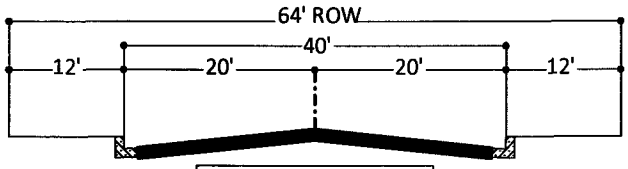
AUGMENTED PRIMARY ARTERIAL



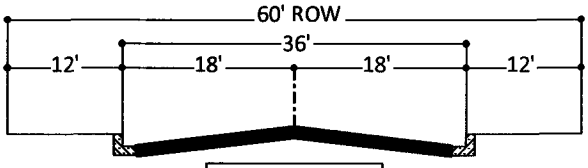
PRIMARY ARTERIAL



SECONDARY ARTERIAL



COLLECTOR STREET



LOCAL STREET

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OVER 30 YEARS OF EXCELLENT SERVICE

Source: City of Dana Point

IV. Project Traffic

The existing high school is proposed to construct a 470 seat performing arts theater. The addition of the performing arts theater will not increase the student population or provide additional capacity for new students. The proposed project will continue to have full access to Acapulco Drive.

A. Trip Generation

The traffic generated by the project is determined by multiplying an appropriate trip generation rate by the quantity of land use. Trip generation rates are predicated on the assumption that energy costs, the availability of roadway capacity, the availability of vehicles to drive, and our life styles remain similar to what we know today. A major change in these variables may affect trip generation rates.

The events to be held in the proposed performing arts theater are currently being held on-site. The student population and capacity for new students will not increase once the performing arts theater is completed. The proposed development is not projected to generate any additional traffic during the morning or evening peak hours.

V. Recommendations

A. Site Access

The proposed project will continue to have full access to Acapulco Drive.

B. Roadway Improvements

1. On- Site

Site-specific circulation and access recommendations are depicted on Figure 10.

On-site traffic signing and striping should be implemented in conjunction with detailed construction plans for the project.

The project site shall guarantee access for emergency services, trash services, and performing arts theater equipment deliveries by verifying truck turning movements on the proposed performing arts theater portion of the site.

During the construction of the performing arts theater the project site should maintain the existing number of available on-site parking spaces. Temporary parking on a designated area of the field or the future location of the tennis courts may be necessary to maintain the existing on-site parking supply.

The high school shall coordinate all major performing arts theater events to guarantee that other major school events do not coincide creating potential additional congestion off-site and a potential parking shortage on-site.

The project site should avoid start and end times of major performing arts theater events that are within 30 minutes of the morning peak period (7:00 AM to 9:00 AM) or the evening peak period (4:00 PM to 6:00 PM). Avoiding the peak hours will greatly reduce the potential for off-site intersection Level of Service degradation.

The project site should maintain the number of currently provided on-site parking spaces.

The project site should maintain the existing on-site pedestrian access to serve the proposed performing arts theater.

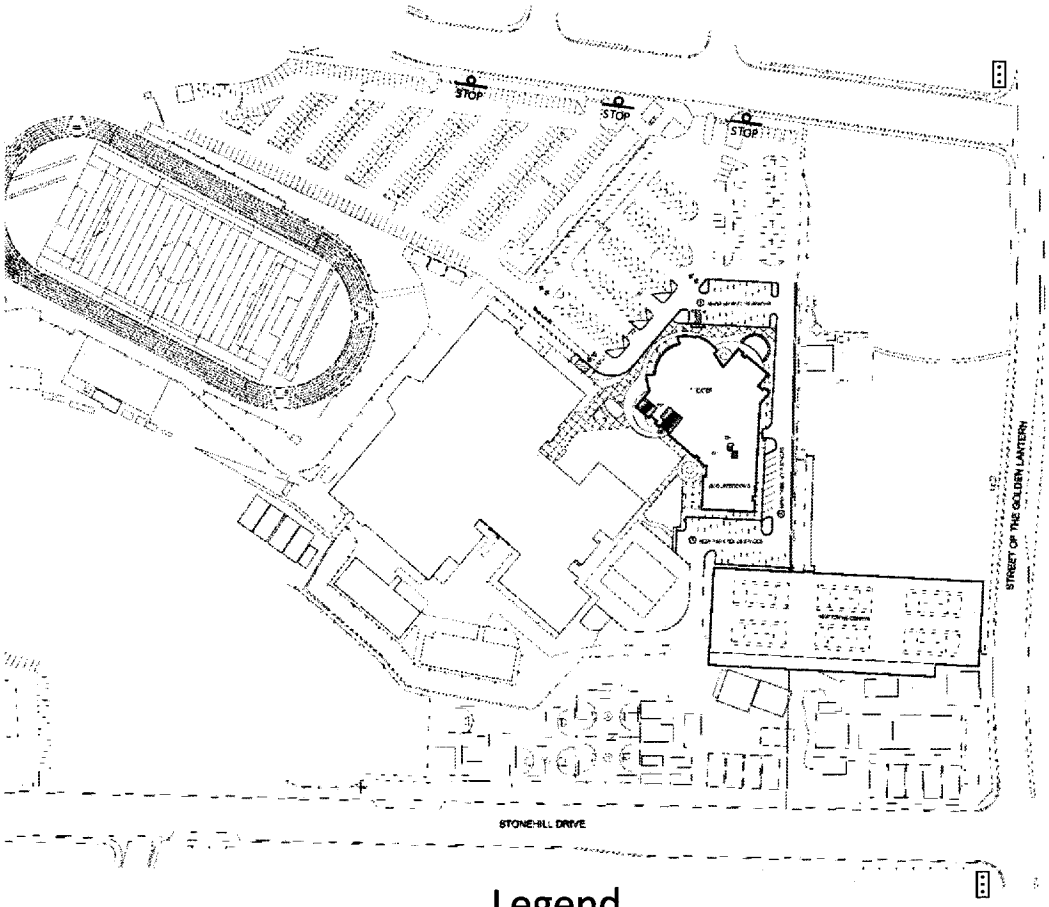
2. Off-Site

As is the case for any roadway design, the City of Dana Point should periodically review traffic operations in the vicinity of the project once the project is constructed to assure that the traffic operations are satisfactory.

3. Phasing

For the purposes of this traffic impact analysis, it is assumed that the project will be implemented in one phase and no additional phased improvements will be necessary.

Figure 10
Circulation Recommendations



Legend

= Traffic Signal

STOP = Stop Sign

On-site traffic signing and striping should be implemented in conjunction with detailed construction plans for the project.

The project site shall guarantee access for emergency services, trash services, and performing arts theater equipment deliveries by verifying truck turning movements on the proposed performing arts theater portion of the site.

During the construction of the performing arts theater the project site should maintain the existing number of available on-site parking spaces. Temporary parking on a designated area of the field or the future location of the tennis courts may be necessary to maintain the existing on-site parking supply.

The high school shall coordinate all major performing arts theater events to guarantee that other major school events do not coincide creating potential additional congestion off-site and a potential parking shortage on-site.

The project site should avoid start and end times of major performing arts theater events that are within 30 minutes of the morning peak period (7:00 AM to 9:00 AM) or in the evening peak period (4:00 PM to 6:00 PM). Avoiding the peak hours will greatly reduce the potential for off-site intersection Level of Service degradation.

The project site should maintain the number of currently provided on-site parking spaces.

The project site should maintain the existing on-site pedestrian access to serve the proposed performing arts theater.

As is the case for any roadway design, the City of Dana Point should periodically review traffic operations in the vicinity of the project once the project is constructed to assure that the traffic operations are satisfactory.

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OVER 30 YEARS OF EXCELLENT SERVICE

Appendices

Appendix A – Glossary of Transportation Terms

Appendix B – Traffic Count Worksheets

Appendix C – Explanation and Calculation of Intersection Capacity Utilization

Please reference the included CD to view and print the Appendices.

For a printed copy of the Appendices, please contact us at:

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APPENDIX A

Glossary of Transportation Terms

GLOSSARY OF TRANSPORTATION TERMS

COMMON ABBREVIATIONS

AC:	Acres
ADT:	Average Daily Traffic
Caltrans:	California Department of Transportation
DU:	Dwelling Unit
ICU:	Intersection Capacity Utilization
LOS:	Level of Service
TSF:	Thousand Square Feet
V/C:	Volume/Capacity
VMT:	Vehicle Miles Traveled

TERMS

AVERAGE DAILY TRAFFIC: The total volume during a year divided by the number of days in a year. Usually only weekdays are included.

BANDWIDTH: The number of seconds of green time available for through traffic in a signal progression.

BOTTLENECK: A constriction along a travelway that limits the amount of traffic that can proceed downstream from its location.

CAPACITY: The maximum number of vehicles that can be reasonably expected to pass over a given section of a lane or a roadway in a given time period.

CHANNELIZATION: The separation or regulation of conflicting traffic movements into definite paths of travel by the use of pavement markings, raised islands, or other suitable means to facilitate the safe and orderly movements of both vehicles and pedestrians.

CLEARANCE INTERVAL: Nearly same as yellow time. If there is an all red interval after the end of a yellow, then that is also added into the clearance interval.

CORDON: An imaginary line around an area across which vehicles, persons, or other items are counted (in and out).

CYCLE LENGTH: The time period in seconds required for one complete signal cycle.

CUL-DE-SAC STREET: A local street open at one end only, and with special provisions for turning around.

DAILY CAPACITY: The daily volume of traffic that will result in a volume during the peak hour equal to the capacity of the roadway.

DELAY: The time consumed while traffic is impeded in its movement by some element over which it has no control, usually expressed in seconds per vehicle.

DEMAND RESPONSIVE SIGNAL: Same as traffic-actuated signal.

DENSITY: The number of vehicles occupying in a unit length of the through traffic lanes of a roadway at any given instant. Usually expressed in vehicles per mile.

DETECTOR: A device that responds to a physical stimulus and transmits a resulting impulse to the signal controller.

DESIGN SPEED: A speed selected for purposes of design. Features of a highway, such as curvature, superelevation, and sight distance (upon which the safe operation of vehicles is dependent) are correlated to design speed.

DIRECTIONAL SPLIT: The percent of traffic in the peak direction at any point in time.

DIVERSION: The rerouting of peak hour traffic to avoid congestion.

FORCED FLOW: Opposite of free flow.

FREE FLOW: Volumes are well below capacity. Vehicles can maneuver freely and travel is unimpeded by other traffic.

GAP: Time or distance between successive vehicles in a traffic stream, rear bumper to front bumper.

HEADWAY: Time or distance spacing between successive vehicles in a traffic stream, front bumper to front bumper.

INTERCONNECTED SIGNAL SYSTEM: A number of intersections that are connected to achieve signal progression.

LEVEL OF SERVICE: A qualitative measure of a number of factors, which include speed and travel time, traffic interruptions, freedom to maneuver, safety, driving comfort and convenience, and operating costs.

LOOP DETECTOR: A vehicle detector consisting of a loop of wire embedded in the roadway, energized by alternating current and producing an output circuit closure when passed over by a vehicle.

MINIMUM ACCEPTABLE GAP: Smallest time headway between successive vehicles in a traffic stream into which another vehicle is willing and able to cross or merge.

MULTI-MODAL: More than one mode; such as automobile, bus transit, rail rapid transit, and bicycle transportation modes.

OFFSET: The time interval in seconds between the beginning of green at one intersection and the beginning of green at an adjacent intersection.

PLATOON: A closely grouped component of traffic that is composed of several vehicles moving, or standing ready to move, with clear spaces ahead and behind.

ORIGIN-DESTINATION SURVEY: A survey to determine the point of origin and the point of destination for a given vehicle trip.

PASSENGER CAR EQUIVALENTS: One car is one Passenger Car Equivalent. A truck is equal to 2 or 3 Passenger Car Equivalents in that a truck requires longer to start, goes slower, and accelerates slower. Loaded trucks have a higher Passenger Car Equivalent than empty trucks.

PEAK HOUR: The 60 consecutive minutes with the highest number of vehicles.

PRETIMED SIGNAL: A type of traffic signal that directs traffic to stop and go on a predetermined time schedule without regard to traffic conditions. Also, fixed time signal.

PROGRESSION: A term used to describe the progressive movement of traffic through several signalized intersections.

SCREEN-LINE: An imaginary line or physical feature across which all trips are counted, normally to verify the validity of mathematical traffic models.

SIGNAL CYCLE: The time period in seconds required for one complete sequence of signal indications.

SIGNAL PHASE: The part of the signal cycle allocated to one or more traffic movements.

STARTING DELAY: The delay experienced in initiating the movement of queued traffic from a stop to an average running speed through a signalized intersection.

TRAFFIC-ACTUATED SIGNAL: A type of traffic signal that directs traffic to stop and go in accordance with the demands of traffic, as registered by the actuation of detectors.

TRIP: The movement of a person or vehicle from one location (origin) to another (destination). For example, from home to store to home is two trips, not one.

TRIP-END: One end of a trip at either the origin or destination; i.e. each trip has two trip-ends. A trip-end occurs when a person, object, or message is transferred to or from a vehicle.

TRIP GENERATION RATE: The quality of trips produced and/or attracted by a specific land use stated in terms of units such as per dwelling, per acre, and per 1,000 square feet of floor space.

TRUCK: A vehicle having dual tires on one or more axles, or having more than two axles.

UNBALANCED FLOW: Heavier traffic flow in one direction than the other. On a daily basis, most facilities have balanced flow. During the peak hours, flow is seldom balanced in an urban area.

VEHICLE MILES OF TRAVEL: A measure of the amount of usage of a section of highway, obtained by multiplying the average daily traffic by length of facility in miles.

APPENDIX B

Traffic Count Worksheets

Intersection Turning Movement

Prepared by:

National Data & Surveying Services

N-S STREET: Golden Lantern St DATE: 3/17/2009 LOCATION: City of Dana Point

E-W STREET: Acapulco Dr DAY: TUESDAY PROJECT# 09-1046-001

	NORTHBOUND			SOUTHBOUND			EASTBOUND			WESTBOUND			
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
LANES:	1	2	0	1	2	1	1.5	1.5	1	1	1	0	
6:00 AM													
6:15 AM													
6:30 AM													
6:45 AM													
7:00 AM	22	44	3	2	98	33	25	0	45	0	5	7	284
7:15 AM	39	95	5	6	138	98	64	3	68	5	29	8	558
7:30 AM	94	125	7	10	207	210	133	6	100	7	54	8	961
7:45 AM	56	128	7	7	220	171	110	2	73	1	35	10	820
8:00 AM	34	130	5	3	197	36	24	0	61	5	6	2	503
8:15 AM	17	102	3	2	120	8	22	3	32	2	2	1	314
8:30 AM	17	112	6	5	143	12	14	1	33	3	0	10	356
8:45 AM	15	101	1	4	126	9	17	7	32	2	2	5	321
9:00 AM													
9:15 AM													
9:30 AM													
9:45 AM													
10:00 AM													
10:15 AM													
10:30 AM													
10:45 AM													
11:00 AM													
11:15 AM													
11:30 AM													
11:45 AM													
TOTAL VOLUMES =	NL 294	NT 837	NR 37	SL 39	ST 1249	SR 577	EL 409	ET 22	ER 444	WL 25	WT 133	WR 51	TOTAL 4117

AM Peak Hr Begins at: 715 AM

PEAK VOLUMES =	223	478	24	26	762	515	331	11	302	18	124	28	2842
PEAK HR. FACTOR:		0.802			0.763			0.674			0.616		0.739

CONTROL: Signalized

Intersection Turning Movement

Prepared by:

National Data & Surveying Services

N-S STREET: Golden Lantern St DATE: 3/17/2009 LOCATION: City of Dana Point

E-W STREET: Acapulco Dr DAY: TUESDAY PROJECT# 09-1046-001

	NORTHBOUND			SOUTHBOUND			EASTBOUND			WESTBOUND			
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
LANES:	1	2	0	1	2	1	1.5	1.5	1	1	1	0	
1:00 PM													
1:15 PM													
1:30 PM													
1:45 PM													
2:00 PM													
2:15 PM													
2:30 PM													
2:45 PM													
3:00 PM													
3:15 PM													
3:30 PM													
3:45 PM													
4:00 PM	44	178	6	3	176	51	44	4	54	2	5	2	569
4:15 PM	29	174	3	7	148	38	29	1	46	2	5	2	484
4:30 PM	41	217	5	10	139	41	31	2	39	4	7	4	540
4:45 PM	54	200	4	12	152	47	39	1	46	7	4	6	572
5:00 PM	62	246	3	9	187	38	33	0	43	6	5	8	640
5:15 PM	36	217	3	6	195	38	31	0	37	2	6	7	578
5:30 PM	40	228	8	7	171	31	27	2	30	3	5	9	561
5:45 PM	22	215	5	5	168	27	20	1	24	4	4	5	500
6:00 PM													
6:15 PM													
6:30 PM													
6:45 PM													
TOTAL VOLUMES =	NL 328	NT 1675	NR 37	SL 59	ST 1336	SR 311	EL 254	ET 11	ER 319	WL 30	WT 41	WR 43	TOTAL 4444

PM Peak Hr Begins at: 445 PM

PEAK VOLUMES =	192	891	18	34	705	154	130	3	156	18	20	30	2351
PEAK HR. FACTOR:		0.885			0.934			0.840			0.895		0.918

CONTROL: Signalized

Intersection Turning Movement

Prepared by:

National Data & Surveying Services

N-S STREET: Golden Lantern St DATE: 3/17/2009 LOCATION: City of Dana Point

E-W STREET: Stonehill Dr DAY: TUESDAY PROJECT# 09-1046-002

	NORTHBOUND			SOUTHBOUND			EASTBOUND			WESTBOUND			
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
LANES:	1	2	1	1	2	0	1	2	0	1	2	1	
6:00 AM													
6:15 AM													
6:30 AM													
6:45 AM													
7:00 AM	6	30	13	58	59	12	7	41	6	10	39	20	301
7:15 AM	9	65	21	77	110	55	31	103	11	17	75	48	622
7:30 AM	31	78	24	92	105	123	89	125	22	19	102	44	854
7:45 AM	49	128	30	85	129	76	48	101	20	25	113	40	844
8:00 AM	36	98	23	69	98	46	10	78	27	30	100	50	665
8:15 AM	13	76	25	71	83	15	15	72	10	19	69	46	514
8:30 AM	14	82	13	54	94	15	8	49	15	16	70	58	488
8:45 AM	11	84	10	48	89	20	7	40	11	12	36	42	410
9:00 AM													
9:15 AM													
9:30 AM													
9:45 AM													
10:00 AM													
10:15 AM													
10:30 AM													
10:45 AM													
11:00 AM													
11:15 AM													
11:30 AM													
11:45 AM													
TOTAL VOLUMES =	NL 169	NT 641	NR 159	SL 554	ST 767	SR 362	EL 215	ET 609	ER 122	WL 148	WT 604	WR 348	TOTAL 4698

AM Peak Hr Begins at: 715 AM

PEAK VOLUMES =	125	369	98	323	442	300	178	407	80	91	390	182	2985
PEAK HR. FACTOR:		0.715			0.832			0.704			0.921		0.874

CONTROL: Signalized

Intersection Turning Movement

Prepared by:

National Data & Surveying Services

N-S STREET: Golden Lantern St DATE: 3/17/2009 LOCATION: City of Dana Point

E-W STREET: Stonehill Dr DAY: TUESDAY PROJECT# 09-1046-002

	NORTHBOUND			SOUTHBOUND			EASTBOUND			WESTBOUND			
	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
LANES:	1	2	1	1	2	0	1	2	0	1	2	1	
1:00 PM													
1:15 PM													
1:30 PM													
1:45 PM													
2:00 PM													
2:15 PM													
2:30 PM													
2:45 PM													
3:00 PM													
3:15 PM													
3:30 PM													
3:45 PM													
4:00 PM	22	137	14	46	131	36	20	74	11	29	89	59	668
4:15 PM	27	139	19	53	112	32	28	81	13	36	97	60	697
4:30 PM	32	155	22	50	121	29	25	91	18	40	101	81	765
4:45 PM	14	130	20	42	142	22	23	72	6	30	87	103	691
5:00 PM	19	148	17	54	155	27	30	81	10	41	91	124	797
5:15 PM	16	126	14	60	139	32	27	69	8	47	103	103	744
5:30 PM	13	131	16	67	124	27	26	77	13	53	111	116	774
5:45 PM	10	119	14	50	111	31	30	62	10	41	90	94	662
6:00 PM													
6:15 PM													
6:30 PM													
6:45 PM													
TOTAL VOLUMES =	153	1085	136	422	1035	236	209	607	89	317	769	740	5798

PM Peak Hr Begins at: 445 PM

PEAK VOLUMES =	62	535	67	223	560	108	106	299	37	171	392	446	3006
PEAK HR. FACTOR:		0.902			0.944			0.913			0.901		0.943

CONTROL: Signalized

APPENDIX C

Explanation and Calculation of Intersection Capacity Utilization

EXPLANATION AND CALCULATION OF INTERSECTION CAPACITY UTILIZATION

Overview

The ability of a roadway to carry traffic is referred to as capacity. The capacity is usually greater between intersections and less at intersections because traffic flows continuously between them and only during the green phase at them. Capacity at intersections is best defined in terms of vehicles per lane per hour of green. If capacity is 1600 vehicles per lane per hour of green, and if the green phase is 50 percent of the cycle and there are three lanes, then the capacity is 1600 times 50 percent times 3 lanes, or 2400 vehicles per hour for that approach.

The technique used to compare the volume and capacity at an intersection is known as Intersection Capacity Utilization. Intersection Capacity Utilization, usually expressed as a decimal, is the proportion of an hour required to provide sufficient capacity to accommodate all intersection traffic if all approaches operate at capacity. If an intersection is operating at 80 percent of capacity (i.e., an Intersection capacity Utilization of 0.80), then 20 percent of the signal cycle is not used. The signal could show red on all indications 20 percent of the time and the signal would just accommodate approaching traffic.

Intersection Capacity Utilization analysis consists of (a) determining the proportion of signal time needed to serve each conflicting movement of traffic, (b) summing the times for the movements, and (c) comparing the total time required to the total time available. For example, if for north-south traffic the northbound traffic is 1600 vehicles per hour, the southbound traffic is 1200 vehicles per hour, and the capacity of either direction is 3200 vehicles per hour, then the northbound traffic is critical and requires 1600/3200 or 50 percent of the signal time. If for east-west traffic, 30 percent of the signal time is required, then it can be seen that the Intersection Capacity Utilization is 50 plus 30, or 80 percent. When left turn arrows (left turn phasing) exist, they are incorporated into the analysis. The critical movements are usually the heavy left turn movements and the opposing through movements.

The Intersection Capacity Utilization technique is an ideal tool to quantify existing as well as future intersection operation. The impact of adding a lane can be quickly determined by examining the effect the lane has on the Intersection Capacity Utilization.

Intersection Capacity Utilization Worksheets That Follow This Discussion

The Intersection Capacity Utilization worksheet table contains the following information:

1. Peak hour turning movement volumes.
2. Number of lanes that serve each movement.
3. For right turn lanes, whether the lane is a free right turn lane, whether it has a right turn arrow, and the percent of right turns on red that are assumed.
4. Capacity assumed per lane.
5. Capacity available to serve each movement (number of lanes times capacity per lane).
6. Volume to capacity ratio for each movement.
7. Whether the movement's volume to capacity ratio is critical and adds to the Intersection Capacity Utilization value.
8. The yellow time or clearance interval assumed.
9. Adjustments for right turn movements.
10. The Intersection Capacity Utilization and Level of Service.

The Intersection Capacity Utilization Worksheet also has two graphics on the same page. These two graphics show the following:

1. Peak hour turning movement volumes.

2. Number of lanes that serve each movement.

3. The approach and exit leg volumes.

4. The two-way leg volumes.

5. An estimate of daily traffic volumes that is fairly close to actual counts and is based strictly on the peak hour leg volumes multiplied by a factor.

6. Percent of daily traffic in peak hours.

7. Percent of peak hour leg volume that is inbound versus outbound.

A more detailed discussion of Intersection Capacity Utilization and Level of Service follows.

Level of Service

Level of Service is used to describe the quality of traffic flow. Levels of Service A to C operate quite well. Level of Service C is typically the standard to which rural roadways are designed.

Level of Service D is characterized by fairly restricted traffic flow. Level of Service D is the standard to which urban roadways are typically designed. Level of Service E is the maximum volume a facility can accommodate and will result in possible stoppages of momentary duration. Level of Service F occurs when a facility is overloaded and is characterized by stop-and-go traffic with stoppages of long duration.

A description of the various Levels of Service appears at the end of the Intersection Capacity Utilization description, along with the relationship between Intersection Capacity and Level of Service and Level of Service.

Signalized and Unsignalized Intersections

Although calculating an Intersection Capacity Utilization value for an unsignalized intersection is invalid, the presumption is that a signal can be installed and the calculation shows whether the geometrics are capable of

accommodating the expected volumes with a signal. A traffic signal becomes warranted before Level of Service D is reached for a signalized intersection.

Signal Timing

The Intersection Capacity Utilization calculation assumes that a signal is properly timed. It is possible to have an Intersection Capacity Utilization well below 1.00, yet have severe traffic congestion. This would occur if one or more movements is not getting sufficient green time to satisfy its demand, and excess green time exists on other movements. This is an operational problem that should be remedied.

Lane Capacity

Capacity is often defined in terms of roadway width; however, standard lanes have approximately the same capacity whether they are 11 or 14 feet wide. Our data indicates a typical lane, whether a through lane or a left turn lane, has a capacity of approximately 1750 vehicles per hour of green time, with nearly all locations showing a capacity greater than 1600 vehicles per hour of green per lane. Right turn lanes have a slightly lower capacity; however 1600 vehicles per hour is a valid capacity assumption for right turn lanes.

This finding is published in the August, 1978 issue of Institute of Transportation Engineers Journal in the article entitled, "Another Look at Signalized Intersection Capacity" by William Kunzman. A capacity of 1600 vehicles per hour per lane with no yellow time penalty, or 1700 vehicles per hour with a 3 or 5 percent yellow time penalty is reasonable.

Yellow Time

The yellow time can either be assumed to be completely used and no penalty applied, or it can be assumed to be only partially usable. Total yellow time accounts for approximately 10 percent of a signal cycle, and a penalty of 3 to 5 percent is reasonable.

During peak hour traffic operation the yellow times are nearly completely used. If there is no left turn phasing, the left turn vehicles completely use the yellow time. Even if there is left turn phasing, the through traffic continues to enter the intersection on the yellow until just a split second before the red.

Shared Lanes

Shared lanes occur in many locations. A shared lane is often found at the end of an off ramp where the ramp forms an intersection with the cross street. Often at a diamond interchange off ramp, there are three lanes. In the case of a diamond interchange, the middle lane is sometimes shared, and the driver can turn left, go through, or turn right from that lane.

If one assumes a three lane off ramp as described above, and if one assumes that each lane has 1600 capacity, and if one assumes that there are 1000 left turns per hour, 500 right turns per hour, and 100 through vehicles per hour, then how should one assume that the three lanes operate. There are three ways that it is done.

One way is to just assume that all 1600 vehicles (1000 plus 500 plus 100) are served simultaneously by three lanes. When this is done, the capacity is 3 times 1600 or 4800, and the amount of green time needed to serve the ramp is 1600 vehicles divided by 4800 capacity or 33.3 percent. This assumption effectively assumes perfect lane distribution between the three lanes that is not realistic. It also means a left turn can be made from the right lane.

Another way is to equally split the capacity of a shared lane and in this case to assume there are 1.33 left turn lanes, 1.33 right turn lanes, and 0.33 through lanes. With this assumption, the critical movement is the left turns and the 1000 left turns are served by a capacity of 1.33 times 1600, or 2133. The volume to capacity ratio of the critical move is 1000 divided by 2133 or 46.9 percent.

The first method results in a critical move of 33.3 percent and the second method results in a critical move of 46.9 percent. Neither is very accurate, and the difference in the calculated Level of Service will be approximately 1.5 Levels of Service (one Level of Service is 10 percent).

The way Kunzman Associates does it is to assign fractional lanes in a reasonable way. In this example, it would be assumed that there is 1.1 right turn lanes, 0.2 through lanes, and 1.7 left turn lanes. The volume to capacity ratios for each movement would be 31.3 percent for the through traffic, 28.4 percent for the right turn movement, and 36.8 percent for the left turn movement. The critical movement would be the 36.8 percent for the left turns.

Right Turn on Red

Kunzman Associates' software treats right turn lanes in one of five different ways. Each right turn lane is classified into one of five cases. The five cases are (1) free right turn lane, (2) right turn lane with separate right turn arrow, (3) standard right turn lane with no right turns on red allowed, (4) standard right turn lane with a certain percentage of right turns on red allowed, and (5) separate right turn arrow and a certain percentage of right turns on red allowed.

Free Right Turn Lane

If it is a free right turn lane, then it is given a capacity of one full lane with continuous or 100 percent green time. A free right turn lane occurs when there is a separate approach lane for right turning vehicles, there is a separate departure lane for the right turning vehicles after they turn and are exiting the intersection, and the through cross street traffic does not interfere with the vehicles after they turn right.

Separate Right Turn Arrow

If there is a separate right turn arrow, then it is assumed that vehicles are given a green indication and can proceed on what is known as the left turn overlap.

The left turn overlap for a northbound right turn is the westbound left turn. When the left turn overlap has a green indication, the right turn lane is also given a green arrow indication. Thus, if there is a northbound right turn arrow, then it can be turned green for the period of time that the westbound left turns are proceeding.

If there are more right turns than can be accommodated during the northbound through green and the time that the northbound right turn arrow is on, then an adjustment is made to the Intersection Capacity Utilization to account for the green time that needs to be added to the northbound through green to accommodate the northbound right turns.

Standard Right Turn Lane, No Right Turns on Red

A standard right turn lane, with no right turn on red assumed, proceeds only when there is a green indication displayed for the adjacent through movement. If additional green time is needed above that amount of time, then in the Intersection Capacity Utilization calculation a right turn adjustment green time is added above the green time that is needed to serve the adjacent through movement.

Standard Right Turn Lane, With Right Turns on Red

A standard right turn lane with say 20 percent of the right turns allowed to turn right on a red indication is calculated the same as the standard right turn case where there is no right turn on red allowed, except that the right turn adjustment is reduced to account for the 20 percent of the right turning vehicles that can logically turn right on a red light. The right turns on red are never allowed to exceed the time the overlap left turns take plus the unused part of the green cycle that the cross street traffic moving from left to right has.

As an example of how 20 percent of the cars are allowed to turn right on a red indication, assume that the northbound right turn volume needs 40 percent of the signal cycle to be satisfied. To allow 20 percent of the northbound right turns to turn right on red, then during 8 percent of the signal cycle (40 percent of signal cycle times 20 percent that can turn right on red) right turns on red will be allowed if it is feasible.

For this example, assume that 15 percent of the signal cycle is green for the northbound through traffic, and that means that 15 percent of the signal cycle is available to satisfy northbound right turns. After the northbound through traffic has received its green, 25 percent of the signal cycle is still needed to satisfy the northbound right turns (40 percent of the signal cycle minus the 15 percent of the signal cycle that the northbound through used).

Assume that the westbound left turns require a green time of 6 percent of the signal cycle. This 6 percent of the signal cycle is used by northbound right turns on red. After accounting for the northbound right turns that occur on the westbound overlap left turn, 19 percent of the signal cycle is still needed for the northbound right turns (25 percent of the cycle was needed after the

northbound through green time was accounted for [see above paragraph], and 6 percent was served during the westbound left turn overlap). Also, at this point 6 percent of the signal cycle has been used for northbound right turns on red, and still 2 percent more of the right turns will be allowed to occur on the red if there is unused eastbound through green time.

For purpose of this example, assume that the westbound through green is critical, and that 15 percent of the signal cycle is unused by eastbound through traffic. Thus, 2 percent more of the signal cycle can be used by the northbound right turns on red since there is 15 seconds of unused green time being given to the eastbound through traffic.

At this point, 8 percent of the signal cycle was available to serve northbound right turning vehicles on red, and 15 percent of the signal cycle was available to serve right turning vehicles on the northbound through green. So 23 percent of the signal cycle has been available for northbound right turns.

Because 40 percent of the signal cycle is needed to serve northbound right turns, there is still a need for 17 percent more of the signal cycle to be available for northbound right turns. What this means is the northbound through traffic green time is increased by 17 percent of the cycle length to serve the unserved right turn volume, and a 17 percent adjustment is added to the Intersection Capacity Utilization to account for the northbound right turns that were not served on the northbound through green time or when right turns on red were assumed.

Separate Right Turn Arrow, With Right Turns on Red

A right turn lane with a separate right turn arrow, plus a certain percentage of right turns allowed on red is calculated the same way as a standard right turn lane with a certain percentage of right turns allowed on red, except the turns which occur on the right turn arrow are not counted as part of the percentage of right turns that occur on red.

Critical Lane Method

Intersection Capacity Utilization parallels another calculation procedure known as the Critical Lane Method with one exception. Critical Lane Method dimensions capacity in terms of standardized vehicles per hour per lane. A

Critical Lane Method result of 800 vehicles per hour means that the intersection operates as though 800 vehicles were using a single lane continuously. If one assumes a lane capacity of 1600 vehicles per hour, then a Critical Lane Method calculation resulting in 800 vehicles per hour is the same as an Intersection Capacity Utilization calculation of 50 percent since 800/1600 is 50 percent. It is our opinion that the Critical Lane Method is inferior to the Intersection Capacity Utilization method simply because a statement such as "The Critical Lane Method value is 800 vehicles per hour" means little to most persons, whereas a statement such as "The Intersection Capacity Utilization is 50 percent" communicates clearly. Critical Lane Method results directly correspond to Intersection Capacity Utilization results. The correspondence is as follows, assuming a lane capacity of 1600 vehicles per hour and no clearance interval.

Critical Lane Method Result	ICU Result
800 vehicles per hour	50 percent
960 vehicles per hour	60 percent
1120 vehicles per hour	70 percent
1280 vehicles per hour	80 percent
1440 vehicles per hour	90 percent
1600 vehicles per hour	100 percent
1760 vehicles per hour	110 percent

INTERSECTION CAPACITY UTILIZATION
LEVEL OF SERVICE DESCRIPTION[1]

Level of Service	Description	Volume to Capacity Ratio
A	Level of Service A occurs when progression is extremely favorable and vehicles arrive during the green phase. Most vehicles do not stop at all. Short cycle lengths may also contribute to low delay.	0.600 and below
B	Level of Service B generally occurs with good progression and/or short cycle lengths. More vehicles stop than for Level of Service A, causing higher levels of average delay.	0.601 to 0.700
C	Level of Service C generally results when there is fair progression and/or longer cycle lengths. Individual cycle failures may begin to appear in this level. The number of vehicles stopping is significant at this level, although many still pass through the intersection without stopping.	0.701 to 0.800
D	Level of Service D generally results in noticeable congestion. Longer delays may result from some combination of unfavorable progression, long cycle lengths, or high volume to capacity ratios. Many vehicles stop, and the proportion of vehicles not stopping declines. Individual cycle failures are noticeable.	0.801 to 0.900
E	Level of Service E is considered to be the limit of acceptable delay. These high delay values generally indicate poor progression, long cycle lengths, and high volume to capacity ratios. Individual cycle failures are frequent.	0.901 to 1.000
F	Level of Service F is considered to be unacceptable to most drivers. This condition often occurs when oversaturation, i.e., when arrival flow rates exceed the capacity of the intersection. It may also occur at high volume to capacity ratios below 1.00 with many individual cycle failures. Poor progression and long cycle lengths may also be major contributing causes to such delay levels.	1.001 and up

[1]Source: Highway Capacity Manual Special Report 209, Transportation Research Board, National Research Council Washington D.C., 2000.

Existing

Dana Hills High School Performing Arts Theater
Existing
Morning Peak Hour

Level Of Service Computation Report
ICU 1(Loss as Cycle Length %) Method (Base Volume Alternative)

Intersection #1 Golden Lantern Street (NS) at Acapulco Drive (EW) - #1

Cycle (sec):	100	Critical Vol./Cap.(X):	0.674
Loss Time (sec):	5 (Y+R=0.0 sec)	Average Delay (sec/veh):	xxxxxx
Optimal Cycle:	100	Level Of Service:	B

Street Name:	Golden Lantern Street						Acapulco Drive					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Permitted			Permitted			Permitted			Permitted		
Rights:	Include			Ovl			Ovl			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Lanes:	1 0	2	0 1	1 0	2	0 1	1	1 0	0 1	1 0	0	1 0
Volume Module:												
Base Vol:	223	478	24	26	762	515	331	11	302	18	124	28
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	223	478	24	26	762	515	331	11	302	18	124	28
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	223	478	24	26	762	515	331	11	302	18	124	28
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	223	478	24	26	762	515	331	11	302	18	124	28
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FinalVolume:	223	478	24	26	762	515	331	11	302	18	124	28
Saturation Flow Module:												
Sat/Lane:	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	1.00	2.00	1.00	1.00	2.00	1.00	1.94	0.06	1.00	1.00	0.82	0.18
Final Sat.:	1700	3400	1700	1700	3400	1700	3291	109	1700	1700	1387	313
Capacity Analysis Module:												
Vol/Sat:	0.13	0.14	0.01	0.02	0.22	0.30	0.10	0.10	0.18	0.01	0.09	0.09
Crit Moves:	****					****	****				****	

Dana Hills High School Performing Arts Theater
Existing
Evening Peak Hour

Level Of Service Computation Report
ICU 1(Loss as Cycle Length %) Method (Base Volume Alternative)

Intersection #1 Golden Lantern Street (NS) at Acapulco Drive (EW) - #1

Cycle (sec):	100	Critical Vol./Cap.(X):	0.473
Loss Time (sec):	5 (Y+R=0.0 sec)	Average Delay (sec/veh):	xxxxxx
Optimal Cycle:	100	Level Of Service:	A

Street Name:	Golden Lantern Street						Acapulco Drive					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Permitted			Permitted			Permitted			Permitted		
Rights:	Include			Ovl			Ovl			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Lanes:	1 0	2 0	1	1 0	2 0	1	1 1	0 0	1	1 0	0 1	0
Volume Module:												
Base Vol:	192	891	18	34	705	154	130	3	156	18	20	30
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	192	891	18	34	705	154	130	3	156	18	20	30
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	192	891	18	34	705	154	130	3	156	18	20	30
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	192	891	18	34	705	154	130	3	156	18	20	30
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FinalVolume:	192	891	18	34	705	154	130	3	156	18	20	30
Saturation Flow Module:												
Sat/Lane:	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	1.00	2.00	1.00	1.00	2.00	1.00	1.95	0.05	1.00	1.00	0.40	0.60
Final Sat.:	1700	3400	1700	1700	3400	1700	3323	77	1700	1700	680	1020
Capacity Analysis Module:												
Vol/Sat:	0.11	0.26	0.01	0.02	0.21	0.09	0.04	0.04	0.09	0.01	0.03	0.03
Crit Moves:	****				****				****	****		

Dana Hills High School Performing Arts Theater
Existing
Morning Peak Hour

Level Of Service Computation Report
ICU 1(Loss as Cycle Length %) Method (Base Volume Alternative)

Intersection #2 Golden Lantern Street (NS) at Stonehill Drive (EW) - #2

Cycle (sec):	100	Critical Vol./Cap.(X):	0.568
Loss Time (sec):	5 (Y+R=0.0 sec)	Average Delay (sec/veh):	xxxxxx
Optimal Cycle:	100	Level Of Service:	A

Street Name:	Golden lantern Street						Stonehill Drive					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Protected			Protected			Protected			Protected		
Rights:	Include			Include			Include			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Lanes:	1 0	2 0	1	1 0	2 0	1	1 0	2 0	1	1 0	2 0	1
Volume Module:												
Base Vol:	125	369	98	323	442	300	178	407	80	91	390	182
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	125	369	98	323	442	300	178	407	80	91	390	182
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	125	369	98	323	442	300	178	407	80	91	390	182
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	125	369	98	323	442	300	178	407	80	91	390	182
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FinalVolume:	125	369	98	323	442	300	178	407	80	91	390	182
Saturation Flow Module:												
Sat/Lane:	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	1.00	2.00	1.00	1.00	2.00	1.00	1.00	2.00	1.00	1.00	2.00	1.00
Final Sat.:	1700	3400	1700	1700	3400	1700	1700	3400	1700	1700	3400	1700
Capacity Analysis Module:												
Vol/Sat:	0.07	0.11	0.06	0.19	0.13	0.18	0.10	0.12	0.05	0.05	0.11	0.11
Crit Moves:		****		****			****				****	

Dana Hills High School Performing Arts Theater
Existing
Evening Peak Hour

Level Of Service Computation Report
ICU 1(Loss as Cycle Length %) Method (Base Volume Alternative)

Intersection #2 Golden Lantern Street (NS) at Stonehill Drive (EW) - #2

Cycle (sec):	100	Critical Vol./Cap.(X):	0.663
Loss Time (sec):	5 (Y+R=0.0 sec)	Average Delay (sec/veh):	xxxxxx
Optimal Cycle:	100	Level Of Service:	B

Street Name:	Golden lantern Street						Stonehill Drive					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Protected			Protected			Protected			Protected		
Rights:	Include			Include			Include			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Lanes:	1 0 2	0	1	1 0 2	0	1	1 0 2	0	1	1 0 2	0	1
Volume Module:												
Base Vol:	62	535	67	223	560	108	106	299	37	171	392	446
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	62	535	67	223	560	108	106	299	37	171	392	446
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	62	535	67	223	560	108	106	299	37	171	392	446
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	62	535	67	223	560	108	106	299	37	171	392	446
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FinalVolume:	62	535	67	223	560	108	106	299	37	171	392	446
Saturation Flow Module:												
Sat/Lane:	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700	1700
Adjustment:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lanes:	1.00	2.00	1.00	1.00	2.00	1.00	1.00	2.00	1.00	1.00	2.00	1.00
Final Sat.:	1700	3400	1700	1700	3400	1700	1700	3400	1700	1700	3400	1700
Capacity Analysis Module:												
Vol/Sat:	0.04	0.16	0.04	0.13	0.16	0.06	0.06	0.09	0.02	0.10	0.12	0.26
Crit Moves:		****		****			****					****