UCI

FINAL

TIERED INITIAL STUDY &

MITIGATED NEGATIVE DECLARATION

Central Energy Plant Expansion

April 2016

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1.0 PROJECT INFORMATION

1.1 Project Title

Central Energy Plant Expansion

1.2 Lead Agency Name and Address

University of California, Irvine
Office of Environmental Planning and Sustainability
380 University Tower, Irvine, CA 92697-2325

1.3 Contact Person and Phone Number

Richard Demerjian, Director
(949) 824-7058

1.4 Project Location

The University of California, Irvine Medical Center (UCIMC) is located in the city of Orange, Orange County, California. It is bound by Interstate 5 (I-5) to the east, Chapman Avenue to the north, The City Drive to the west, and Dawn Way to the south (see Exhibit 1). One project site is located on the eastern portion of the campus adjacent to the I-5, and one site between Buildings 31 and 32 (see Exhibits 2 and 3).

1.5 Custodian of the Administrative Record

University of California, Irvine
Office of Environmental Planning and Sustainability
380 University Tower, Irvine, CA 92697-2325

1.6 Responsible Agencies

- California Office of Statewide Health Planning and Development
- South Coast Air Quality Management District
- State Water Resources Control Board

1.7 Documents Incorporated by Reference

The University of California, Medical Center Long Range Development Plan (UCIMC LRDP, UCI, 2003) is a comprehensive land use plan that guides physical development on the UCIMC campus through horizon year 2020. It identifies general types of development and land uses to achieve academic, research, patient care, and community service goals. The UCIMC LRDP estimates types and amounts of new building space required to achieve full buildout.

The Long Range Development Plan Environmental Impact Report (LRDP EIR, BonTerra Consulting, 2002) analyzes potential environmental impacts associated with the implementation of the UCIMC LRDP pursuant to CEQA Guidelines Sections 15152 and 15168. This document is used to tier subsequent environmental analysis, including this Initial Study/Mitigated Negative Declaration (IS/MND), for UCIMC development.

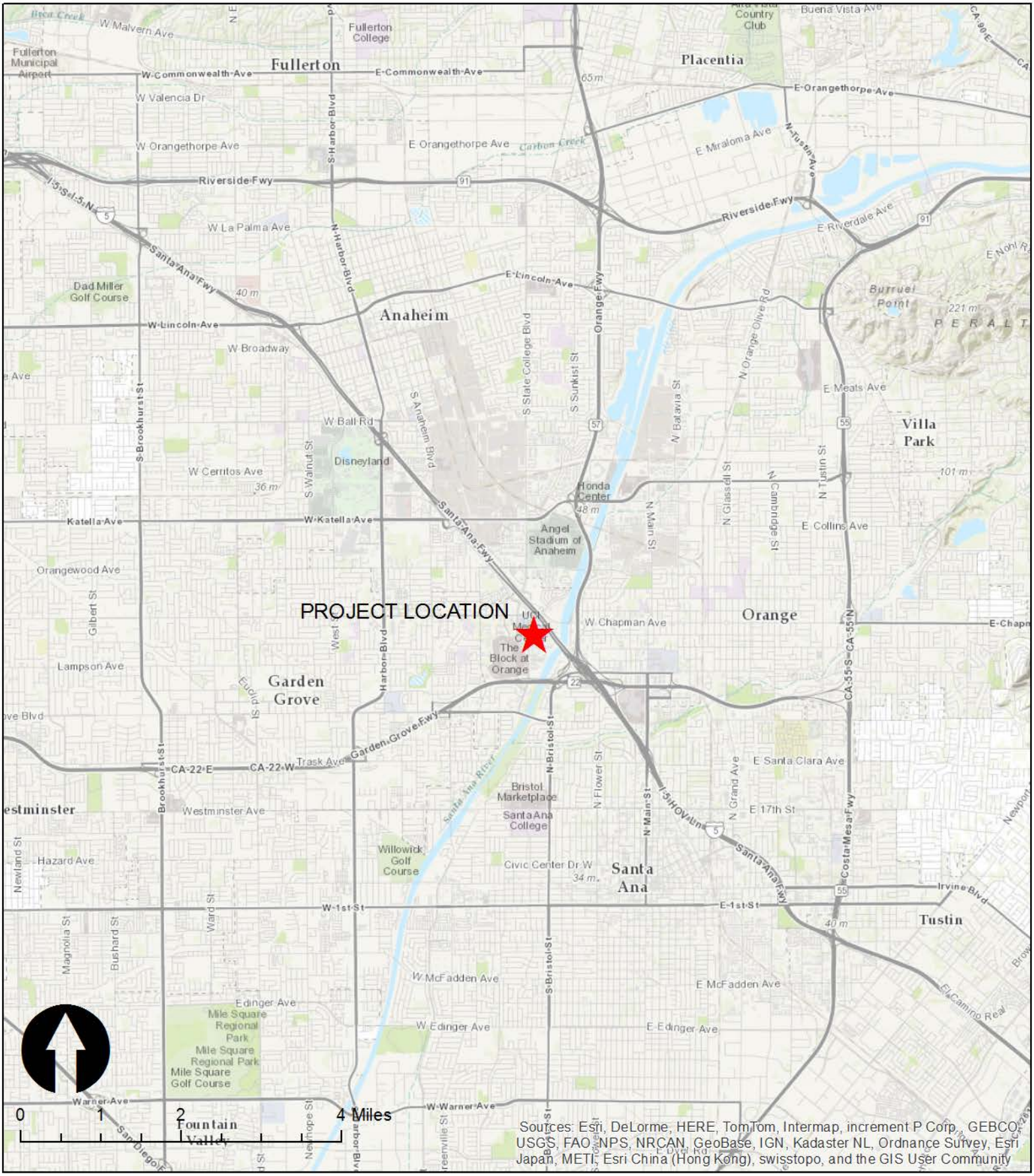

Exhibit 1
Regional Location

Central Energy Plant Expansion Project
University of California, Irvine Medical Center

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Exhibit 2
Project Location

Central Energy Plant Expansion Project
University of California, Irvine Medical Center

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UCIMC ADJACENT LAND USES

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2.0 PROJECT DESCRIPTION

2.1 Description of Project

The Central Energy Plant Expansion project (proposed project) consists of the demolition of the 6,000-gross-square-foot (GSF) Building 33 and construction of four components to provide increased chiller capacity to the University of California, Irvine Medical Center (UCIMC). Two of the components would serve inpatient facilities that fall within the jurisdiction of the Office of Statewide Health Planning and Development (OSHPD)[1] and the other two would serve non-OSHPD facilities. The OSHPD components include expansion of the existing on-site OSHPD chiller plant and modification of the associated OSHPD power generator yard; non-OSHPD components include construction of a non-OSHPD chiller plant and construction of an associated non-OSHPD power generator yard.

Non-OSHPD Chiller Plant and Power Generator Yard

An approximately 8,800 GSF, two-story, and 4,000-ton non-OSHPD chiller plant would be constructed to the west of the existing Building 31. The proposed structure is anticipated to be slab on grade and a glass curtain wall with interior equipment and piping visible from the exterior. The cooling towers would be mounted on the roof, surrounded by a decorative screen wall (see Exhibit 3).

The chiller plant would supply chilled water to existing and future non-OSHPD buildings identified in the Long Range Development Plan (LRDP) including administrative, support service, and ambulatory care facilities. One 1,000-ton chiller would be installed as part of the proposed project with space reserved to accommodate three additional 1,000-ton chillers to serve future facilities to be developed consistent with the LRDP.

Adjacent to the non-OSHPD chiller plant, an approximately 6,500 GSF associated power generator yard would be constructed with one 2,000-kilowatt (kW) generator and associated belly fuel tank. The yard would be sized to accommodate additional generators to meet facility future needs within the LRDP. These generators would replace the existing emergency generators at Building 32 and would be equipped with integral fuel tanks to eliminate piping fuel to the generators from the existing underground storage tanks located between Buildings 20 and 33. A 12-kilovolt (kV) system would be installed for the non-OSHPD yard that would also provide redundancy for the existing OSHPD 12-kV system.

OSPHD Chiller Plant and Power Generator Yard Expansion

OSHPD Buildings 1A and 3 operate with older, individual chillers and cooling towers that are inefficient and require separate maintenance. To achieve energy and operational efficiencies, the existing OSHPD chiller plant (Building 57) that currently serves Building 1 would be expanded to

[1] OSHPD monitors construction, renovation, and seismic safety of hospitals for the State of California.

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Exhibit 3
Non-OSHPD Chiller Plant Rendering

Central Energy Plant Expansion
University of California, Irvine Medical Center

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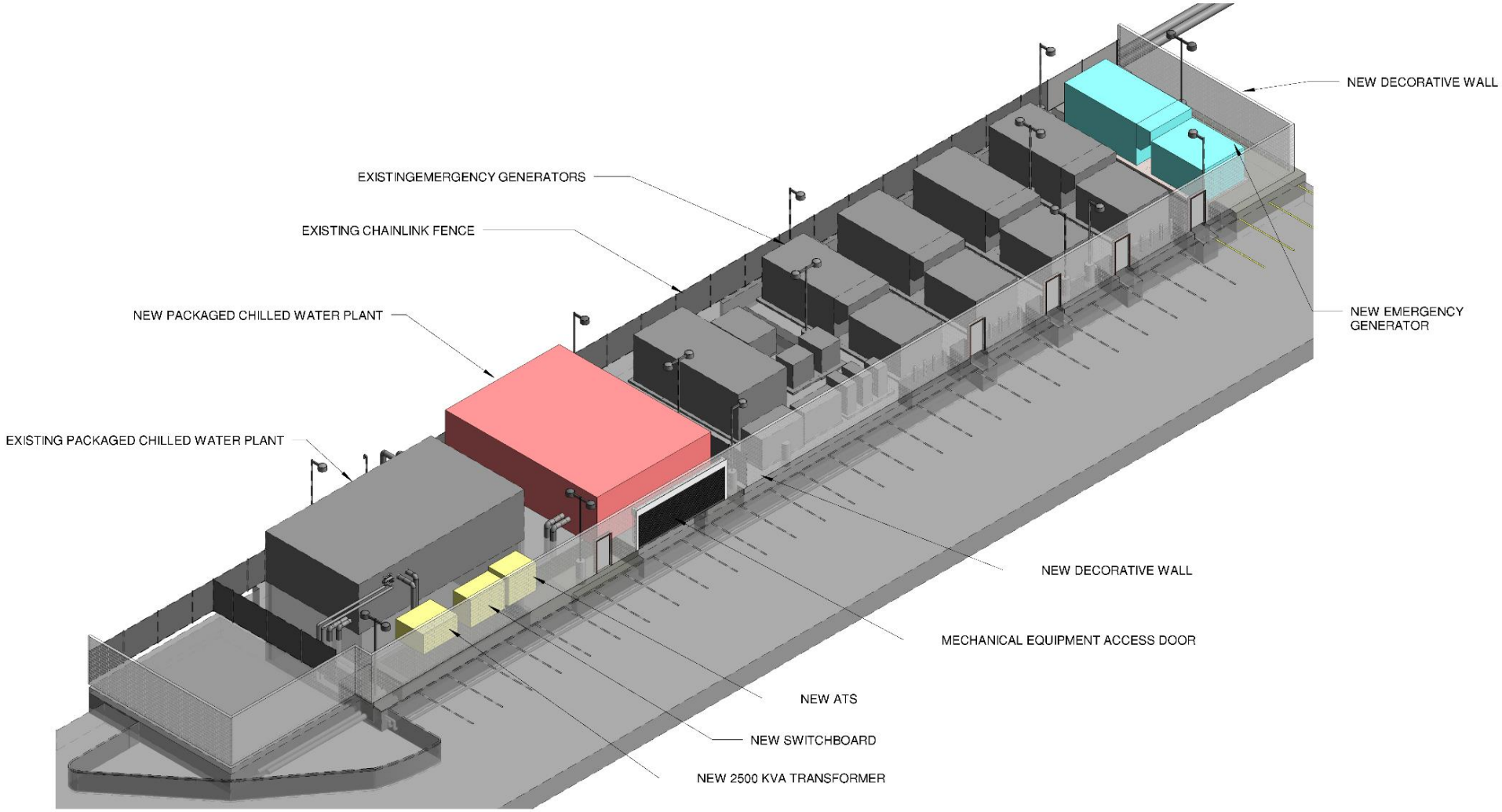

Exhibit 4
OSHPD Chiller Plant Expansion Rendering

Central Energy Plant Expansion Project
University of California, Irvine Medical Center

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feed chilled water and normal and emergency electrical power to Buildings 1A and 3. The individual chillers and cooling towers in Buildings 1A and 3 would be removed.

The expansion would include the addition of one 1,000-ton chiller in a pre-engineered module with space to accommodate a second chiller to meet future need (see Exhibit 4). With the installation of one new 1,000-ton chiller, all existing OSHPD buildings would be provided space cooling. The second chiller, to be installed at a future date, would provide space cooling for future OSHPD space as identified in the LRDP. The existing OSHPD cooling towers would be relocated south of the 1.4-megawatt (MW) fuel cell.

Buildings 1A and 3 are currently fed normal and emergency power from the 5-kV system that feeds all buildings except Buildings 1 and 57. The existing 4,000-kW (four 1,000-kW generators) emergency generator yard that feeds normal and emergency power to Building 1 would be expanded with the addition of one 1,500-kW generator to accommodate existing Buildings 1A, 3, and 31 as well as future OSHPD space. The system would be fed from the existing 12-kV pad mounted switch south of Building 57. It would increase efficiency and also provide redundancy for the non-OSHPD 12-kV system that would be installed to feed the non-OSHPD buildings.

Expansion of the OSPHD chiller plant and power generator yard would not increase the existing footprint of Building 57. Approximately 1,122 square feet would be reserved for the relocation of the cooling towers.

2.2 Project Phasing and Site Development

Project construction is anticipated to begin in June 2016 and be completed over 120 days. Site development would include minimal demolition, ornamental landscape removal, and connection to utility lines for the OSHPD chiller plant expansion and new non-OSHPD chiller plant construction. Both project sites are located on existing level pads; minimal to no grading and limited excavation for utility feed lines would occur.

Appropriate acoustical and visual buffers, as determined during the final design stage, would be utilized during construction to minimize potential project related aesthetic and/or noise impacts to existing sensitive receivers.

2.2.1 Access

Site access during construction of the proposed project would be provided via the existing service road, Hospital Frontage Road, along the perimeter of the UCIMC. Construction staging would occur adjacent to the project sites.

2.2.2 Hydrology

Existing hydrology patterns on the site would be maintained to the extent practical as determined during the project's final design stage. Low impact development stormwater management techniques and/or best management practices (BMPs) would be installed during construction to manage project generated stormwater in conformance with a prepared Water Quality

Management Plan (WQMP) and water quality control standards established in the countywide Drainage Area Management Plan (DAMP).

2.2.3 Utilities

The proposed project would provide additional chiller capacity to the UCIMC. At full buildout, the OSHPD chiller plant would add connections to existing Buildings 1A and 3 and the future OSHPD space. The non-OSPHD chiller plant would serve all existing and proposed non-OSHPD buildings throughout the UCIMC at LRDP buildout.

2.2.4 Design

Construction of the non-OSHPD chiller plant, expansion of the OSHPD chiller plant, and construction/modification of the associated power generator yards would blend architecturally; shield equipment to protect receivers from noise, heat, unsafe conditions, and pollution; be designed to support flexibility for future expansion; and site mechanical equipment away from public view.

The project design would meet the City of Orange's noise standard for exterior and interior noise levels, and would be included as a design specification requirement when choosing the design-build team. During the design phase, a noise study would be completed to assess anticipated operational noise levels when final equipment is chosen, such as generators and cooling towers. The noise study would be shared in consultation with the County of Orange to address and alleviate concerns regarding potential noise impacts. If the noise study finds the project to be above the City of Orange's standard, appropriate measures to reduce noise through equipment and attenuation barriers would be included in the project design.

2.3 Environmental Setting and Surrounding Land Uses

The project sites are located within the previously developed, urbanized UCIMC with minimal ornamental landscaping. There are no rock outcroppings, water bodies, or other distinctive natural features.

Surrounding uses for the non-OSHPD chiller plant and associated power generator yard are Building 32 to the west, Building 20 to the north, Building 31 to the east, and Dawn Way to the south. Immediately south of Dawn Way is real property owned by the County of Orange, including the five-story Manchester Office Building located at 301 The City Drive South in the city of Orange. It houses approximately 300 County of Orange staff from the Probation Department, Health Care Agency, and Social Services Agency, as well as café employees on the ground floor.

Surrounding uses for the OSHPD chiller plant and associated power generator yard are Building 54 to the west, Interstate-5 (I-5) to the north and east, and Building 58 to the south. The relocated cooling towers would be located approximately 30 feet north of the Orange County Juvenile Hall property line.

2.4 Consistency with the LRDP

As designated in the 2003 UCIMC LRDP, the non-OSHPD chiller plant and associated power generator yard would be located in the South Sector, and the existing OSHPD chiller plant and associated power generator yard are located in the East Sector. Permitted uses within these sectors are service functions; therefore, the proposed project is consistent with the 2003 UCIMC LRDP.

2.5 Discretionary Approval Authority and Other Public Agencies Whose Approval Is Required

University of California

As a public agency principally responsible for approving or carrying out the proposed project, the University of California is the Lead Agency under CEQA and is responsible for reviewing and certifying the adequacy of the environmental document and approving the proposed project. Pursuant to authority delegated from the Board of Regents of the University of California (The Regents), the UCI Chancellor would consider approval of the proposed project.

3.0 DETERMINATION

On the basis of the initial study that follows:

	I find that the proposed project meets the criteria for the Section 15332 In-Fill Development Project Class 32 exemption and is CATEGORICALLY EXEMPT from the provisions of CEQA.
	I find that the proposed project WOULD NOT have a significant effect on the environment, and a NEGATIVE DECLARATION will be prepared.
X	I find that although the proposed project could have a significant effect on the environment, the project impacts were adequately addressed in an earlier document or there will not be a significant effect in this case because revisions in the project have been made that will avoid or reduce any potential significant effects to a less than significant level. A MITIGATED NEGATIVE DECLARATION will be prepared.
	I find that the proposed project MAY have a significant effect on the environment. An ENVIRONMENTAL IMPACT REPORT will be prepared.

Signature

4/13/16
Date

Printed Name

For

4.0 EVALUATION OF ENVIRONMENTAL IMPACTS

The University has defined the column headings in the Initial Study checklist as follows:

- **"Potentially Significant Impact"** is appropriate if there is substantial evidence that the project's effect may be significant. If there are one or more "Potentially Significant Impacts," a Project EIR will be prepared.

- **"Project Impact Adequately Addressed in LRDP EIR"** applies where the potential impacts of the proposed project were adequately addressed in the LRDP EIR and mitigation measures identified in the LRDP EIR will mitigate any impacts of the proposed project to the extent feasible. All applicable LRDP EIR mitigation measures are incorporated into the project as proposed. The impact analysis in this document summarizes and cross-references (including section/page numbers) the relevant analysis in the LRDP EIR.

- **"Less Than Significant with Project-level Mitigation Incorporated"** applies where the incorporation of project-specific mitigation measures will reduce an effect from "Potentially Significant Impact" to a "Less Than Significant Impact." All project-level mitigation measures must be described, including a brief explanation of how the measures reduce the effect to a less than significant level.

- **"Less Than Significant Impact"** applies where the project will not result in any significant effects. The effects may or may not have been discussed in the LRDP EIR. The project impact is less than significant without the incorporation of LRDP or project-level mitigation.

- **"No Impact"** applies where a project would not result in any impact in the category or the category does not apply. Information is provided to show that the impact does not apply to projects like the one involved (e.g., the project falls outside a fault rupture zone). A "No Impact" answer may be based on project-specific factors as well as general standards (e.g., the project will not expose sensitive receptors to pollutants, based on a project specific screening analysis).

4.1 Aesthetics

Issues	Potentially Significant Impact	Project Impact Adequately Addressed in LRDP EIR	Less Than Significant with Project-level Mitigation Incorporated	Less Than Significant Impact	No Impact
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**			

Discussion

Aesthetics issues are discussed in Section 3.1 of the 2002 UCIMC LRDP EIR.

a) Scenic Vista: No Impact

b) Scenic Resources within a State Scenic Highway: No Impact

The project sites are located in an urbanized area in the city of Orange with no identified adjacent scenic vistas (LRDP EIR, 3.1-7). The California Scenic Highway Mapping System indicated that no Officially Designated State Scenic Highway is located within proximity to the

UCIMC,[1] while the closest Officially Designated State Scenic Highway, California State Route 91, is located approximately four miles northeast of the project site. Therefore, due to distance, the proposed project would not affect a scenic vista or scenic resources and no impact would occur. No mitigation is required.

c) Visual Character: Less than Significant Impact

The proposed project would expand the existing OSPHD chiller plant and demolish the existing Building 33 to construct the new non-OSHPD chiller plant and associated electrical yard. The proposed use of the new non-OSHPD chiller plant is consistent with the adjacent UCIMC boiler plant to the east. No change in use to the existing OSHPD chiller plant would occur during the expansion. Because the UCIMC is located within an urbanized area, operation of the proposed project would be similar to existing sources of lighting on and around the site.

Furthermore, the Orange County Juvenile Hall, a sensitive receptor, would not have views of either project sites. The only portion of the project visible would be the relocation of the OSHPD cooling towers, which is consistent with the existing facilities, such as the abandoned water tank. Therefore, the proposed project would not substantially degrade the existing visual character of the site or its surroundings and impacts would be less than significant. No mitigation is required.

d) Light or Glare: Project Impact Adequately Addressed in LRDP EIR

The proposed project includes a glass wall for the new non-OSHPD chiller plant that would expose interior lights and also include exterior lighting around the building. The change in lighting would not represent a substantial change from existing light levels nor would the project sites be visible from any major surrounding roadways (LRDP EIR, 3.1-9). However, the LRDP EIR concluded that projects could impact pedestrians and motorists during daylight if non-reflective building materials are used for construction. Therefore, with the implementation of LRDP EIR MM 3.1-3, impacts from light or glare would be reduced to a less than significant level.

Mitigation Measures

3.1-3: Prior to the completion of final construction documents, the UCIMC shall ensure that projects use low-reflective materials on buildings and parking structures that do not promote glare to the greatest extent feasible.

[1] http://www.dot.ca.gov/hq/LandArch/16_livability/scenic_highways/index.htm. Accessed September 19. 2015.

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Exhibit 5: Views from OSPHD Chiller Plant Expansion Site

View 1: View from southeast corner of project site looking east to the berm wall of the I-5 freeway.

View 2: View from northwest boundary of project site looking southwest toward Buildings 54 and 55.

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View 3: View from western boundary of project site looking south toward Building 58.

View 4: View from northwest corner of the project site looking southeast toward the project site.

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View 5: View from southwest corner of project site looking east toward the project site.

View 6: View from southeast corner of the project site looking northwest toward the project site.

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View 7: View from southeast corner of the project site looking west toward the project site.

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Exhibit 6: Views from non-OSPHD Chiller Plant Site

View 1: View from southern boundary of project site looking south toward the County of Orange Manchester Office Building.

View 2: View from southern boundary of project site looking west toward County of Orange parking structure and Building 73.

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View 3: View from northern boundary of project site looking west toward Building 20.

View 4: View from southeast corner of project site looking northwest toward the project site.

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View 5: View from western boundary of project site looking east toward project site.

View 6: View from northeast of project site looking southwest toward the project site.

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4.2 Air Quality

Issues	Potentially Significant Impact	Project Impact Adequately Addressed in LRDP EIR	Less Than Significant with Project-level Mitigation Incorporated	Less Than Significant Impact	No Impact
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 non-attainment 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) Create objectionable odors affecting a substantial number of people?				**X**	

Discussion

Air quality issues are discussed in Section 3.2 of the 2002 UCIMC LRDP EIR. A project-specific

Air Quality Assessment was prepared by Landrum & Brown and is included as Appendix A.

a) Air Quality Management Plan Consistency: No Impact

The South Coast Air Quality Management District (SCAQMD) CEQA Handbook states that "new or amended General Plan Elements, Specific Plans, and significant projects must be analyzed for consistency with the air quality management plan (AQMP)." A proposed project should be considered to be consistent with the plan if it furthers one or more policies and does not obstruct other policies. The Handbook identifies two key indicators of consistency:

- Whether the project would result in an increase in the frequency or severity of existing air quality violations or cause or contribute to new violations, or delay timely attainment of air quality standards or the interim emission reductions specified in the AQMP (except as provided for CO in Section 9.4 for relocating CO hot spots).

- Whether the project would exceed the assumptions in the AQMP based on the year of project buildout and phase.

Criterion 1 - Increase in the Frequency or Severity of Violations?

Based on the air quality modeling analysis, there would not be significant short-term construction and long-term operational impacts due to the project based on the SCAQMD thresholds of significance. Emissions generated during construction and operation would not exceed SCAQMD's localized significance threshold (LST) criteria, and therefore, the proposed project would not increase the frequency or severity of existing air quality violations in the immediate vicinity of the project. Furthermore, the project is not projected to result in any exceedances due to traffic volume increases at nearby intersections. The proposed project is not projected to contribute to the exceedance of any air pollutant concentration standards; therefore, the project is consistent with first criterion of the AQMP.

Criterion 2 - Exceed Assumptions in the AQMP?

Consistency with the AQMP assumptions is determined by performing an analysis of the project with the assumptions in the AQMP. Thus, the emphasis of this criterion is to ensure that the analyses conducted for the project are based on the same forecasts as the AQMP. The Regional Comprehensive Plan and Guide (RCP&G) consists of three sections: Core Chapters, Ancillary Chapters, and Bridge Chapters. The Growth Management, Regional Mobility, Air Quality, Water Quality, and Hazardous Waste Management chapters constitute the Core Chapters of the document. These chapters currently respond directly to federal and State requirements placed on Southern California Association of Governments (SCAG). Local governments are required to use these as the basis of their plans for purposes of consistency with applicable regional plans under CEQA.

Since the SCAG forecasts are not detailed, the test for consistency of this project is not specific. The SCAG forecasts are based on the General Plans of municipalities in the basin. The project is consistent with the UCIMC LDRP, which is effectively the General Plan. Furthermore, the

project-level analysis shows that the total project emissions are less than the SCAQMD significance thresholds. The emissions increase due to the project is minor and would not interfere with the AQMP or the attainment of the ambient air quality standards. Therefore, emissions from the project site would not be greater than those anticipated in the AQMP and no impact would occur. No mitigation is required.

b) Air Quality Standards: Less Than Significant Impact with Project-level Mitigation Incorporated

Short-term Impacts

Regional Construction Emissions

The air pollutant emissions were calculated and presented in Table 1, which represent the highest level of emissions during each construction activity.

Table 1
Total Construction Emissions by Activity

	Daily Emissions (lbs/day)					
Activity	**CO**	**NO_x**	**VOC**	**PM_{10}**	**$PM_{2.5}$**	**SO_x**
OSHPD Plant						
Demolition	9.4	11.4	1.4	1.1	0.8	0.01
Site Preparation	7.6	13.7	1.4	1.4	0.8	0.01
Grading	9.3	11.3	1.3	1.7	1.2	0.01
Trenching	3.0	4.9	0.6	0.4	0.4	0.00
Building Construction	8.3	13.7	1.4	1.0	0.9	0.01
Paving	8.3	10.7	1.2	0.9	0.7	0.01
Painting	1.9	2.4	7.1	0.2	0.2	0.00
Non-OSHPD Plant						
Demolition	10.5	13.0	1.5	2.4	1.1	0.02
Site Preparation	7.6	13.7	1.4	1.4	0.8	0.01
Grading	9.3	11.3	1.3	1.7	1.2	0.01
Building Construction	8.5	13.8	1.4	1.0	0.9	0.01
Paving	8.3	10.7	1.2	0.9	0.7	0.01
Painting	1.9	2.4	41.2	0.2	0.2	0.00
Significance Threshold	**550**	**100**	**75**	**150**	**55**	**150**
Exceed Threshold?	**No**	**No**	**No**	**No**	**No**	**No**

Table 1 shows that no individual construction activity would generate emissions that exceed the SCAQMD Regional Emissions Significance Thresholds. It is not known whether or not any of the individual activities would occur concurrently, however, the total daily emissions, summed over all activities, are less than the thresholds for all pollutants except NO_X. Therefore, all construction activities could occur concurrently and the pollutant emissions would be less than

the significance threshold for all pollutants except NO_X. NO_X emissions are anticipated to be less than 13.8 pounds per day for all activities. This means that at least seven activities could occur concurrently with the total daily NO_X emissions remaining below the 100 pounds per day threshold. Construction of the project is not anticipated to result in more than a few construction activities occurring concurrently. Therefore, construction of the project would not result in pollutant emissions exceeding the SCAQMD regional construction significance threshold.

On-site Construction Emissions

On-site emissions for each of the construction activities were calculated based and are presented in Table 2. The applicable LST thresholds are also presented.

Table 2
On-site Emissions by Construction Activity

	Daily Emissions (lbs/day)			
Activity	**CO**	**NO_x**	**PM_{10}**	**$PM_{2.5}$**
OSHPD Plant				
Demolition	8.8	11.4	0.9	0.8
Site Preparation	7.4	13.6	1.4	0.8
Grading	8.7	11.2	1.6	1.2
Trenching	2.8	4.9	0.4	0.4
Building Construction	8.2	13.7	0.9	0.9
Paving	7.3	10.6	0.7	0.6
Painting	1.9	2.4	0.2	0.2
Non-OSHPD Plant				
Demolition	10.0	13.0	2.3	1.0
Site Preparation	7.4	13.6	1.4	0.8
Grading	8.7	11.2	1.6	1.2
Building Construction	8.2	13.7	0.9	0.9
Paving	7.3	10.6	0.7	0.6
Painting	1.9	2.4	0.2	0.2
Significance Threshold	**485.0**	**81.0**	**4.0**	**3.0**
Exceed Threshold?	**No**	**No**	**No**	**No**

Table 2 shows that no individual construction activity would generate emissions that exceed the SCAQMD LSTs. As discussed above it is not known whether any individual construction activities would occur concurrently. Because the OSHPD and non-OSPHD chiller plant sites are separate, the emissions from each site individually are compared to the significance threshold. The total CO and NO_X emissions from all activities for each project component are less than the significance thresholds. However, no more than two or three activities would be expected to occur concurrently. Examination of Table 2 shows that the only way that the PM_{10} threshold is

exceeded with three concurrent activities is if non-OSHPD demolition is one of the activities. However, demolition would need to be completed prior to starting the other construction activities at the non-OSHPD site and this condition would not occur. Construction of the project would not result in emissions exceeding the SCAQMD localized construction significance thresholds and would not result in a significant localized impact.

Diesel Particulate Matter

In 1998, the California Air Resources Board (ARB) identified particulate matter from diesel-fueled engines (Diesel Particulate Matter or DPM) as a Toxic Air Contaminant (TAC). It is assumed that the majority of the heavy construction equipment utilized during construction would be diesel fueled and emit DPM. Impacts from toxic substances are related to cumulative exposure and are assessed over a 70-year period. Cancer risk is expressed as the maximum number of new cases of cancer projected to occur in a population of one million people due to exposure to the cancer-causing substance over a 70-year lifetime. Demolition and grading for the project, when the peak diesel exhaust emissions would occur, is expected to take approximately two months, cumulatively, with all construction expected to take less than one year. Because of the relatively short duration of construction compared to a 70-year lifespan, diesel emissions resulting from the construction of the project are not expected to result in a significant impact.

Long-term Impacts

The proposed project would not result in any increases to the number of employees or patients at the hospital that would increase the number of motor vehicles traveling to and from the site each day. The two components of the project that would result in long-term air pollutant emissions during the operation of the project are the diesel emergency generators and the cooling towers.

Cooling Towers

There are three cooling towers currently being operated for the OSHPD chiller plant with 2,250 tons of cooling capacity that would be replaced. A new modular cooling tower with an initial cooling capacity of approximately 3,000 tons would be installed for the OSHPD chiller plant when construction is complete. The tower would be able to accommodate up to 1,000 additional tons of cooling with additional equipment. This equipment would be added in the future to provide 4,000 tons of cooling for the OSHPD chiller plant for UCIMC buildout.

There are no existing cooling towers for the non-OSHPD chiller plant. A new modular cooling tower with a capacity of approximately 1,000 tons would be installed for the non-OSHPD chiller plant when construction is completed. The tower would be able to accommodate up to 3,000 additional tons of cooling with additional equipment. This equipment would be added in the future to, ultimately, provide 4,000 tons of cooling for the non-OSHPD chiller plant. This plant is anticipated to be operated 12 hours per day.

SCAQMD Guidance recommends the use of an emission factor 1.643 pounds of total particulates per year for each ton of cooling provided, assuming 24 hours per day operation. This emission rate is based on the cooling tower water having a total suspended particulates of 2,500 parts per million, a 3 gallon per minute per ton of cooling circulating water rate and a drift loss of 0.005 percent.[1] This data was used to estimate the emissions from the existing 2,250-ton cooling towers.

The new cooling towers would have a lower water circulation rate, 2.25 gallons per minute per ton of cooling, total dissolved solids of 2,050 parts per million or less, and would include drift eliminators that would reduce the drift loss to 0.0025 percent. This lowers the total particulate matter (PM) emission rate to 0.506 pounds of total particulates each year per ton of cooling. Of the total particulates, approximately 70 percent are PM_{10} and approximately 42 percent are $PM_{2.5}$.

Using these factors, the daily PM_{10} and $PM_{2.5}$ emissions from the cooling towers were calculated and are presented in Table 3. This table shows that while the project would ultimately increase the cooling tower cooling from 2,250 tons operating 24 hours per day to 4,000 tons operating 24-hours per day and 4,000 tons operating 12-hours per day, the total cooling tower particulate emissions are anticipated to be reduced from existing conditions.

Table 3
Cooling Tower Particulate Emissions (lbs/day)

	PM_{10}	$PM_{2.5}$
OSHPD		
Project		
Initial	2.9	1.7
Ultimate	3.9	2.3
Existing	7.1	4.3
Change	***-3.2***	***-1.9***
Non-OSHPD		
Project		
Initial	0.5	0.3
Ultimate	1.9	1.2
Existing	0.0	0.0
Change	***1.9***	***1.2***
Total		
Project		
Initial	3.4	2.0
Ultimate	5.8	3.5

[1] The measure of the rate of water evaporation from the cooling tower.

Existing	7.1	4.3
Change	***-1.3***	***-0.8***

Emergency Generator Emissions

The project would add a 1,500 kW generator to the OSHPD generator, which has four 1,000 kW generators. Additionally, two 2,000 kW generators would be installed in the non-OSHPD chiller plant. Space and infrastructure would be provided to add two additional 2,000 kW generators to the non-OSHPD chiller plant in the future.

As discussed above, the project would be constructed under future design-build contracts. Because of this, the specific make and model of emergency generators to be used by the project are not known. Because these generators would be purchased and installed after January 2015, they would be required to comply with Tier 4 emissions standards. Tier 4 particulate matter and nitrogen oxide emissions are 90 percent lower than Tier 2 standards.

The project engineer provided an emission rate cut sheet for a representative emergency generator. Emission rates were provided for six operating modes of the generator. Table 4 presents the maximum emissions during any mode of generator operation (maximum emissions occur during Full Standby or Full Prime Modes) along with the average emission during full power continuous operation.

Table 4
Emergency Generator Emissions (lbs/hr/generator)

	CO	NO_x	VOC	PM_{10}	$PM_{2.5}$	SO_x
Maximum	1.16	35.01	0.71	0.45	0.43	0.71
Average	0.77	26.73	0.46	0.15	0.15	0.57

As discussed previously, operation of the emergency generators during emergency conditions is exempted from CEQA as an emergency activity. However, the emergency generators would require regular testing where the generators are operated for approximately thirty minutes once every forty days. Table 4 shows that the pollutant with the greatest amount of emissions is NO_X. Dividing the SCAQMD NO_X regional significance threshold of 55 lbs/day by the hourly emission rates presented in Table 4 gives the number of hours that the generator could be operated without exceeding the significance threshold. This shows that the generator could be operated at least 1.6 hours per day, based on the maximum emission rate, and up to 2.1 hours per day, based on the average emission rate without exceeding the significance threshold. Therefore, as long as, at most, three emergency generators are tested for 30 minutes each on any one day, testing of the emergency generators would not result in pollutant emissions exceeding the SCAQMD regional significance thresholds. Furthermore, the CO, NOx, PM_{10} and $PM_{2.5}$ emissions would be less than the localized significance thresholds of 485 lbs per day, 81 lbs per day, 1.0 lbs per day and 1.0 lbs per day, respectively, with this restriction.

Operation of the project would not result in air pollutant emissions greater than the SCAQMD

regional significance thresholds nor would it result in any significant localized impacts. Therefore, with implementation of project-level MM AQ-1 and AQ-2, operation of the project would not result in a significant air quality impact.

c) Cumulatively Considerable Net Increase of Any Criteria Pollutants: Less than Significant Impact

The SCAQMD approach for assessing cumulative impacts is based on the AQMP forecasts of attainment of ambient air quality standards in accordance with the requirements of the federal and State Clean Air Acts. As discussed in 4.2(a), the proposed project would be consistent with the AQMP, which is intended to bring the Southern California Air Basin into attainment for all criteria pollutants. In addition, the mass regional emissions calculated for the proposed project would be lower than the applicable SCAQMD daily significant thresholds that are designed to assist the region in attaining the applicable National and State Ambient Air Quality Standards. Furthermore, there are no known construction projects in the vicinity of the project site that would occur concurrently with the proposed project. Therefore, cumulative impacts to air quality would be less than significant. No mitigation is required.

d) Sensitive Receptors: Less Than Significant Impact

The project is located in SRA 17. The closest area where a person could spend 24-hours is the Orange County Juvenile Hall located south of the OSHPD project site and southeast of the non-OSHPD project site. The nearest area where a person could spend one hour is the Manchester Office Building directly adjacent and south of the non-OSHPD project site. Therefore, the thresholds were calculated based on an observer distance of 82 feet (25 meters). The OSHPD chiller plant and non-OSHPD chiller plant sites are less than one acre and uses the corresponding threshold.

As shown in Table 2 above and discussed in 4.2(b), the proposed project does not exceed the LST thresholds. Therefore, the proposed project would not expose sensitive receptors to substantial pollutant concentrations and impacts would be less than significant. No mitigation is required.

e) Objectionable Odors: Less than Significant Impact

According to the SCAQMD CEQA Air Quality Handbook, land uses associated with odor complaints typically include agricultural uses; wastewater treatment, food processing, and chemical plants; composting; refineries; landfills; dairies; and fiberglass molding. The proposed project does not include any uses identified by the SCAQMD as being associated with odors and would not produce long-term operational odors.

Short-term project construction equipment and activities would generate odors. Potential construction odors include diesel exhaust emissions, blasting, and paving activities. However, these odors would be temporary and dissipate rapidly from the source with an increase in distance. Therefore, impacts due to odors would be less than significant. No mitigation is

required.

Mitigation Measures

AQ-1: Testing of the emergency generators installed by this project shall be limited to no more than 1.6 hours per day.

AQ-2: Operation of the non-OSHPD cooling towers shall be limited to 12 hours per day.

4.3 Cultural Resources

Issues	Potentially Significant Impact	Project Impact Adequately Addressed in LRDP EIR	Less Than Significant with Project-level Mitigation Incorporated	Less Than Significant Impact	No Impact
Would the project:					
a) Cause a substantial adverse change in the significance of a historical resource as defined in Section 15064.5?					**X**
b) Cause a substantial adverse change in the significance of an archaeological resource pursuant to Section 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**	
e) Would the project cause a substantial adverse change in the significance of a tribal cultural resource as defined in Public Resources Code 21074?			**X**		

Discussion

Cultural resources issues are discussed in Section 3.3 of the 2002 UCIMC LRDP EIR.

a) Historical Resources: No Impact

The proposed project would demolish Building 33, currently used by Parking Security, which was constructed in 1943. However, as discussed in the LRDP EIR, none of the structures over 50

years old were determined to be historical resources, including Building 33 (LRDP EIR, 3.3-11). Therefore, the proposed project would not affect historical resources and no impact would occur. No mitigation is required.

b) Archaeological Resources: Less than Significant Impact with Project Level Mitigation Incorporated

c) Paleontological Resources: Less than Significant Impact with Project-level Mitigation Incorporated

The UCIMC is a developed and urban site that has undergone previous demolition and construction activities. Minimal grading is anticipated during project construction but would be limited to topsoil, and, as discussed in the 2003 LRDP EIR, no archeological or paleontological resources have been noted or previously uncovered (LRDP EIR, 3.3-17 through 3.3-18). However, archaeological or paleontological may be uncovered during construction activities at any time. Therefore, implementation of project-level MM-Cul-1 and MM-Cul-2 would reduce potential impacts to a less than significant level.

d) Human Remains: Less than Significant Impact

The proposed sites are located within the UCIMC, an urban and previously developed site. The project would not excavate sedimentation rock material other than topsoil, and impacts to human remains are not anticipated. In the event that human remains are discovered during construction, UCI would comply with Section 7.50.5 of the California Health and Safety Code, which requires notification of the County Coroner to determine whether the remains are of forensic interest. If the Coroner, with the aid of a supervising archeologist, determines that the remains appear to be of a Native American, s/he would contact the Native American Heritage Commission (NAHC) for further investigation and proper recovery. Therefore, compliance with the California Health and Safety Code would reduce potential impacts to human remains to a less than significant level. No mitigation is required.

e) Tribal Cultural Resources: Less than Significant Impact with Project-level Mitigation Incorporated

On July 23, 2015 and October 1, 2015 notification letters were mailed to the Gabrieleño Band of Mission Indians – Kizh Nation and Juaneño Band of Mission Indians – Acjachemen Nation, respectively. In accordance with AB 52, no consultation was initiated during the 30-day period by either tribe to indicate that the previously developed sites contain tribal cultural resources. However, as discussed in 4.3(b) and (c), resources may be discovered at any time during construction. Therefore, with incorporation of project-level MM-Cul-1 and compliance with Section 7.50.5 of the California Health and Safety Code, potential impacts to tribal cultural resources would be reduced to a less than significant level.

Mitigation Measures

CR-1: Should archaeological resources be found during ground-disturbing activities related to construction, all such activities must be directed away from the immediate area of the discovery and further disturbance to it must be prevented by the on-site contractor in consultation with UCI and a qualified project archaeologist approved by UCI.

The project archaeologist shall first determine whether the uncovered resource is a "unique archaeological resource" pursuant to Section 21083.2(g) of the California Public Resources Code or a "historical resource" pursuant to Section 15064.5(a) of the CEQA Guidelines. If the resource is determined to be a "unique archaeological resource" or a "historic resource," the archaeologist in consultation with UCI shall recommend disposition of the site and formulate a mitigation plan that satisfies the requirements of Section 21083.2 of the PRC and Section 15064.5 of the CEQA Guidelines.

If the archaeologist determines that the resource is not a "unique archaeological resource" or "historical resource," s/he shall record the site and submit the recordation form to the California Historical Resource Information System (CHRIS) at the South Central Coastal Information Center (SCCIC). The archaeologist shall prepare a report of the results of any study prepared as part of a testing or mitigation plan, following accepted professional practice. The report shall follow guidelines of the California Office of Historic Preservation. Copies of the report shall be submitted to UCI and to the CHRIS at the SCCIC.

CR-2: If fossil resources are discovered by the Contractor or others during project grading, ground-disturbing activities in the vicinity of the discovery shall be halted or diverted until a qualified paleontologist, approved by UCI, inspects the find and evaluates it for significance. Work may proceed in other areas of the site, subject to the direction of the paleontologist, in consultation with UCI. If determined to be significant, the paleontologist shall have the authority to quickly and efficiently salvage and remove the fossil from its locality, as appropriate, before ground-disturbing activities resume in the area. These actions, as well as final disposition of the resources, shall be subject to the approval of UCI.

4.4 Geology and Soils

Issues	Potentially Significant Impact	Project Impact Adequately Addressed in LRDP EIR	Less Than Significant with Project-level Mitigation Incorporated	Less Than Significant Impact	No Impact
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**	
ii) Strong seismic ground shaking?				**X**	
iii) Seismic-related ground failure, including liquefaction?				**X**	
iv) Landslides					
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**

Discussion

Geology and soils issues are discussed in Section 3.4 of the 2002 UCIMC LRDP EIR.

a) Expose People or Structures to:

i) Fault Rupture: Less than Significant Impact

ii) Seismic Ground Shaking: Less than Significant Impact

UCIMC, like most of Southern California, is located in a seismically active area where strong ground shaking could occur during movements along any of the regional faults. Although there are no known active faults in the immediate vicinity of the UCIMC, an earthquake along local or regional faults could generate strong ground motion at the project sites that could expose people or structures to potential hazard. However, grading, foundation, and structural elements would be designed to meet or exceed the California Building Code (CBC) seismic safety standards. In addition, the proposed project would comply with the University of California Seismic Safety Policy. In accordance with regulation, impacts due to fault rupture or seismic ground shaking would be less than significant. No mitigation is required.

iii) Liquefaction: Less than Significant Impact

The southeastern portion of the UCIMC is located within a liquefaction zone (LRDP EIR, 3.4-16). However, it was found that the possibility of liquefaction was very low due to the depth of groundwater and the dense character of the soil.

Furthermore, the site-specific geotechnical report completed for the non-OSHPD chiller plant site indicates water surface elevation in nearby wells has been deeper than 50 feet below the surface for more than 88 years, and the potential for groundwater elevation to be within 50 feet of the project site surface elevation is considered to be very low (Earth Systems Southwest, 2015). Therefore, impacts due to liquefaction would be less than significant. No mitigation is required.

iv) Landslides: Less than Significant Impact

Landslides may either be earthquake-induced or caused by the weight of water-saturated soil and rock that exceeds the strength of the underlying soil material. However, the majority of the UCIMC, including the project sites, is characterized by flat terrain, and the occurrence of landslides is unlikely to occur. The closest upland slope is located approximately five miles away (LRDP EIR, 3.4-4). Furthermore, the proposed project, as discussed above, would be subject to CBC and University of California Seismic Safety Policy compliance that would reduce impacts due to landslides to a less than significant level. No mitigation is required.

b) Soil Erosion: Less than Significant Impact

Demolition of existing surfaces and earthwork would result in exposed soil conditions during construction. As discussed in the site-specific geotechnical report, project site soils are susceptible to wind and water erosion. However, construction would be temporary and site grading would be in compliance with the grading requirements of the South Coast Air Quality Management District (SCAQMD), California Building Code (CBC), and the National Pollutant Discharge Elimination System (NPDES) that requires implementation of best management practices (BMPs) to prevent soil erosion. Therefore, impacts due to soil erosion would be less than significant. No mitigation is required.

c) Soil Instability: Less than Significant Impact

d) Expansive Soils: Less than Significant Impact

Expansive soils are characterized by their ability to undergo significant volume change, shrink or swell, due to variations in moisture content. Changes in soil moisture content can result from rainfall, landscape irrigation, utility leakage, roof drainage, perched groundwater, drought, or other factors, and may cause unacceptable settlement or heave of structures, concrete slabs supported-on-grade, or pavements supported over these materials. Depending on the extent and location below finished subgrade, expansive soils can have a detrimental effect on structures. Based on a sample taken during the exploration for the non-OSHPD chiller plant, the Expansion Index of the onsite soil in which the structure is anticipated to be located was found to be “very low.” The geotechnical report does not identify soils instability, soil expansion hazards, or other

geologic constraints to the construction of the proposed project (Earth Systems Southwest, 2015). Recommendations for engineering design and construction are also provided in the report, which would ensure the structural integrity and stability of the proposed project and compliance with the CBC.

Prior to grading for the OSHPD chiller plant, the UCIMC must comply with regulation including submission of soils and geological reports by a registered geotechnical engineer for OSHPD review and approval prior to grading. Detailed foundation and designed information for the structure prepared by a registered civil engineer and based on recommendations from a geotechnical engineer must be submitted for approval by OSHPD prior to construction (LRDP EIR, 3.4-11). Therefore, compliance with OSPHD and CBC would reduce impacts related to expansive soil to a less than significant level. No mitigation is required.

e) Septic Tanks or Alternative Waste Disposal Systems: No Impact

The proposed project does not include restroom facilities and would not require septic tanks or an alternative waste disposal system; therefore, no impact would occur. No mitigation is required.

Mitigation Measures

No mitigation measures required.

4.5 Greenhouse Gas Emissions

Issues	Potentially Significant Impact	Project Impact Adequately Addressed in LRDP EIR	Less Than Significant with Project-level Mitigation Incorporated	Less Than Significant Impact	No Impact
Would the project:					
a) Generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment?				**X**	
b) Conflict with an applicable plan, policy or regulation adopted for the purpose of reducing the emissions of greenhouse gases?					**X**

Discussion

In March 2010, the CEQA guidelines were revised to require analysis of greenhouse gas (GHG) emissions. Because it was not required at the time the 2002 UCIMC LRDP EIR was adopted, a GHG analysis was not included. GHG emissions are addressed in this section and uses a project-specific GHG study prepared by Lundrum & Brown (Appendix B).

a) Greenhouse Gas Emissions: Less than Significant Impact

The project-level analysis indicated that the proposed project would exceed the SCAQMD suggested significance threshold of 3,000 metric tons per year. However, the emissions per service population are less than the 4.60 metric tons of carbon dioxide ($CO_{2)}$ equivalent per year and the total emissions are less than the 25,000 metric tons of CO_2 equivalent (MT CO_2EQ) residual as required by the South Coast Air Quality Management District (SCAQMD) threshold. Therefore, impacts due to generation of greenhouse gas emissions would be less than significant. No mitigation is required.

b) Conflict with a Greenhouse Gas Plan, Policy, or Regulation: No Impact

As discussed in 4.5(a), the analysis shows that the increase in GHG emissions are below the SCAQMD threshold. Additionally, UCI implements a Climate Action Plan (CAP) which is compliant with AB 32 and policies contained in the University of California Policy on Sustainable Practices to further reduce GHG emissions on the UCIMC. The proposed project

would also incorporate specific, project-relevant policies contained in these plans. Therefore, the proposed project would not considerably contribute to significant cumulative impacts associated with global climate change due to GHG emissions or interfere with California's ability to achieve its GHG reduction goal and no impact would occur. No mitigation is required.

Mitigation Measures

No mitigation measures are required.

4.6 Hazards and Hazardous Materials

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

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

Discussion

Hazards and hazardous materials issues are discussed in Section 3.5 of the 2002 UCIMC LRDP EIR.

a) Transport, Use, Disposal of Hazardous Materials: Less than Significant Impact

b) Release of Hazardous Materials: Project Impact Adequately Addressed in LRDP EIR

Demolition of Building 33, built prior to the 1970s, could potentially expose construction

personnel, staff, patients, students, and visitors to asbestos-containing building materials and lead-based paint, which can result in adverse health effects in uncontrolled situations. However, several regulations and guidelines pertaining to asbestos and lead-based paint have been adopted for demolition activities to reduce potential impacts, including SCAQMD Rule 1403 (LRDP EIR, 3.5-15 through 3.5-17).

Construction activities for the proposed project would involve the use of hazardous materials, which may include asphalt, diesel gasoline, paints, thinners, solvents, acids, grease, oil, fertilizers, and other substances that could pose health risks or have the potential to cause soil and groundwater contamination if not properly stored, used, or disposed. However, the University's standard construction specifications require that contractors be responsible for identification and proper removal and disposal of any unexpected soil or water contaminants encountered during construction. Furthermore, the proposed project would comply with all federal and State regulations that control the use, storage, disposal, and transport of hazardous materials and wastes, including operational safety and emergency response requirements that would prevent major threats to public health and safety. In addition, the UCIMC has developed a Disaster Response Plan in conjunction with the City of Orange Fire Department to continually review and update policies and procedures to ensure a coordinated approach to hazardous material incident planning and response (LRDP EIR, 3.5-15). Compliance with pertinent hazardous material regulations would prevent hazards at the site.

Maintenance of the proposed project is anticipated to involve the use of limited hazardous materials. Due to the limited amount, it is not anticipated to create a hazard to the public or the environment with compliance with existing federal and State regulations related to the transport, use, or disposal of hazardous materials.

Therefore, in accordance with SCAQMD Rule 1403 and LRDP EIR MMs 3.5-2(a), 3.5-2(c), and 3.5-2(d), impacts due the release of hazardous materials would be reduced to a less than significant level.

c) Proximity to Schools: Less than Significant Impact

No schools are located within one-quarter mile of the project sites, but the Orange County Juvenile Hall would have educational facilities as part of its programming. The non-OSHPD project site would be located 100 feet from the Orange County Juvenile Hall property line and its closest building; the OSHPD relocated cooling towers would be approximately 30 feet from the Orange County Juvenile Hall property line and 180 feet to its closest building. As discussed above, construction and operation of the proposed project would involve limited quantities of hazardous materials and are subject to federal and State regulations. Therefore, impacts due to proximity to schools is less than significant. No mitigation is required.

d) Hazardous Materials Sites: No Impact

The LRDP EIR indicated that the five listed hazardous materials incidents on the UCIMC required no action or remedial action was completed or deemed unnecessary. Furthermore, a

review of the State Water Resources Control Board (SWRCB) Geotracker[1] and Department of Toxic Substance Control (DTSC) Envirostor[2] databases show that no hazardous material sites are located on the project site. Therefore, the proposed project is not located on a hazardous material site and no impact would occur. No mitigation is required.

e) Airport Land Use Plan: No Impact

f) Private Airstrip: No Impact

Because the proposed project is not located within two miles of an airport or airstrip, the proposed project would not result in a safety hazard related to airport or aircraft operations. Therefore, no impact would occur. No mitigation is required.

g) Emergency Response: No Impact

State College Boulevard, which runs along the western boundary of the UCIMC, is designated as an evacuation corridor in the City of Orange General Plan Public Safety Element[3] (Figure PS-4, Generalized Evacuation Corridors). However, construction traffic would not interfere with vehicle movement or emergency access along State College Boulevard because direct project site access and staging would occur on the UCIMC. In addition, emergency access to the project sites would be provided by Dawn Way and Frontage Road. Therefore, the proposed project would not affect emergency access and no impact would occur. No mitigation is required.

h) Wildland Fires: No Impact

The UCIMC is not located in or near areas designated as Wildland Very High Fire Hazards Areas or Wildland Fire Hazard Areas in the City of Orange General Plan[4] or a Fire Hazard Severity Zone by the California Department of Forestry and Fire Protection.[5] Therefore, the proposed project would not result in significant risk of loss, injury, or death involving wildland fires and no impact would occur. No mitigation is required.

Mitigation Measures

3.5-2(a): Prior to demolition activities at each location, the UCI Medical Center shall develop a decommissioning plan for facilities known or suspected to contain hazardous materials in building features including, but not limited to, exterior surfaces such as rooftops and stacks, and interior features such as floors, walls, ceilings, countertops, and storage areas, and plumbing and ventilation fixtures. Potential contaminants to be evaluated shall include, but not be limited to, the following: friable asbestos, lead-based paint, mercury or other chemical substances,

[1] http://geotracker.waterboards.ca.gov/. Accessed September 22, 2015.
[2] http://www.envirostor.dtsc.ca.gov/public/. Accessed September 22, 2015.
[3] http://www.cityoforange.org/civicax/filebank/blobdload.aspx?blobid=9424. Accessed September 18, 2015.
[4] http://www.cityoforange.org/civicax/filebank/blobdload.aspx?blobid=9424. Accessed September 18, 2015.
[5] http://www.fire.ca.gov/fire_prevention/fhsz_maps_orange.php. Accessed September 18, 2015.

Polychlorinated Biphenyls (PCBs), radioactive materials, and biohazardous materials. The decommissioning plan shall identify, at a minimum, the following information:

- The location, type, and estimated amount of exterior and interior features known or suspected to contain contaminants. Measures to evaluate the potential for contaminants to be present could include, but would not be limited to, a review of departmental history, UCI Medical Center records pertaining to use, hazardous materials purchases, consultation with knowledgeable individuals, and sample collection where practical;

- Specific tasks that would be performed to determine the type, location, and amount of contaminants that could be present;

- A mechanism for ensuring removal of contaminated items in compliance with all applicable hazardous materials management laws and regulations. Such measures could include identification for individuals or companies permitted or licensed to handle contaminants, procedures, contract specifications, periodic monitoring during demolition, and documentation of activities;

- For each affected location, health and safety precautions that meet the intent of California Occupational Safety and Health Administration (Cal/OSHA) requirements shall be developed and identified in the decommissioning plan; and

- The decommissioning plan shall identify specific steps that will be taken to account for and relocate all stored chemical and radioactive wastes and other hazardous wastes and other hazardous substances used in routine operations. This mitigation would occur during the design phase.

3.5-2(c): In the event unidentified, obvious, or suspected hazardous materials or contamination are discovered during decommissioning or demolition, such activities shall cease immediately until evaluated by a qualified health and safety professional. Work shall not continue until appropriate actions recommended by the health and safety professional have been implemented to demonstrate that there would be no unacceptable health risk to exposed individuals.

3.5-2(d): All buildings shall be tested by a registered environmental assessor for the presence of lead-based paint prior to demolition. If lead-based paint is detected, the material shall be removed and transported to an approved waste disposal facility in accordance with the County of Orange Health Care Agency.

4.7 Hydrology and Water Quality

Issues	Potentially Significant Impact	Project Impact Adequately Addressed in LRDP EIR	Less Than Significant with Project-level Mitigation Incorporated	Less Than Significant Impact	No Impact
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				**X**	

on- or off-site?			
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) Inundation by seiche, tsunami, or mudflow?		**X**	

Discussion

Hydrology and water quality issues are discussed in Section 3.6 of the 2002 UCIMC LRDP EIR.

a) Water Quality Standards: No Impact

Construction of the proposed project could result in pollutants in stormwater runoff from ground disturbance (e.g., site clearing, excavation, and grading), materials and/or soil stockpiles, landscaping materials, concrete, and asphalt. Pollutants that could result in water quality impacts include soils, trash, debris, oil and grease, fuels and other fluids associated with construction equipment, fertilizers, paints, concrete slurries, and asphalt. These pollutants could

affect water quality if joining runoff that leaves the site.

Pursuant to the Clean Water Act, the State Water Resources Control Board (SWRCB) issues the NPDES General Permit for Storm Water Discharges Associated with Construction and Land Disturbance Activities. Under this permit, individual coverage must be obtained for discharges of stormwater from construction sites with a disturbance area of one acre or more or projects that disturb less than one acre but are part of a larger common plan of development that in total disturbs one or more acres. In accordance, a Storm Water Pollution Prevent Plan (SWPPP) would be prepared that identifies best management practices (BMPs) that would be installed, implemented, and maintained at the construction site to reduce or eliminate pollutants in stormwater discharges.

In accordance with the NPDES General Construction Permit and the implementation of the SWPPP, the proposed project would not violate water quality standards or waste discharge requirements and no impact would occur. No mitigation is required.

b) Groundwater: No Impact

Excavation and grading activities would not exceed 75 feet to affect underlying groundwater resources (LRDP EIR, 3.6-3). The project sites have been previously graded and paved; no decrease in the amount of ground percolation would occur and recharge of the underlying groundwater would not be impacted. Therefore, underlying groundwater resources would not be affected and no impact would occur. No mitigation is required.

c) Erosion On or Off-site: Less than Significant Impact

Erosion due to wind and water occurs on site due to the presence of bare soils, which would occur during the construction phase (e.g., grading). However, the UCIMC campus is a developed site equipped with control measures in place to alleviate soil erosion. Furthermore, as discussed in 4.7 (b), implementation of the NPDES permit requirements would reduce potential erosion, siltation, and water quality impacts resulting from the project. Therefore, impacts to the existing drainage patters would be less than significant. No mitigation is required.

d) Drainage System Capacity/Substantial Additional Polluted Runoff: Less than Significant Impact

e) Substantially Alter Drainage Pattern: Less than Significant Impact

The UCIMC campus has been previously developed with impervious surfaces with limited landscaping (LRDP EIR, 3.6-7). Implementation of the proposed project would not alter the existing impervious condition that would significantly increase the rate and volume of runoff from the site that enter local facilities and ultimately drain to the Santa Ana River.

The existing drainage system is anticipated to be able to control any additional runoff that does not percolate into the ground to minimize potential flooding on and off site. Therefore, impacts due to drainage would be less than significant. No mitigation is required.

f) Substantially Degrade Water Quality: Less than Significant Impact

As discussed in 4.7 (b), the proposed project is required to comply with the provisions of the NPDES permit by developing and implementing a SWPPP. The proposed project would adhere to the site, source, and treatment control BMPs identified in the SWPPP to prevent erosion, siltation, and reduce the pollutants entering the stormwater system. Furthermore, the proposed project would not involve removal or contact with an existing groundwater well. Therefore, compliance with applicable rules and regulations would reduce impacts to water quality to a less than significant level. No mitigation is required.

g) Place Housing with a 100-year Flood Hazard Area: No Impact

The proposed project is the construction of utilities for the UCIMC. Furthermore, the project sites are located in a FEMA Flood Zone X[1] or 500-year flood area. Therefore, the proposed project would not place housing within a 100-year flood hazard area and no impact would occur. No mitigation is required.

h) Place Structures within a 100-year Flood Hazard Area: Less than Significant Impact

i) Expose People or Structures to a Significant Risk Involving Flooding: Less than Significant Impact

As discussed in 4.7-4(g), the project sites are not located within a 100-year flood zone, which are considered to be high risk flood areas. The UCICMC campus is located in an area protected from the 100-year flood by a levee that is subject to possible failure during larger floods, such as the 500-year flood or classification FEMA Zone X (UCIMC 2003, 3.6-2). The 500-year flood has a 0.2 percent annual chance for flooding and is considered to be moderate risk. Therefore, the proposed project would not expose people or structures to significant risk of flooding nor place structures in a 100-year flood hazard area and impacts would be less than significant. No mitigation is required.

j) Seiche, Tsunami, or Mudflow: Less than Significant Impact

The project sites are located approximately 11 miles inland and outside designated tsunami inundation areas[2] along the Pacific Coast, and no large open bodies of water on or near the sites occur that would pose seiche hazards. Furthermore, the site and surrounding areas are relatively flat and existing slopes are landscaped to prevent mudflows that could affect the project sites. Therefore, hazards due to seiche, tsunami, or mudflow would be less than significant. No mitigation is required.

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[1] https://msc.fema.gov/portal/search?AddressQuery=uci%20medical%20center. Accessed September 23, 2015.

[2] http://www.conservation.ca.gov/cgs/geologic_hazards/Tsunami/Inundation_Maps/Orange. Accessed September 23, 2015.

Mitigation Measures

No mitigation measures are required.

4.8 Land Use and Planning

Issues	Potentially Significant Impact	Project Impact Adequately Addressed in LRDP EIR	Less Than Significant with Project-level Mitigation Incorporated	Less Than Significant Impact	No Impact
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 LRDP, general plan, specific plan, local coastal program, or zoning ordinance) adopted for the purpose of avoiding or mitigating an environmental effect?					**X**
c) Conflict with any applicable habitat conservation plan or natural community conservation plan?					**X**

Discussion

Land use and planning issues are discussed in Section 3.7 of the 2002 UCIMC LRDP EIR.

a) Divide an Established Community: No Impact

The project sites are located on the UCIMC, which is surrounded by Urban Mixed Use and Public Institution zoning designations.[1] Adjacent uses for the non-OSHPD chiller plant and associated power generator yard are Building 32 to the west, Building 20 to the north, Building 31 to the east, and Dawn Way to the south. Immediately south of Dawn Way is the non-affiliated Superior Court of Orange County and associated parking structure and the Orange County Juvenile Hall. Surrounding uses for the OSHPD chiller plant and associated power generator

[1] http://gis.cityoforange.org/Maps/WallMaps/Zoning_1000scale.pdf. Accessed August 26, 2015.

yard are Building 54 to the west, Interstate-5 (I-5) to the north and east, and Building 58 to the south. Therefore, because project sites are located on the previously developed UCIMC, the proposed project would not divide the surrounding community and no impact would occur. No mitigation is required.

b) Conflict with an Applicable Land Use Plan: No Impact

As designated in the 2003 UCIMC LRDP, the non-OSHPD chiller plant and associated power generator yard would be located in the South Sector, and the existing OSHPD chiller plant and associated power generator yard are located in the East Sector. Permitted uses within these sectors include service functions. Therefore, the proposed project would not conflict with an applicable land use plan and no impact would occur. No mitigation is required.

c) Conflict with an Applicable Conservation Plan: No Impact

The UCIMC is not located within a designated or proposed Natural Community Conservation Plan (NCCP). Furthermore, development of the proposed project would not conflict with the provisions of a local, regional, or State habitat conservation plan. Therefore, the proposed project would not conflict with a conservation plan and no impact would occur. No mitigation is required.

Mitigation Measures

No mitigation measures are required.

4.9 Noise

Issues	Potentially Significant Impact	Project Impact Adequately Addressed in LRDP EIR	Less Than Significant with Project-level Mitigation Incorporated	Less Than Significant Impact	No Impact
Would the project result in:					
a) Exposure of persons to or generation of noise levels in excess of standards established in any applicable plan or noise ordinance, or applicable standards of other agencies?					**X**
b) Exposure of persons to or generation of excessive groundborne vibration or groundborne noise levels?				**X**	
c) A substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project?			**X**		
d) A substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project?		**X**			
e) For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project expose people residing or working in the project					**X**

area to excessive noise levels?				
f) For a project within the vicinity of a private airstrip, would the project expose people residing or working in the project area to excessive noise levels?				**X**

Discussion

Noise issues are discussed in Section 3.8 of the 2002 UCIMC LRDP EIR.

a) Noise Standards: No Impact

Because UCI is a state agency, there are no quantitative standards applicable to the proposed project. Although the UCIMC is not required to comply with local regulations, construction would be consistent with the City of Orange requirements regarding construction hours (LRDP EIR, 3.8-10). Construction activities would be limited to the hours of 7:00 AM to 8:00 PM Monday through Saturday with construction halted on Sundays and federal holidays. These hours are consistent with Section 8.24, Noise Control, of the City of Orange Municipal Code. Therefore, the proposed project would not exceed noise standards and no impact would occur. No mitigation is required.

b) Groundborne Vibration: Less than Significant Impact

On-site construction activities would be limited and pile driving is not anticipated to be necessary. Additionally, operation of the proposed project would not generate groundborne vibrations nor is it located near vibration-sensitive uses (i.e., historic or fragile buildings). Therefore, impacts due to groundborne vibrations would be less than significant. No mitigation is required.

c) Permanent Ambient Noise: Less than Significant with Project-level Mitigation Incorporated

The proposed project would only require staffing for periodic maintenance, which would not cause a permanent increase in ambient noise related to vehicular traffic. The non-OSHPD project site would be located 100 feet from the Orange County Juvenile Hall property line and its closest building; the OSHPD relocated cooling towers would be approximately 30 feet from the Orange County Juvenile Hall property line and 180 feet to its closest building. Although the UCIMC is a State agency and no noise standards are applicable to the project, the City of Orange's (City) noise standards were used to analyze permanent noise impacts due to the projects proximity to the Orange County Juvenile Hall. The City's exterior noise limits are an hourly L_{eq} of 55 dBA and a maximum of 70 dBA during the daytime, and an hourly L_{eq} of 50 dBA and a maximum of 65 dBA at night. With the relocation of the two existing cooling towers in this project phase, the noise level would be approximately 65 dBA at the Orange County Juvenile Hall property line and 55

dBA at the nearest Orange County Juvenile Hall building. Interior noise levels would be approximately 20 dBA lower at 35 dBA. When all four maximum units are installed at a future date to achieve Long Range Development Plan (LRDP) buildout, noise levels would increase by approximately 3 dBA.[1] The relocation of the cooling towers may result in an increased ambient noise level above the City standard. Therefore, a qualified acoustical expert would be obtained during the design phase to determine appropriate sound barriers necessary to reduce ambient noise levels. With implementation of mitigation measure NO-1, potential impacts to the Orange County Juvenile Hall would be reduced to a less than significant level.

d) Temporary Ambient Noise: Project Impact Adequately Addressed in LRDP EIR

Because the proposed project would involve limited grading, construction related noise is not anticipated to be audible beyond the immediate area. Specialized construction activities that generate unusually loud and repetitive noise such as pile driving would not be required; however, a range of truck types would be required to transport machinery, supplies, and remove waste materials on- and off-site during the project's various construction stages.

The non-OSHPD project site would be located 100 feet from the Orange County Juvenile Hall property line and its closest building; the OSHPD relocated cooling towers would be approximately 30 feet from the Orange County Juvenile Hall property line and 180 feet to its closest building. Because this facility is considered a residential use, noise during construction may cause significant yet temporary short-term noise increases. However, with adherence to Section 8.24, Noise Control, of the City of Orange Municipal Code and implementation of LRDP EIR MM 3.8-1(a) through MM 3.8-1(d), impacts due to temporary increased noise would be reduced to a less than significant level.

e) Public Airport Noise: No Impact

The project site is located approximately seven miles southeast and north of the Fullerton Municipal and John Wayne Airports, respectively. Therefore, the proposed project would not be subject to aircraft noise in excess of regulatory limits and no impact would occur. No mitigation is required.

f) Private Airport Noise: No Impact

There are no private airstrips in the vicinity of the UCIMC. Therefore, the proposed project would not be subject to excessive noise levels due to a private airport and no impact would occur. No mitigation is required.

Mitigation Measures

[1] Correspondence with Matt Jones, Lundrum & Brown, December 17, 2015.

3.8-1(a): All construction equipment shall be equipped with improved noise muffling and have the manufacturer's recommended noise abatement measures, such as mufflers, engine covers, and engine vibration isolators in good working order.

3.8-1(b): To the maximum extent feasible, hydraulic equipment (instead of pneumatic impact tools) and electric power tools (instead of diesel powered equipment) shall be used for all exterior construction work.

3.8-1(c): Maintaining equipment in an idling mode shall be minimized. All equipment shall be turned off if not in use.

3.8-1(d): A noise barrier 8 to 10 feet in height shall be provided at the project site perimeter, where construction would be adjacent to onsite or offsite sensitive receptors, that will break the line-of-sight between construction equipment and noise receptors, where feasible.

NO-1: Construction documents shall be reviewed prior to completion by a qualified acoustical expert to determine if the City of Orange Noise Standards shall be achieved or can be met with sound barriers or other mitigation. Outdoor areas where noise barriers cannot provide enough reduction to achieve the standard should be relocated, if feasible. Areas that shall require sound barriers should have detailed noise studies prepared by a qualified acoustical expert to show the location and height of the noise barrier required to meet the standard.

4.10 Population and Housing

Issues	Potentially Significant Impact	Project Impact Adequately Addressed in LRDP EIR	Less Than Significant with Project-level Mitigation Incorporated	Less Than Significant Impact	No Impact
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**

Discussion

Population and housing issues are discussed in Section 3.9 of the 2002 UCIMC LRDP EIR.

a) Induce Substantial Population Growth: No Impact

Because the proposed project would not construct housing nor result in the hiring of additional UCIMC employees, it would not directly induce population growth. Furthermore, the proposed project would serve only the UCIMC and would not indirectly induce population growth in the surrounding communities. Therefore, the proposed project would not induce population growth and no impact would occur. No mitigation is required.

b) Displace Existing Housing: No Impact

c) Displace a Substantial Number of People: No Impact

The proposed project would be installed on the UCIMC. Neither existing housing nor people would be displaced as a result of the proposed project and no impact would occur. No mitigation is required.

Mitigation Measures

No mitigation measures are required.

4.11 Public Services

Issues	Potentially Significant Impact	Project Impact Adequately Addressed in LRDP EIR	Less Than Significant with Project-level Mitigation Incorporated	Less Than Significant Impact	No Impact
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**

Discussion

Public services issues are discussed in Section 3.10 of the 2002 UCIMC LRDP EIR.

a) Fire Protection: Less than Significant Impact

b) Police Protection: Less than Significant Impact

The proposed project would be operated and maintained by existing on-site staff and would neither directly or indirectly induce population growth. Because population would not increase, a substantial increase in the number of fire or police calls during project operation that would affect response times are not anticipated. Furthermore, the UCI Fire Marshal would review the project plans to ensure adequate emergency access and fire prevention in accordance with California building and fire codes. Therefore, impacts to fire and police protection services would be less than significant. No mitigation is required.

c) Schools: No Impact

The proposed project would not induce population growth directly or indirectly that would result in an increased demand on school facilities. Therefore, no impacts with respect to substantial adverse physical impacts associated with the provision of new or physically altered schools would occur. No mitigation is required.

d) Parks: No Impact

The proposed project would not induce population growth, which would trigger demand for new parks or affect the level of usage of any existing parks. Therefore, the proposed project would not affect parks and no impact would occur. No mitigation is required.

e) Other Public Facilities: No Impact

The proposed project would not induce population growth, which would result in an increased demand or physical alterations to public facilities. Therefore, the proposed project would not result in a substantial adverse physical impact for other public facilities and no impact would occur. No mitigation is required.

Mitigation Measures

No mitigation measures are required.

4.12 Transportation and Traffic

Issues	Potentially Significant Impact	Project Impact Adequately Addressed in LRDP EIR	Less Than Significant with Project-level Mitigation Incorporated	Less Than Significant Impact	No Impact
Would the project:					
a) Conflict with an applicable plan, ordinance or policy establishing measures of effectiveness for the performance of the circulation system, taking into account all modes of transportation including mass transit and non-motorized travel and relevant components of the circulation system, including but not limited to intersections, streets, highways and freeways, pedestrian and bicycle paths, and mass transit?					**X**
b) Conflict with an applicable congestion management program, including, but not limited to level of service standards and travel demand measures, or other standards established by the county congestion management agency for designated roads or highways?					**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**

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) Result in inadequate emergency access?			**X**
f) Conflict with adopted policies plans or programs regarding public transit, bicycle, or pedestrian facilities, or otherwise decrease the performance or safety of such facilities?			**X**

Discussion

Transportation and traffic issues are discussed in Section 3.11 of the 2003 UCIMC LRDP EIR. This analysis is based on the traffic study prepared by Austin-Foust Associates, Inc. (now Stantec Consulting Services, Inc.) in 2002. In addition, a 2015 project-level analysis was prepared by Stantec Consulting Services, Inc. (Appendix C).

a) Performance of the Circulation System: No Impact

The proposed project would not increase the number of existing faculty, staff, or patients on the UCIMC. Generation of new vehicle trips or changes in existing traffic patterns are not anticipated. Due to the size of the project, traffic generated during construction would be minimal, temporary in nature, and would not significantly affect surrounding roadways.

The project sites on the UCIMC currently contain existing structures. Construction of the proposed project would not change pedestrian patterns, and no bicycle paths are located on the UCIMC. Therefore, the proposed project would not conflict with a plan, ordinance, or policy regarding circulation system performance and no impact would occur. No mitigation is required.

b) Conflict with Congestion Management Program: No Impact

A Congestion Management Program (CMP) analysis is required when a project would generate 2,400 average daily or 200 peak hour trips. As discussed in 4.14(a), the project is not anticipated to generate new vehicle trips. The proposed project would not affect CMP intersections nor meet the trip threshold, and an assessment of impacts under CMP guidelines is not required. Therefore, the proposed project would not conflict with the CMP and no impact would occur. No mitigation is required.

c) Air Traffic Patterns: No Impact

The project site is located approximately seven miles north of the nearest airport, John Wayne. Therefore, due to distance, the proposed project would not affect air traffic patterns and no impact would occur. No mitigation is required.

d) Hazards Due to a Design Feature: No Impact

The proposed project would not include construction of a new roadway, intersection improvement, or other access routes, and potential hazards due to a design feature are not anticipated. Construction traffic would access the project sites from Dawn Way and the existing service road located on-site. Staging would occur adjacent to the project sites. Therefore, the proposed project would not create hazards or incompatible uses and no impact would occur. No mitigation is required.

e) Inadequate Emergency Access: No Impact

As discussed in 4.14(d), construction traffic would access the project site from Dawn Way via the The City Drive intersection, and is not anticipated to interfere with vehicle movement or emergency access. Construction activities, including staging, would occur adjacent to the project sites within the service areas of the UCIMC. Therefore, the proposed project would not cause inadequate emergency access and no impact would occur. No mitigation is required.

f) Public Transit, Bicycle, or Pedestrian Facilities: No Impact

As discussed in 4.14(a), none of these facilities are located on the UCIMC. Because operation of the project would not require full-time staffing, public transit service would not be needed nor would existing services in proximity be affected. Therefore, the proposed project would not conflict with plans or policies regarding public transit, bicycle, or pedestrian facilities and no impact would occur. No mitigation is required.

Mitigation Measures

No mitigation measures are required.

4.13 Utilities and Service Systems

Issues	Potentially Significant Impact	Project Impact Adequately Addressed in LRDP EIR	Less Than Significant with Project-level Mitigation Incorporated	Less Than Significant Impact	No Impact
Would the project:					
a) Exceed wastewater treatment requirements of the applicable Regional Water Quality Control Board?					**X**
b) Require or result in the construction of new water or wastewater treatment facilities or expansion of existing facilities, the construction of which could cause significant environmental effects?				**X**	
c) Require or result in the construction of new storm water 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 wastewater treatment provider, which serves or may serve the project that it has adequate capacity to serve the project's projected demand in addition to the provider's existing commitments?		**X**	
f) Be served by a landfill with sufficient permitted capacity to accommodate the project's solid waste disposal needs?		**X**	
g) Comply with applicable federal, state, and local statutes and regulations related to solid waste?			**X**

Discussion

Utilities and service systems issues are discussed in Section 3.12 of the 2002 UCIMC LRDP EIR.

a) Regional Water Quality Control Board Wastewater Treatment Requirements: No Impact

Wastewater discharged into stormwater runoff and drainage facilities is regulated through Regional Water Quality Control Board (RWQCB) by requiring projects to obtain a MS4 permit. In compliance with the permit, the proposed project would include a Water Quality Management Plan (WQMP) and best management practices (BMPs) within the Stormwater Pollution Prevention Plan (SWPPP) for treating discharged water and minimizing water pollution. Therefore, the proposed project would not exceed wastewater treatment requirements and no impact would occur. No mitigation is required.

b) Construction of New Water or Wastewater Treatment Facilities or Expansion of Existing Facilities: Less than Significant Impact

UCIMC receives domestic water supply from the City of Orange Water District through multiple service connections along Chapman Avenue, The City Drive South, and Dawn Way. The City has a number of existing domestic water supply pipelines surrounding UCIMC, including a 16-inch line in Chapman Avenue, an 8-inch line in The City Drive South, and a 12-inch line in Dawn Way (GHD, 2015). In order to serve the new non-OSHPD chiller plant, the domestic water system would be expanded to include an 8-inch loop from the existing 14-inch pipeline along

with a new fire hydrant. However, the project sites have been previously graded and minimal excavation would occur to construct the utility connections. Therefore, impacts due to expansion of water facilities would be less than significant. No mitigation is required.

c) Stormwater Drainage Facilities: No Impact

As discussed in Section 4.7 Hydrology and Water Quality, the UCIMC has been previously developed with impervious surfaces with limited landscaping and would not result in the generation of substantially more stormwater on the project site than the baseline condition (LRDP EIR, 3.6-7). Furthermore, the stormwater drainage has been evaluated with proposed underground detention vaults as part of the LRDP EIR buildout. However, in consultation with Orange County Flood Control, the vaults may not be required to mitigate the peak discharge rate. Although drainage facilities may be constructed at a later date, these impacts would be evaluated on a project by project basis. Therefore, the proposed project would not require the construction of stormwater facilities and no impact would occur. No mitigation is required.

d) Water Supplies: Less than Significant Impact

The UCIMC is located within the service area of the City of Orange Water District. As discussed in the LRDP EIR, the City of Orange Water District evaluated full buildout and indicated that it would increase overall demand for water services. However, the City of Orange Water District, Orange County Water District, and Metropolitan Water District indicated that there was adequate water supplies to serve the LRDP EIR buildout (LRDP EIR, 3.12-4). Furthermore, the City of Orange Water District has developed an Urban Water Management Plan (UWMP) that projects water supply availability and demand through 2035.[1] The UWMP indicates that the City is capable of meeting water demands for customers through normal, single dry, and multiple dry years. Therefore, the proposed project would have sufficient water supply and impacts would be less than significant. No mitigation is required.

e) Wastewater Capacity: Less than Significant Impact

The UCIMC existing onsite infrastructure was found to be capable to support LRDP EIR buildout. Onsite improvements, as projects occur, would be necessary to connect utility services to structures (LRDP EIR 3.12-6).

Flow would be added to the east trunk wastewater system with the construction of the non-OSHPD chiller plant and the OSHPD chiller plant expansion. New 12-inch diameter pipes would be installed to connect the wastewater system to the project site to increase capacity. Therefore, impacts to wastewater capacity would be less than significant. No mitigation is required.

f) Landfill Capacity: Less than Significant Impact

[1] http://www.cityoforange.org/civicax/filebank/blobdload.aspx?blobid=9704. Accessed October 15, 2015.

The proposed project solid waste would be transported to one of the County of Orange Waste and Recycling landfills. At full buildout of the LRDP EIR, the County of Orange Waste and Recycling indicated that there is enough capacity in the landfill system to serve the proposed project (LRDP EIR, 3.12-15). Furthermore, the project would comply with the University of California Policy on Sustainable Practices, which includes the goal of diverting 75 percent of solid waste from landfills. Therefore, impacts to local landfill capacity would be less than significant. No mitigation is required.

g) Solid Waste Regulations: No Impact

Because the UCIMC is a Large Quantity Generator of medical waste, it is regulated by the County of Orange Health Care Agency, Environmental Health Division. Solid waste generation and disposal procedures are currently in place and approved by the County (LRDP EIR, 3.12-15). Therefore, the proposed project would comply with applicable federal, State, and local regulations regarding solid waste and no impact would occur. No mitigation is required.

Mitigation Measures

No mitigation measures required.

4.14 Mandatory Findings of Significance

Issues	Potentially Significant Impact	Project Impact Adequately Addressed in LRDP EIR	Less Than Significant with Project-level Mitigation Incorporated	Less Than Significant Impact	No Impact
a) Does the project have the potential to degrade the quality of the environment, substantially reduce the habitat of a fish or wildlife species, cause a fish or wildlife population to drop below self-sustaining levels, threaten to eliminate a plant or animal community, substantially reduce the number or restrict the range of a rare or endangered plant or animal or eliminate important examples of the major periods of California history or prehistory?				**X**	
b) Does the project have impacts that are individually limited, but cumulatively considerable? ("Cumulatively considerable" means that the incremental effects of a project are significant when viewed in connection with the effects of past projects, the effects of other current projects, and the effects of past, present, and probably future projects?)				**X**	

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

Discussion

a) Degrade the Environment, Reduce Habitat or Wildlife Populations, Eliminate Examples of California History: Less than Significant Impact

The proposed project would occur on a previously developed and urban site with only ornamental vegetation. No significant environmental impacts were identified in the responses to the thresholds regarding project effects organized under the preceding 13 topics. Thresholds were found to be less than significant with mitigation, less than significant, or no impact.

b) Cumulatively Considerable Impacts: Less Than Significant Impact

Long-term environmental consequences resulting from the cumulative effect of completing UCIMC development through implementation of the 2003 UCIMC LRDP were thoroughly evaluated in the 2002 LRDP EIR. As discussed in the project description, the project is consistent with the LRDP land use policies. No new or increased severity of impacts beyond what was anticipated in the 2002 LRDP EIR have been identified as a result of the analysis completed for this Initial Study. As discussed in Sections 4.1 through 4.13, project level impacts have been determined to be less than significant, no impact, or mitigated to a level considered less than significant. The project would not result in cumulatively considerable impacts.

c) Direct or Indirect Effects on Humans: Less Than Significant Impact

As discussed in Sections 4.1 through 4.13, no significant impacts on human beings have been identified in this Initial Study. Short-term adverse impacts involving the project's installation would be less than significant with the incorporation and implementation of the identified routine control measures set forth in the LRDP EIR and project-specific mitigation measures. Therefore, the project would not have environmental effects on human beings, either directly or indirectly.

5.0 PREPARERS

Office of Environmental Planning and Sustainability
University of California, Irvine

Richard Demerjian, Director
Lindsey Hashimoto, Associate Planner

Lundrum & Brown

Matthew B. Jones, P.E., Project Manager

Stantec Consulting Services, Inc.

Daryl Zerfass, P.E., P.T.P., Project Manager
Cathy Lawrence, P.E., Transportation Engineer

APPENDIX A

Air Quality Assessment

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Air Quality Assessment For:
UCI Medical Center Energy Plant Expansion

Prepared For:

University of California, Irvine
Environmental Planning and Sustainability
380 University Tower
Irvine, CA 92697-2325

Prepared By:

Landrum & Brown
Matthew B. Jones P.E.
19700 Fairchild, Suite 230
Irvine, CA 92618
949•349•0671

December 17, 2015
Report #559701AQ200

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1.0 Introduction

This report analyzes the potential air quality impacts associated with expansion of the UCI Medical Center's Energy Plant. Regional air quality impacts from construction and operation of the proposed project are analyzed, as are potential local air quality impacts. Section 1.1 presents a detailed description of the proposed project.

Existing air quality conditions are presented in Section 2.0. Existing land uses in the immediate vicinity of the project sites that are considered sensitive to air quality are presented in Section 2.1. The structure and agencies responsible for regulating air quality are presented in Section. 2.2. Section 2.3 describes the criteria air pollutants and their health effects and presents the state and federal ambient air quality standards (AAQS). The California Air Resources Board (CARB) and U.S. Environmental Protection Agency (EPA) establish the AAQS and designate areas as being in attainment if measured pollutant concentrations are less than the standards. Areas where concentrations exceed the AAQS are designated as non-attainment and are required to prepare plans to reduce pollution levels to below the standards. State and federal AAQS attainment designations for the South Coast Air Basin (SCAB) are discussed in Section 2.4 and the plans to attain the AAQS are discussed in Section 2.5. Air quality and climate are intimately related and the climate of the SCAB is discussed in Section. 2.6. Monitored air quality in the vicinity of the project is presented in Section 2.7.

Potential air quality impacts from the proposed project are assessed in Section 3.0. The thresholds used to determine the significance of the project's emissions are presented in Section 3.1. Short-term impacts from pollutant emissions generated during construction of the project are presented in Section3.2. Long-term impacts from pollutant emissions during operation of the project are presented in Section 3.3. Section 3.4 discusses the project's compliance with local air quality planning. Mitigation measures to reduce the project's air quality impacts are presented in Section 4.0.

1.1 Project Description

The overall project site is the UCI Medical Center campus located south of Chapman Avenue, north of Dawn Way, east of The City Drive, and west of the Santa Ana (I-5) Freeway. Note that the triangle parking lot north of Chapman Avenue bound by The City Drive and the Santa Ana (I-5) Freeway is also part of the campus. Figure 1 presents a vicinity map showing the project location and Figure 2 shows an aerial photograph of primary Medical Center Campus with the location of the areas affected by the project indicated.

The project proposes the expansion of UCI Medical Center's Energy Plant through the addition and replacement of chiller units with associated cooling towers as well as the addition of diesel emergency generators. The energy plant functions that serve the hospital portions of the campus (Buildings 1A and 3 and a future 300,000 square foot ancillary building) are regulated by the California Office of Statewide Health Planning and Development (OSHPD) while those that serve the non-hospital portions of the campus are not. This results in the project having two components, the OSHPD Plant and the Non-OSHPD plant. The OSHPD Plant portion of the

project is located along the eastern boundary of the Medical Center Campus, along I-5, near the southeast corner of the campus as shown on Figure 2. The Non-OSHPD Plant portion of the project is located near the middle southern boundary of the campus.

The existing OSHPD plant includes 2,250 tons of chillers and an existing 2,250-ton cooling tower. The OSHPD Plant project proposes the removal of and existing 250-ton chiller and the addition of a 1,000-ton chiller in a pre-engineered module that has the capability of adding a second 1,000-ton chiller. A new 3,000-ton cooling tower will be installed to replace the existing 2,250-ton cooling tower. This modular cooling tower will ultimately be equipped to provide 4,000 tons of cooling at buildout of the Medical Center's Long Range Development Plan. The OSHPD Plant project also includes the installation of a 1,500 kW diesel generator. This generator will be tested for 30 minutes approximately every 40 days. Figure 3 shows an aerial photo with the boundary of the OSHPD Plant project indicated and Figure 4 shows the proposed site plan.

The Non-OSHPD Plant portion of the project proposes the addition of 4,000-ton chiller plant in an 8,000 square foot two story building. A new 1,000-ton modular cooling tower will be installed that can be upgraded to ultimately provide 4,000 tons of cooling for the Non-OSHPD chiller plant at buildout of the Medical Center's Long Range Development Plan. In addition, four 2,000 kW diesel emergency generators will be installed. Initially, only a single generator will be installed. The remaining generators will be installed as the Long Range Development Plan is completed. These generators will be tested for 30 minutes approximately every 40 days. Figure 5 shows an aerial photo with the boundary of the Non-OSHPD Plant portion of the project indicated and Figure 6 shows the proposed site plan.

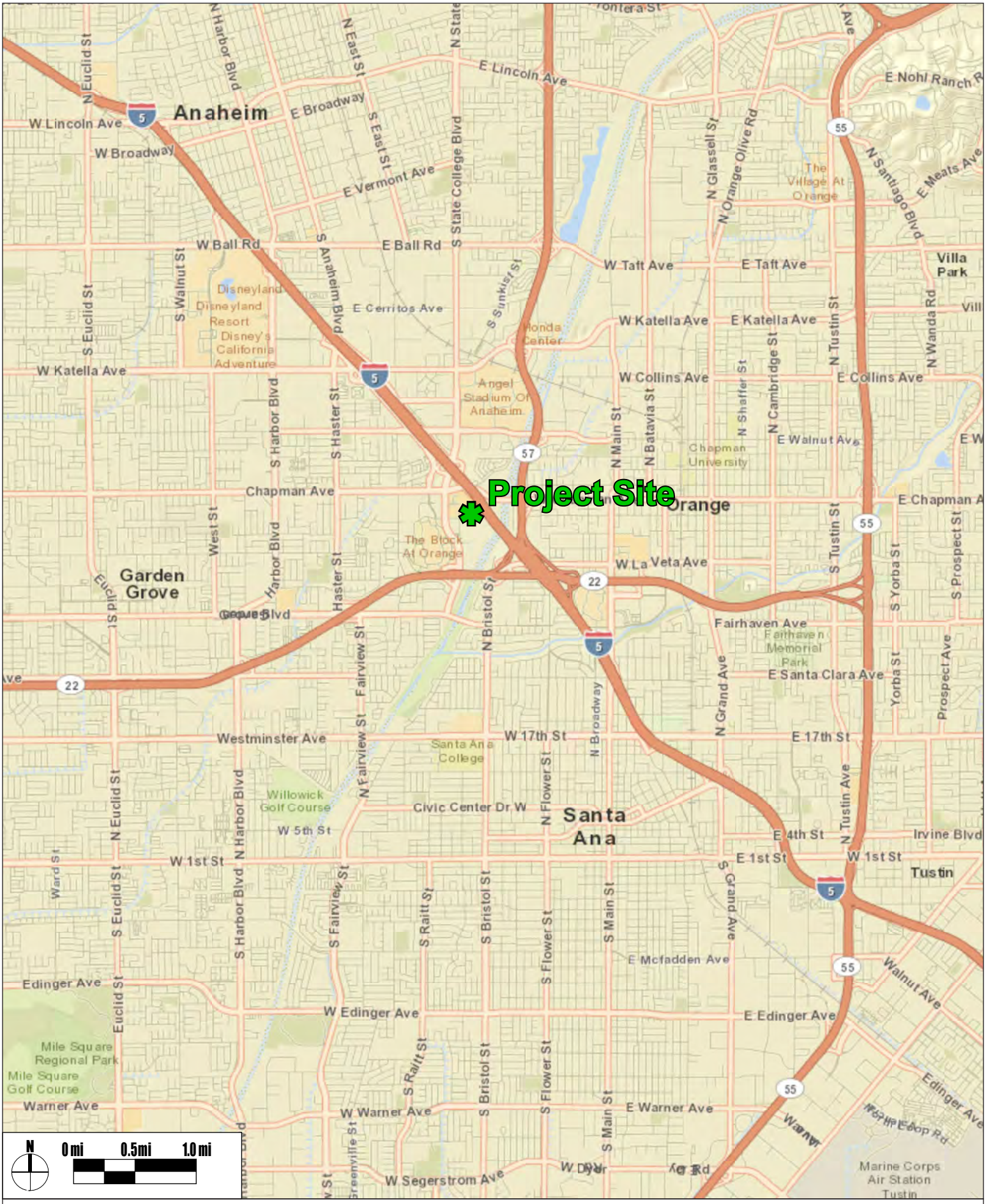

Figure 1
Vicinity Map

UCI Medical Center Energy Plant Expansion

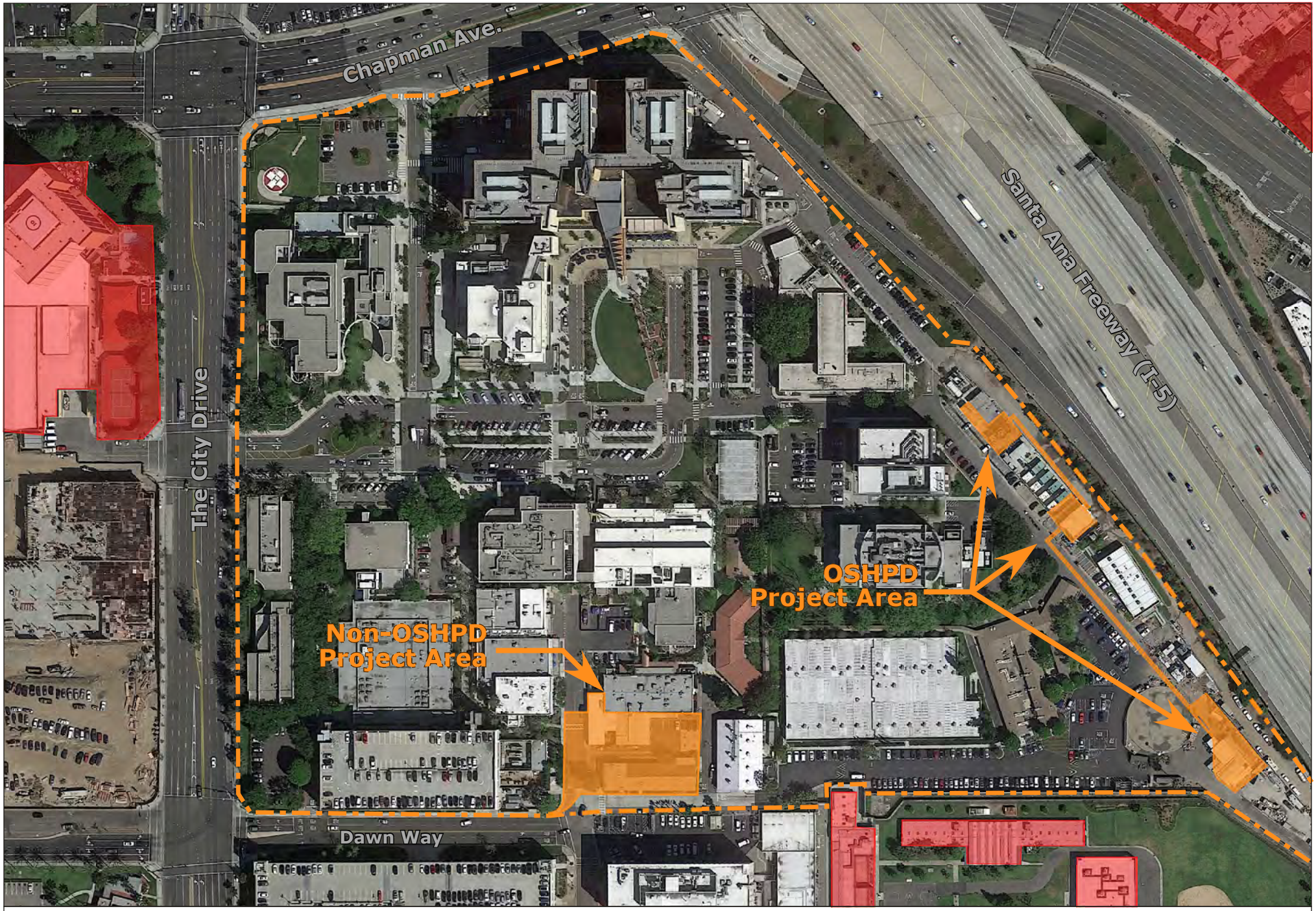

Figure 2
Project Areas

UCI Medical Center Energy Plant Expansion

0' 30' 60'

Project Site

Figure 3
OSHPD Project Boundaries
UCI Medical Center Energy Plant Expansion

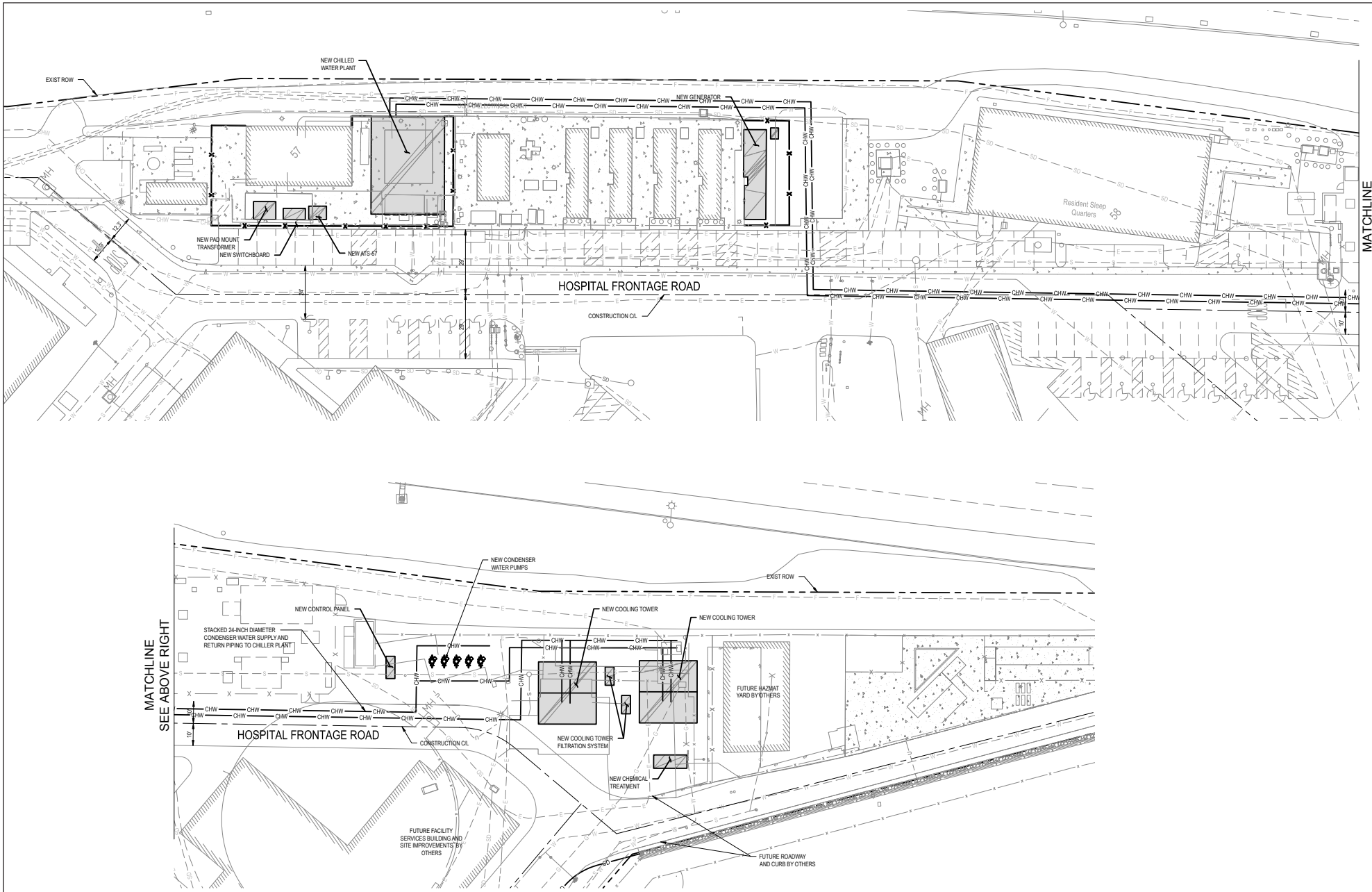

Figure 4
OSHPD Site Plan

UCI Medical Center Energy Plant Expansion

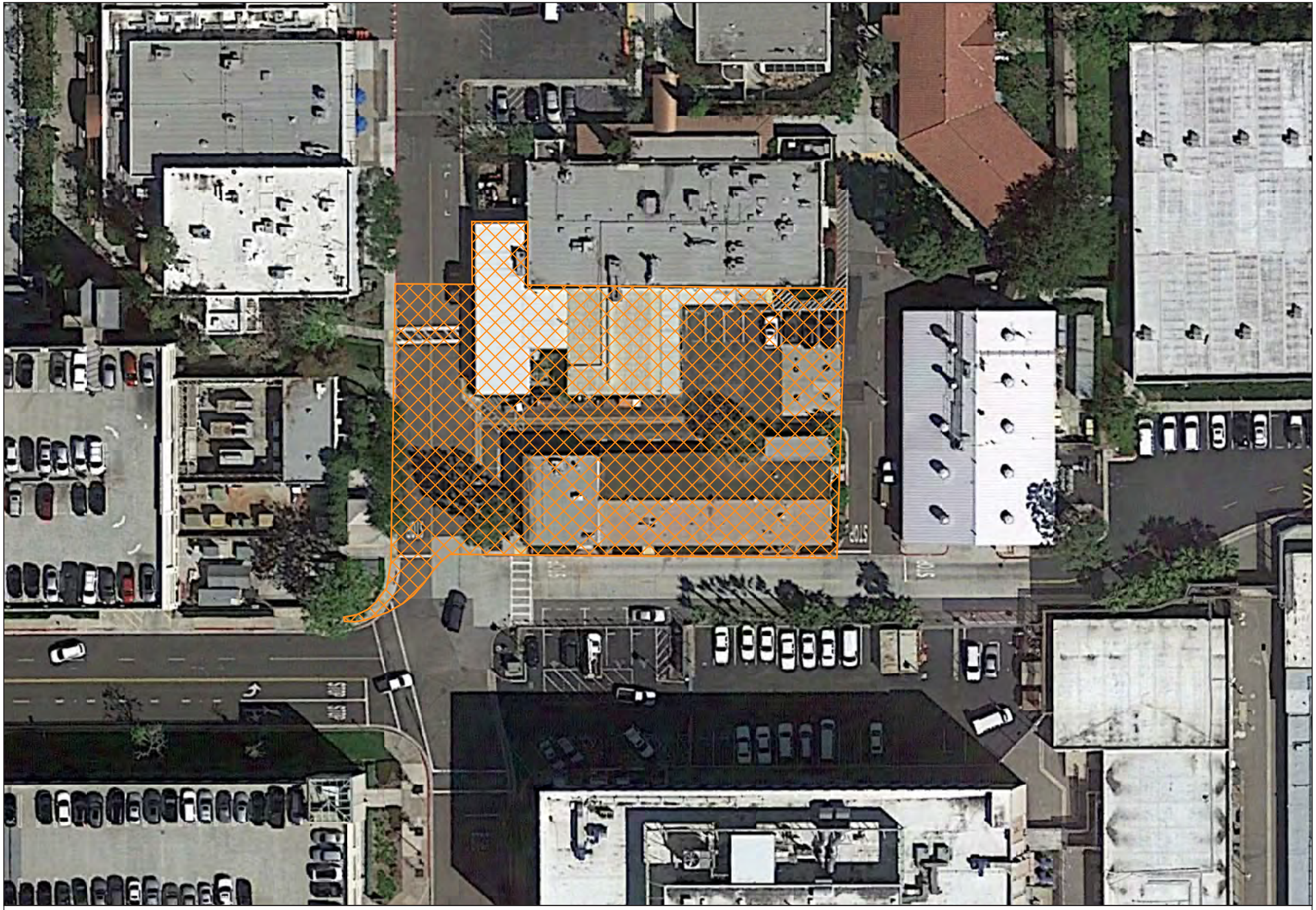

Figure 5
Non-OSHPD Project Boundaries
UCI Medical Center Energy Plant Expansion

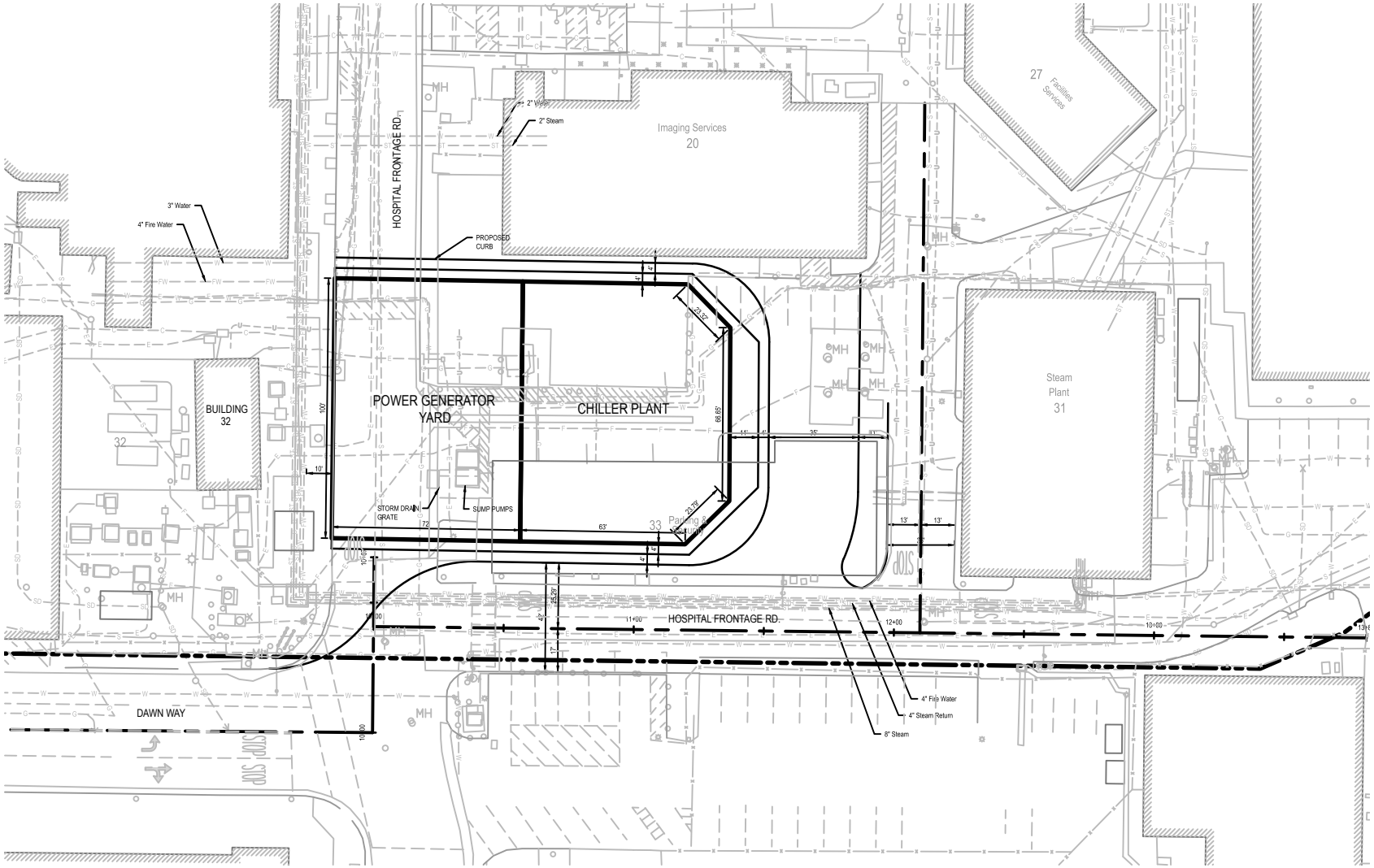

Figure 6
Non-OSHPD Site Plan

UCI Medical Center Energy Plant Expansion

2.0 Existing Conditions

2.1 Sensitive Land Uses

The OSHPD Plant is located along the eastern boundary of the Medical Center and the Santa Ana Freeway (I-5). There are Medical Center Offices located to the west of the OSHPD Plant. The residential uses closest to the project are indicated in Figure 2. The nearest residential uses are located across the Freeway and Chapman Avenue, approximately 800 feet from the OSHPD Plant site. Orange County Juvenile Hall is located directly south Medical Center. The Juvenile Hall property line is located approximately 30 feet from the southernmost portion of the OSHPD Plant site and the nearest Juvenile Hall building is located approximately 180 feet from the site.

The Non-OSHPD Plant is located near the center of the southern boundary of the Medical Center. There are office buildings surrounding the site. Orange County Juvenile Hall is located just southeast of the Non-OSHPD Plant Site. The Juvenile Hall property line and nearest building are located approximately 100 feet from the Non-OSHPD Plant site. There is also a hotel located across The City Drive, approximately 800 feet from the Non-OSHPD Plant site.

2.2 Local, State, and Federal Air Quality Agencies

The Environmental Protection Agency (EPA) is the primary federal agency for regulating air quality. The EPA implements the provisions of the Federal Clean Air Act (FCAA). This Act establishes National Ambient Air Quality Standards (NAAQS) that are applicable nationwide. The EPA designates areas with pollutant concentrations that do not meet the NAAQS as non-attainment areas for each criteria pollutant. States are required by the FCAA to prepare State Implementation Plans (SIP) for designated non-attainment areas. The SIP is required to demonstrate how the areas will attain the NAAQS by the prescribed deadlines and what measures will be required to attain the standards. The EPA also oversees implementation of the prescribed measures. Areas that achieve the NAAQS after a non-attainment designation are redesignated as maintenance areas and must have approved Maintenance Plans to ensure continued attainment of the NAAQS. In addition, the EPA sets national vehicle and stationary source emission standards as well as providing research and guidance for air pollution programs.

The California Air Resources Board (CARB) was established in 1967 by the California legislature to attain and maintain healthy air quality, conduct research into the causes and solutions to air pollution, and systematically address the serious problem caused by motor vehicles, which are the major causes of air pollution in the State. CARB sets and enforces emission standards for motor vehicles, fuels, and consumer products in the state of California. It sets the health based California Ambient Air Quality Standards (CAAQS) and monitors air quality levels throughout the state. CARB identifies and sets control measures for toxic air contaminants, performs air quality related research, provides compliance assistance for businesses, and produces education and outreach programs and materials. CARB is also responsible for compiling the SIP for submission to the EPA. Components of the SIP are prepared by local air polluting control districts in coordination with CARB.

California is divided into 15 Air Basins to better manage air pollution. Air basin boundaries define areas with similar geographical and meteorological features as well as political boundaries. While air pollution can move freely within an air basin, it can also sometimes be transported from one basin to another. The proposed project is located in the South Coast Air Basin (SCAB). The SCAB is comprised of parts of Los Angeles, Riverside, and San Bernardino counties and all of Orange County. The Basin is bounded on the west by the Pacific Ocean and surrounded on the other sides by mountains. To the north lie the San Gabriel Mountains, to the north and east the San Bernardino Mountains, to the southeast the San Jacinto Mountains and to the south the Santa Ana Mountains. The Basin forms a low plain and the mountains channel and confine airflow that trap air pollutants.

The State has established 35 air pollution control districts to set and enforce regulations to control pollutant emissions from local pollution sources within their jurisdictions. The air district responsible for the SCAB is the South Coast Air Quality Management District (SCAQMD). The local air districts are responsible for preparing the portion of the SIP applicable within their boundaries. The districts also adopt and enforce regulations for stationary sources as well as develop and implement indirect source and transportation control measures.

The Southern California Association of Governments (SCAG) is an important partner to the SCAQMD, as it is the designated metropolitan planning authority for the area. SCAG is responsible for preparing the portion of the SIP that relates to transportation control measures (TCM) as well as providing land use and population projections. TCM are intended to reduce and improve vehicular travel and associated pollutant emissions.

The California Clean Air Act (CCAA) required all air pollution control districts in the state to prepare a plan prior to December 31, 1994 to reduce pollutant concentrations exceeding the CAAQS and ultimately achieve the CAAQS. The districts are required to review and revise these plans every three years. The SCAQMD satisfies this requirement through the publication of an Air Quality Management Plan (AQMP). The AQMP is developed by SCAQMD and SCAG in coordination with local governments and the private sector. The AQMP is incorporated into the SIP by CARB to satisfy the FCAA requirements discussed above. The AQMP is discussed further in Section 2.5.

2.3 Criteria Pollutants, Health Effects and Standards

Under the Federal Clean Air Act (FCAA), the U.S. EPA has established National Ambient Air Quality Standards (NAAQS) for six major pollutants; ozone (O_3), respirable particulate matter (PM_{10}), fine particulate matter ($PM_{2.5}$), carbon monoxide (CO), nitrogen dioxide (NO_2), sulfur dioxide (SO_2), and lead. These six air pollutants are often referred to as the criteria pollutants. The NAAQS are two tiered: primary, to protect public health, and secondary, to prevent degradation to the environment (i.e., impairment of visibility, damage to vegetation and property).

Under the California Clean Air Act (CCAA), the California Air Resources Board has established California Ambient Air Quality Standards (CAAQS) to protect the health and welfare of Californians. State standards have been established for the six

criteria pollutants as well as four additional pollutants; visibility reducing particles, sulfates, hydrogen sulfide, and vinyl chloride.

Table 1 presents the state and national ambient air quality standards. A brief explanation of each pollutant and their health effects is presented below.

Table 1
Ambient Air Quality Standards

Pollutant	Averaging Time	State Standards[1,3]	Federal Standards[2] Primary[3,4]	Federal Standards[2] Secondary[3,5]
Ozone (O_3)	1 Hour	0.09 ppm (180 µg/m^3)	--	--
	8 Hour	0.070 ppm (137 µg/m^3)	0.075 ppm (147 µg/m^3)	Same as Primary
Respirable Particulate Matter (PM_{10})[6]	24 Hour	50 µg/m^3	150 µg/m^3	Same as Primary
	AAM[12]	20 µg/m^3	--	Same as Primary
Fine Particulate Matter ($PM_{2.5}$)[6]	24 Hour	--	35 µg/m^3	Same as Primary
	AAM[12]	12 µg/m^3	12.0 µg/m^3	Same as Primary
Carbon Monoxide (CO)	1 Hour	20 ppm (23 mg/m^3)	35 ppm (40 mg/m^3)	None
	8 Hour	9.0 ppm (10 mg/m^3)	9 ppm (10 mg/m^3)	None
	8 Hour (Lake Tahoe)	6 ppm (7 mg/m^3)	--	--
Nitrogen Dioxide (NO_2)[7]	1 Hour	0.18 ppm (338 µg/m^3)	100 ppb (196 µg/m^3)	--
	AAM[12]	0.030 ppm (56 µg/m^3)	0.053 ppb (100 µg/m^3)	Same as Primary
Sulfur Dioxide (SO_2)[8]	1 Hour	0.25 ppm (655 µg/m^3)	75 ppb (196 µg/m^3)	--
	3 Hour	--	--	0.5 ppm (1,300 µg/m^3)
	24 Hour	0.04 ppm (105 µg/m^3)	0.14 ppm (365 µg/m^3)	--
	AAM[12]	--	0.030 ppm (80 µg/m^3)	--
Lead[9, 10]	30 day Avg.	1.5 µg/m^3	--	--
	Calendar Quarter		0.15 µg/m^3	
	Rolling 3-Month Average	--	0.15 µg/m^3	Same as Primary
Visibility Reducing Particles[11]	8 hour	Extinction coefficient of 0.23 per km -- visibility ≥ 10 miles (0.07 per km -- ≥30 miles for Lake Tahoe)	**No Federal Standards**	
Sulfates	24 Hour	25 µg/m^3		
Hydrogen Sulfide	1 Hour	0.03 ppm (42 µg/m^3)		
Vinyl Chloride[9]	24 Hour	0.01 ppm (26 µg/m^3)		

(Notes Presented on Next Page)

Table 1 (Continued)
Ambient Air Quality Standards

1. California standards for ozone, carbon monoxide (except Lake Tahoe), sulfur dioxide (1 and 24 hour), nitrogen dioxide, PM10, PM2.5, and visibility reducing particles, are values that are not to be exceeded. All others are not to be equaled or exceeded. California ambient air quality standards are listed in the Table of Standards in Section 70200 of Title 17 of the California Code of Regulations.
2. National standards (other than ozone, PM10, PM2.5, and those based on annual averages or annual arithmetic mean) are not to be exceeded more than once a year. The ozone standard is attained when the fourth highest eight-hour concentration in a year, averaged over three years, is equal to or less than the standard. For PM10, the 24-hour standard is attained when the expected number of days per calendar year with a 24-hour average concentration above 150 µg/m3 is equal to or less than one. For PM2.5, the 24-hour standard is attained when 98 percent of the daily concentrations, averaged over three years, are equal to or less than the standard. Contact EPA for further clarification and current federal policies.
3. Concentration expressed first in units in which it was promulgated. Equivalent units given in parentheses are based upon a reference temperature of 25° C and a reference pressure of 760 torr. Most measurements of air quality are to be corrected to a reference temperature of 25° C and a reference pressure of 760 torr; ppm in this table refers to ppm by volume, or micromoles of pollutant per mole of gas.
4. National Primary Standards: The levels of air quality necessary, with an adequate margin of safety to protect the public health.
5. National Secondary Standards: The levels of air quality necessary to protect the public welfare from any known or anticipated adverse effects of a pollutant.
6. On December 14, 2012, the national annual PM2.5 primary standard was lowered from 15 µg/m3 to 12.0 µg/m3. The existing national 24-hour PM2.5 standards (primary and secondary) were retained at 35 µg/m3, as was the annual secondary standard of 15 µg/m3. The existing 24-hour PM10 standards (primary and secondary) of 150 µg/m3 also were retained. The form of the annual primary and secondary standards is the annual mean, averaged over 3 years.
7. To attain the 1-hour national standard, the 3-year average of the annual 98th percentile of the 1-hour daily maximum concentrations at each site must not exceed 100 ppb. Note that the national 1-hour standard is in units of parts per billion (ppb). California standards are in units of parts per million (ppm). To directly compare the national 1-hour standard to the California standards the units can be converted from ppb to ppm. In this case, the national standard of 100 ppb is identical to 0.100 ppm.
8. On June 2, 2010, a new 1-hour SO_2 standard was established and the existing 24-hour and annual primary standards were revoked. To attain the 1-hour national standard, the 3-year average of the annual 99th percentile of the 1-hour daily maximum concentrations at each site must not exceed 75 ppb. The 1971 SO_2 national standards (24-hour and annual) remain in effect until one year after an area is designated for the 2010 standard, except that in areas designated nonattainment for the 1971 standards, the 1971 standards remain in effect until implementation plans to attain or maintain the 2010 standards are approved.

   Note that the 1-hour national standard is in units of parts per billion (ppb). California standards are in units of parts per million (ppm). To directly compare the 1-hour national standard to the California standard the units can be converted to ppm. In this case, the national standard of 75 ppb is identical to 0.075 ppm.
9. The ARB has identified lead and vinyl chloride as 'toxic air contaminants' with no threshold level of exposure for adverse health effects determined. These actions allow for the implementation of control measures at levels below the ambient concentrations specified for these pollutants.
10. The national standard for lead was revised on October 15, 2008 to a rolling 3-month average. The 1978 lead standard (1.5 $\mu g/m^3$ as a quarterly average) remains in effect until one year after an area is designated for the 2008 standard, except that in areas designated nonattainment for the 1978 standard, the 1978 standard remains in effect until implementation plans to attain or maintain the 2008 standard are approved.
11. In 1989, the ARB converted both the general statewide 10-mile visibility standard and the Lake Tahoe 30-mile visibility standard to instrumental equivalents, which are "extinction of 0.23 per kilometer" and "extinction of 0.07 per kilometer" for the statewide and Lake Tahoe Air Basin standards, respectively.
12. Annual Arithmetic Mean

-- No Standard

2.3.1 Ozone (O_3)

Ozone is a secondary pollutant; it is not directly emitted. Ozone is the result of chemical reactions between volatile organic compounds (VOC) (also referred to as reactive organic gasses (ROG)) and nitrogen oxides (NO_x), which occur only in the presence of bright sunlight. Sunlight and hot weather cause ground-level ozone to form in the air. As a result, it is known as a summertime air pollutant. Ground-level ozone is the primary constituent of smog. Because ozone is formed in the atmosphere, high concentrations can occur in areas well away from sources of its constituent pollutants.

People with lung disease, children, older adults, and people who are active can be affected when ozone levels are unhealthy. Numerous scientific studies have linked ground-level ozone exposure to a variety of problems, including:

- lung irritation that can cause inflammation much like a sunburn;
- wheezing, coughing, pain when taking a deep breath, and breathing difficulties during exercise or outdoor activities;
- permanent lung damage to those with repeated exposure to ozone pollution; and
- aggravated asthma, reduced lung capacity, and increased susceptibility to respiratory illnesses like pneumonia and bronchitis.

Ground-level ozone can have detrimental effects on plants and ecosystems. These effects include:

- interfering with the ability of sensitive plants to produce and store food, making them more susceptible to certain diseases, insects, other pollutants, competition and harsh weather;
- damaging the leaves of trees and other plants, negatively impacting the appearance of urban vegetation, national parks, and recreation areas; and
- reducing crop yields and forest growth, potentially impacting species diversity in ecosystems.

2.3.2 Particulate Matter (PM_{10} & $PM_{2.5}$)

Particulate matter includes both aerosols and solid particles of a wide range of size and composition. Of particular concern are those particles smaller than 10 microns in size (PM_{10}) and smaller than or equal to 2.5 microns ($PM_{2.5}$). The size of the particulate matter is referenced to the aerodynamic diameter of the particulate. Smaller particulates are of greater concern because they can penetrate deeper into the lungs than large particles.

The principal health effect of airborne particulate matter is on the respiratory system. Short-term exposures to high $PM_{2.5}$ levels are associated with premature mortality and increased hospital admissions and emergency room visits. Long-term exposures to high $PM_{2.5}$ levels are associated with premature mortality and development of chronic respiratory disease. Short-term exposure to high PM_{10} levels is associated with hospital admissions for cardiopulmonary diseases, increased respiratory symptoms, and possible premature mortality. The EPA has concluded that available evidence does not suggest an association between long-term exposure to PM_{10} at current ambient levels and health effects.

$PM_{2.5}$ is directly emitted in combustion exhaust and formed from atmospheric reactions between various gaseous pollutants including nitrogen oxides (NO_x), sulfur oxides (SO_x), and volatile organic compounds (VOC). PM_{10} is generally emitted directly as a result of mechanical processes that crush or grind larger particles or the re-suspension of dusts most typically through construction activities and vehicular travels. $PM_{2.5}$ can remain suspended in the atmosphere for days and weeks and can be transported long distances. PM_{10} generally settles out of the atmosphere rapidly and are not readily transported over large distances.

2.3.3 Carbon Monoxide (CO)

Carbon monoxide is a colorless and odorless gas, which in the urban environment, is associated primarily with the incomplete combustion of fossil fuels in motor vehicles. Carbon monoxide combines with hemoglobin in the bloodstream and reduces the amount of oxygen that can be circulated through the body. High carbon monoxide concentrations can lead to headaches, aggravation of cardiovascular disease, and impairment of central nervous system functions. Carbon monoxide concentrations can vary greatly over comparatively short distances. Relatively high concentrations are typically found near crowded intersections, along heavily used roadways carrying slow-moving traffic, and at or near ground level. Even under the most severe meteorological and traffic conditions, high concentrations of carbon monoxide are limited to locations within a relatively short distance (i.e., up to 600 feet or 185 meters) of heavily traveled roadways. Overall carbon monoxide emissions are decreasing as a result of the Federal Motor Vehicle Control Program, which has mandated increasingly lower emission levels for vehicles manufactured since 1973.

2.3.4 Nitrogen Dioxide (NO_2)

Nitrogen gas, normally relatively inert (unreactive), comprises about 80% of the air. At high temperatures (i.e., in the combustion process) and under certain other conditions it can combine with oxygen, forming several different gaseous compounds collectively called nitrogen oxides (NO_x). Nitric oxide (NO) and nitrogen dioxide (NO_2) are the two most important compounds. NO is converted to NO_2, a red pungent gas, in the atmosphere. Motor vehicle emissions are the main source of NO_x in urban areas.

Nitrogen dioxide is toxic to various animals as well as to humans. Its toxicity relates to its ability to form nitric acid with water in the eye, lung, mucus membrane and skin. In animals, long-term exposure to nitrogen oxides increases susceptibility to respiratory infections lowering their resistance to such diseases as pneumonia and influenza. Laboratory studies show susceptible humans, such as asthmatics, exposed to high concentrations of NO_2 can suffer lung irritation and potentially lung damage. Epidemiological studies have also shown associations between NO_2 concentrations and daily mortality from respiratory and cardiovascular causes and with hospital admissions for respiratory conditions.

NO_x is a combination of primarily NO and NO_2. While the NAAQS only addresses NO_2, NO and the total group of nitrogen oxides is of concern. NO and NO_2 are both precursors in the formation of ozone and secondary particulate matter as discussed in Sections 2.3.1 and 2.3.2. Because of this and that NO emissions largely convert to NO_2, NO_x emissions are typically examined when assessing potential air quality impacts.

2.3.5 Sulfur Dioxide (SO_2)

Sulfur oxides (SO_x) constitute a class of compounds of which sulfur dioxide (SO_2) and sulfur trioxide (SO_3) are of greatest importance. Ninety-five percent of pollution related SO_x emissions are in the form of SO_2. SO_x emissions are typically examined when assessing potential air quality impacts of SO_2. Combustion of fossil fuels for generation of electric power is the primary contributor of SO_x emissions. Industrial processes, such as nonferrous metal smelting, also contribute to SO_x

emissions. SO_x are also formed during combustion of motor fuels. However, most of the sulfur has been removed from fuels greatly reducing SO_x emissions from vehicles.

SO_2 combines easily with water vapor, forming aerosols of sulfurous acid (H_2SO_3), a colorless, mildly corrosive liquid. This liquid may then combine with oxygen in the air, forming the even more irritating and corrosive sulfuric acid (H_2SO_4). Peak levels of SO_2 in the air can cause temporary breathing difficulty for people with asthma who are active outdoors. Longer-term exposures to high levels of SO_2 gas and particles cause respiratory illness and aggravate existing heart disease. SO_2 reacts with other chemicals in the air to form tiny sulfate particles which are measured as $PM_{2.5}$. The heath effects of $PM_{2.5}$ are discussed in Section 2.3.2.

2.3.6 Lead (Pb)

Lead is a stable compound, which persists and accumulates both in the environment and in animals. In humans, it affects the blood forming or hematopoietic, nervous, and renal systems. In addition, lead has been shown to affect the normal functions of the reproductive, endocrine, hepatic, cardiovascular, immunological, and gastrointestinal systems, although there is significant individual variability in response to lead exposure. Since 1975, lead emissions have been in decline due in part to the introduction of catalyst-equipped vehicles, and decline in production of leaded gasoline. In general, an analysis of lead is limited to projects that emit significant quantities of the pollutant (i.e. lead smelters) and are not applied to transportation projects.

2.3.7 Visibility Reducing Particulates

Visibility-reducing particles consist of suspended particulate matter, which is a complex mixture of tiny particles that consists of dry solid fragments, solid cores with liquid coatings, and small droplets of liquid. These particles vary greatly in shape, size and chemical composition, and can be made up of many different materials such as metals, soot, soil, dust, and salt. The Statewide standard is intended to limit the frequency and severity of visibility impairment due to regional haze. A separate standard for visibility-reducing particles that is applicable only in the Lake Tahoe Air Basin is based on reduction in scenic quality.

2.3.8 Sulfates (SO_4^{2-})

Sulfates are the fully oxidized ionic form of sulfur. Sulfates occur in combination with metal and / or hydrogen ions. In California, emissions of sulfur compounds occur primarily from the combustion of petroleum-derived fuels (e.g., gasoline and diesel fuel) that contain sulfur. This sulfur is oxidized to sulfur dioxide (SO_2) during the combustion process and subsequently converted to sulfate compounds in the atmosphere. The conversion of SO_2 to sulfates takes place rapidly and completely in urban areas of California due to regional meteorological features.

The ARB's sulfates standard is designed to prevent aggravation of respiratory symptoms. Effects of sulfate exposure at levels above the standard include a decrease in ventilatory function, aggravation of asthmatic symptoms, and an increased risk of cardio-pulmonary disease. Sulfates are particularly effective in degrading visibility, and, due to fact that they are usually acidic, can harm ecosystems and damage materials and property.

2.3.9 Hydrogen Sulfide (H_2S)

Hydrogen sulfide (H_2S) is a colorless gas with the odor of rotten eggs. It is formed during bacterial decomposition of sulfur-containing organic substances. It can also be present in sewer gas and some natural gas, and can be emitted as the result of geothermal energy exploitation. Breathing H_2S at levels above the standard will result in exposure to a very disagreeable odor. In 1984, an ARB committee concluded that the ambient standard for H_2S is adequate to protect public health and to significantly reduce odor annoyance.

2.3.10 Vinyl Chloride (Chloroethene)

Vinyl chloride (chloroethene), a chlorinated hydrocarbon, is a colorless gas with a mild, sweet odor. Most vinyl chloride is used to make polyvinyl chloride (PVC) plastic and vinyl products. Vinyl chloride has been detected near landfills, sewage plants, and hazardous waste sites, due to microbial breakdown of chlorinated solvents.

Short-term exposure to high levels of vinyl chloride in air causes central nervous system effects, such as dizziness, drowsiness, and headaches. Long-term exposure to vinyl chloride through inhalation and oral exposure causes in liver damage. Cancer is a major concern from exposure to vinyl chloride via inhalation. Vinyl chloride exposure has been shown to increase the risk of angiosarcoma, a rare form of liver cancer in humans.

2.4 SCAB Attainment Designations

Based on monitored air pollutant concentrations, the EPA and CARB designate areas relative to their status in attaining the NAAQS and CAAQS respectively. Table 2 lists the current attainment designations for the SCAB. For the Federal standards, the required attainment date is also shown. The Unclassified designation indicates that the air quality data for the area does not support a designation of attainment or non-attainment.

Table 2 shows that the EPA has designated SCAB as extreme non-attainment for ozone, non-attainment for $PM_{2.5}$, and attainment/maintenance for PM_{10}, CO, and NO_2. The basin has been designated by the state as non-attainment for ozone, PM_{10}, and $PM_{2.5}$. For the federal designations, the qualifier "extreme" affects the required attainment dates as the federal regulations have different requirements for areas that exceed the standards by greater amounts at the time of attainment/non-attainment designation. The SCAB is designated as in attainment of the Federal SO_2 and lead NAAQS as well as the state CO, NO_2, SO_2, lead, hydrogen sulfide, and vinyl chloride CAAQS.

Table 2
Designations of Criteria Pollutants for the SCAB

Pollutant	Federal	State
Ozone (O_3)	Extreme Non-Attainment (2024)	Non-Attainment
Respirable Particulate Matter (PM_{10})	Attainment/ Maintenance	Non-Attainment
Fine Particulate Matter ($PM_{2.5}$)	Non-Attainment (2021)	Non-Attainment
Carbon Monoxide (CO)	Attainment/ Maintenance	Attainment
Nitrogen Dioxide (NO_2)	Attainment/ Maintenance	Attainment
Sulfur Dioxide (SO_2)	Attainment	Attainment
Lead	Attainment*	Attainment
Visibility Reducing Particles	n/a	Unclassified
Sulfates	n/a	Unclassified
Hydrogen Sulfide	n/a	Attainment
Vinyl Chloride	n/a	Attainment

* A portion of Los Angeles County is designated as non-attainment for Lead due to high lead concentrations near the Excide automobile battery plant.

2.5 Air Quality Management Plan (AQMP)

As, discussed in Section 2.2, the FCAA requires all states with designated non-attainment areas to prepare SIP to demonstrate attainment of the NAAQS. SIPs for California are compiled by CARB. Local air pollution control districts are responsible for preparing the portions of the SIP that address local non-transportation pollutant sources within their jurisdiction and demonstrate attainment of the NAAQS by the required date. Further, the CCAA requires SCAQMD to publish a plan to reduce pollutant concentrations exceeding the CAAQS. In the SCAB, SCAQMD develops the AQMP for the air basin to satisfy these requirements. The AQMP is the most important air management document for the basin because it provides the blueprint for meeting state and federal ambient air quality standards. The plan is prepared in coordination with SCAG, local governments, and the private sector with considerable public outreach and input.

The AQMP provides considerable background information on historical air quality in the SCAB and control efforts as well as pollution sources and impacts. Existing and future air pollutant emissions inventories for the basin are presented and analyzed along with the results of modeling of the pollutant concentrations that would occur under each of the inventoried conditions. To comply with the FCAA SIP requirements, the plan must then present control measures, along with their

estimated effectiveness, to ensure that future concentrations will be less than the NAAQS by the attainment date required for each pollutant. The CCCA requires the plan to show 5% annual reductions for non-attainment pollutants, or include all feasible measures and an expeditious adoption schedule.

The Plans often discuss emerging air pollution issues. For example the most recent Plan, the 2012 AQMP, discusses the considerable hurdles that the Basin will have in achieving the revised ozone NAAQS adopted in 2008 that will need to be addressed in the next AQMP. In order to attain the eight-hour ozone NAAQS, the NO_X emissions in the Basin will need to be reduced by about 65% by 2023, and 75% by 2032 below the emission rates projected for those years that include known future reductions. As most sources will be controlled by that time, attainment of the ozone standards will require development and broad deployment of zero and near zero emission technologies for on land transportation sources. With the EPA currently considering further reductions in the ozone NAAQS, this issue will become even more serious.

The 2012 AQMP also discusses ultrafine particulates, which are particulates with a diameter of less than 0.1 µm (UFP or $PM_{0.1}$). Due to their small size, UFPs can penetrate deeply into the human respiratory tract, into the blood stream, and be transported to other critical organs such as the heart and brain. UFPs have been shown to be toxic and have health impacts, but are not specifically regulated. The Plan describes the results of research to characterize the physical and chemical properties of UFPs and their potential impact on people as well as the results of ambient UFP measurements in different environments. Potential control, mitigation, and policy strategies for limiting UFP exposures are discussed with recommendations for future actions to address this emerging and important topic

The AQMP is required to be updated every three years by the CCAA. It also must be updated in response to new or modified NAAQS. In recent years, updating of the AQMP has primarily been driven by new or modified NAAQS. As discussed above, the SCAB is not in attainment of the ozone and particulate NAAQS. Previously, the basin was not in attainment of the CO and NO_2 NAAQS as well. The 1997 AQMP included a demonstration of attainment of the NO_2 NAAQS as well as the Maintenance Plan required to assure continued attainment of the standard. The EPA re-designated the SCAB as attainment/maintenance for NO_2 in 1998 and approved SCAQMD's maintenance plan to ensure continued attainment of the standard. In 2005, SCAQMD submitted a re-designation request and maintenance plan for the CO NAAQS separate from the AQMP process. The EPA approved the CO Re-Designation and Maintenance Plan in 2007.

When the FCAA was adopted, the SCAB was designated as non-attainment for Total Suspended Particulates (TSP). Standards for both daily average and annual average concentrations were specified. Subsequent scientific data showed that the adverse health effects from exposure to particulate pollution were caused by particulates with a diameter of 10 microns (µm) or smaller, PM_{10}. In 1987, the EPA revised the particulate NAAQS to be based on PM_{10} rather than TSP with an attainment date of December 31, 2001. The 1997 AQMP as amended in 1998 and 1999 determined that this attainment date was not feasible and requested a five-year extension for attainment. This extension was granted in April 2003. In

December 2009 the SCAQMD submitted the 2009 South Coast PM_{10} Re-Resignation Request and Maintenance Plan to the EPA. The EPA approved the Re-designation Request and Maintenance Plan in June 2013.

By 1997, additional research into particulate matter health effects showed that particulate matter with a diameter of 2.5 µm or smaller, $PM_{2.5}$, had adverse health effects at concentrations lower than those allowed by the 1987 PM_{10} standard. In 1997 the EPA revised the particulate NAAQS to specify limits for $PM_{2.5}$ concentrations in addition to the previously adopted PM_{10} standards. The SCAB was identified as being non-attainment for the new $PM_{2.5}$ standards in April 2005. The required attainment date for the 1997 $PM_{2.5}$ NAAQS was April 5, 2010. The 2007 AQMP presented the attainment plan for the 1997 $PM_{2.5}$ NAAQS. As a part of the 2007 AQMP, SCAQMD requested an attainment extension. The attainment plan and extension were approved in November 2011 with a revised attainment date of April 5, 2015.

In 2006, the EPA lowered the daily average $PM_{2.5}$ NAAQS from 65 $\mu g/m^3$ to 35 $\mu g/m^3$ due to scientific research showing adverse health effects at lower concentrations. Further, the EPA rescinded the annual average PM_{10} NAAQS as research indicated that adverse health effects were not associated with long-term exposures to PM_{10}. The daily average PM_{10} NAAQS was retained. The SCAB was identified as being non-attainment for the 2006 $PM_{2.5}$ standards in November 2011. The 2012 AQMP presented the attainment plan to achieve the 2006 $PM_{2.5}$ NAAQS by the 2014 deadline.

The pollutant that is most problematic in the SCAB is ozone. The basin has been designated as non-attainment since the adoption of the FCAA in 1971. Originally, the ozone NAAQS was in terms of the maximum one-hour average concentration. By 1997, research had indicated that a longer exposure of eight-hours was better correlated with adverse health effects than one-hour average concentrations. In response to this research, the EPA replaced the 0.12 ppm one-hour ozone NAAQS with the 0.08 ppm eight-hour ozone NAAQS. While the one-hour standard was rescinded by the EPA with the adoption of the eight-hour standard, anti-backsliding provisions in the FCAA have required the EPA to continue to apply the one-hour standard to areas that were designated as non-attainment for the one-hour standard. The SCAB was designated as non-attainment for the 1997 eight-hour ozone standard in 2004.

All of the AQMPs up to and including the 2003 AQMP addressed attainment of the one-hour ozone standards. The 2007 AQMP was prepared to address the 1997 eight-hour ozone NAAQS and demonstrate attainment of the standard by 2024 as required by the EPA. The EPA approved this plan in December 2011.

While the 2012 AQMP was prepared to primarily address the 2006 $PM_{2.5}$ standard it also updated the eight-hour ozone control plan from the 2007 AQMP. The updated plan presented new measures designed to reduce reliance on reduction from future anticipated, but unknown, technological advances expected to reduce NO_X and VOC emissions. On September 3, 2014 (79 FR 52526) the EPA announced that it was approving the portions of the 2012 AQMP that relate to attainment of the one-hour ozone and 1997 eight-hour ozone AAQS in the SCAB. Specifically the control strategy for the 1997 eight-hour ozone standard and the attainment demonstration

for the one-hour ozone standard were approved. EPA also found that the demonstrated attainment date for the one-hour ozone standard, December 31, 2022 to be appropriate given the severity of the problem and the limited emissions remaining that have not already been regulated. EPA has not yet approved the 2006 $PM_{2.5}$ standard attainment demonstration from the 2012 AMP.

In 2008, the EPA lowered the eight-hour ozone standard from 0.08 ppm to 0.075 ppm. The SCAB was designated as extreme non-attainment in May 2012. EPA published proposed rules for implementation in May 2013. Under the proposed rule the state has until 2016 to submit an attainment plan and extreme classification requires the basin to attain the standard by December 31, 2032. However, court challenges have delayed adoption of the final implementation rules. In December 2014, the EPA announced plans to further reduce the eight-hour ozone standard to between 0.065 and 0.70 ppm while seeking comment on reducing the standard to as low as 0.060 ppm.

2.6 Climate

The climate in and around the project area, as with all of Southern California, is controlled largely by the strength and position of the subtropical high-pressure cell over the Pacific Ocean. It maintains moderate temperatures and comfortable humidity, and limits precipitation to a few storms during the winter "wet" season. Temperatures are normally mild, excepting the summer months, which commonly bring substantially higher temperatures. In all portions of the basin, temperatures well above 100 degrees F have been recorded in recent years. The annual average temperature in the basin is approximately 62 degrees Fahrenheit.

Winds in the project area are usually driven by the dominant land/sea breeze circulation system. Regional wind patterns are dominated by daytime onshore sea breezes. At night the wind generally slows and reverses direction traveling towards the sea. Local canyons, with wind tending to flow parallel to the canyons, will alter wind direction. During the transition period from one wind pattern to the other, the dominant wind direction rotates into the south. The frequency of calm winds (less than 2 miles per hour) is less than 10 percent. Therefore, there is little stagnation in the project vicinity, especially during busy daytime traffic hours.

Southern California frequently has temperature inversions that inhibit the dispersion of pollutants. Inversions may be either ground based or elevated. Ground based inversions, sometimes referred to as radiation inversions, are most severe during clear, cold, early winter mornings. Under conditions of a ground-based inversion, very little mixing or turbulence occurs, and high concentrations of primary pollutants may occur near to major roadways. Elevated inversions can be generated by a variety of meteorological phenomena. Elevated inversions act as a lid or upper boundary and restrict vertical mixing. Below the elevated inversion, dispersion is not restricted. Mixing heights for elevated inversions are lower in the summer and more persistent. This low summer inversion puts a lid over the South Coast Air Basin (SCAB) and is responsible for the high levels of ozone observed during summer months in the air basin.

2.7 Monitored Air Quality

Air quality at any site is dependent on the regional air quality and local pollutant sources. Regional air quality is determined by the release of pollutants throughout the air basin. Estimates for the SCAB have been made for existing emissions ("2012 Air Quality Management Plan," December 2012). The data indicate that on-road (e.g.; automobiles, busses and trucks) and off-road (e.g.; trains, ships, and construction equipment) mobile sources are the major source of current emissions in the SCAB. Mobile sources account for approximately 59% of VOC emissions, 88% of NO_X emissions, 40% of direct $PM_{2.5}$ emissions, and 75% of SO_X emissions. Area sources (e.g., architectural coatings, residential water heaters, and consumer products) account for approximately 26% of VOC emissions and 39% of direct $PM_{2.5}$ emissions. Point sources (e.g., chemical manufacturing, petroleum production, and electric utilities) account for approximately 23% of SO_X emissions. Entrained road dust account for approximately 10% of direct $PM_{2.5}$ emissions.

The SCAQMD has divided its jurisdiction into 38 source receptor areas (SRA) with a designated ambient air monitoring station in most areas. The project is located in the North Orange County SRA (SRA 17). The designated monitoring station for this SRA is the Anaheim-Pampas Lane station, which is located approximately 4.25 miles northwest of the site in the vicinity of the intersection of Euclid Street and Lincoln Avenue in the City of Anaheim. The air pollutants measured at the Anaheim-Pampas Lane site include ozone, carbon monoxide (CO), nitrogen dioxide (NO_2), and particulate matter (PM_{10} and $PM_{2.5}$). Sulfur dioxide (SO_2) is not measured at the Anaheim-Pampas Lane Station. Sulfur dioxide levels in the SCAB have been well below state and federal standards for many years.

The air quality data monitored at the Anaheim-Pampas Lane station from 2011 to 2014 are presented in Table 3. The air quality data monitored were obtained from the CARB air quality data website (www.arb.ca.gov/adam/) and the SCAQMD Historical Data website (http://www.aqmd.gov/smog/historicaldata.htm).

Table 3
Air Quality Measured at the Anaheim-Pampas Lane Monitoring Station

Pollutant	California Standard	National Standard	Year	% Msrd.[1]	Max. Level	Days State Standard Exceeded[2]	Days National Standard Exceeded[2]
Ozone	0.09 ppm	None	2014	94	0.111	2	n/a
1 Hour			2013	84	0.084	0	n/a
Average			2012	95	0.079	0	n/a
			2011	96	0.088	0	n/a
Ozone	0.070 ppm	0.075 ppm	2014	92	0.082	6	4
8 Hour			2013	82	0.070	0	0
Average			2012	93	0.068	0	0
			2011	94	0.073	1	0

(Table Continued on Next Page)

Table 3 (Continued)
Air Quality Measured at the Anaheim-Pampas Lane Monitoring Station

Pollutant	California Standard	National Standard	Year	% Msrd.[1]	Max. Level	Days State Standard Exceeded[2]	Days National Standard Exceeded[2]
CO	20 ppm	35 ppm	2014	100	3	0	0
1 Hour			2013	--	--	--	--
Average			2012	46	--	--	--
			2011	45	--	--	--
CO	9.0 ppm	9 ppm	2014	100	2.10		
8 Hour			2013	95	2.60	0	0
Average			2012	46	2.34	0	0
			2011	95	2.08	0	0
NO_2	0.25 ppm	None	2014	91	0.076	0	n/a
1 Hour			2013	86	0.082	0	n/a
Average			2012	96	0.067	0	n/a
			2011	96	0.074	0	n/a
NO_2	None	0.053 ppm	2014	91	0.015	n/a	No
AAM[3]			2013	82	0.018	n/a	No
			2012	96	0.014	n/a	No
			2011	94	0.017	n/a	No
Respirable	50 µg/m^3	150 µg/m^3	2014	100	85.0	2/12	0/0
Particulates			2013	99	77.0	1/6	0/0
PM_{10}			2012	100	48.0	0/0	0/0
24 Hour Average			2011	99	53.0	2/12	0/0
Respirable	20 µg/m^3	None	2014	100	26.7	Yes	n/a
Particulates			2013	99	25.2	Yes	n/a
PM_{10}			2012	100	22.3	Yes	n/a
AAM[3]			2011	99	24.9	Yes	n/a
Fine	None	35 µg/m^3	2014	92	56.2	n/a	6/7
Particulates			2013	91	37.8	n/a	1/1
$PM_{2.5}$			2012	95	50.1	n/a	4/4
24 Hour Average			2011	97	39.2	n/a	2/2
Fine	12 µg/m^3	15 µg/m^3	2014	92	16.2	Yes	No
Particulates			2013	91	10.1	No	No
$PM_{2.5}$			2012	99	10.8	No	No
AAM[3]			2011	100	11.0	No	No

1. Percent of year where high pollutant levels were expected that measurements were made.
2. For annual averaging times a yes or no response is given if the annual average concentration exceeded the applicable standard. For the PM_{10} and $PM_{2.5}$ 24-hour standards, daily monitoring is not performed. The first number shown in Days State Standard Exceeded column is the actual number of days measured that State standard was exceeded. The second number shows the number of days the standard would be expected to be exceeded if measurements were taken every day.
3. Annual Arithmetic Mean

-- Data Not Reported, n/a – no applicable standard

Sources: CARB Air Quality Data Statistics web site www.arb.ca.gov/adam/ accessed 10/20/15
SCAQMD Historical Data Website http://www.aqmd.gov/smog/historicaldata.htm accessed 10/20/15

The monitoring data presented in Table 3 show that the only air quality standards exceeded in the project area in the past four years are particulates and ozone. The table shows that the State one-hour ozone standard was not exceeded in 2011, 2012, or 2013 but was exceeded two days in 2014. The State eight-hour ozone was exceeded one day in 2010 and six days 2014 but was not exceeded in 2012 or 2013. The Federal eight-hour ozone standard was exceeded one day in 2014 but was not exceeded in 2011, 2012, or 2013.

There have been no exceedances of Federal 24-hour average PM_{10} standard in the past four years. The State standard was measured to be exceeded twice in 2011 (with an estimated total of 12 days of exceedances that year), once in 2013 (with an estimated total of 6 days of exceedances that year), and twice in 2014 (with an estimated total of 12 days of exceedances that year). The exceedances in 2011 and the second high exceedance in 2014 were just above the standard and do not appear anomalous. The 2013 exceedance and the highest exceedance in 2014 were well above the standard suggesting that some local source or other factor was the cause of these high readings. The second-highest 24-hour PM_{10} measurement in 2013 was 46 $\mu g/m^3$, which is 31 $\mu g/m^3$ less than the maximum. The second highest 24-hour PM_{10} measurement in 2014 was 58 $\mu g/m^3$, just above the standard, while the third highest was 40 $\mu g/m^3$.

The annual average PM_{10} concentration at the Anaheim-Pampas Lane station has exceeded the State annual average PM_{10} standard each of the past four years. The federal 24-hour $PM_{2.5}$ standard was exceeded between two and seven days each year at the Anaheim-Pampas Lane Monitoring Station. The state annual $PM_{2.5}$ standard was exceeded in 2014 but had not been exceeded the previous three years. The federal annual $PM_{2.5}$ standard has not been exceeded for the past four years. CARB's website provides separate annual averages for the state and federal standards. The site shows the state annual average $PM_{2.5}$ concentration to be 16.2 $\mu g/m^3$ and the federal annual average to be 10.1 $\mu g/m^3$. The cause of this discrepancy is due to the differences in the specific measurement methodologies prescribed by state and federal laws.

The measured air quality data does not indicate a trend in particulate and ozone concentrations and number of days of exceedances. The one-hour ozone and 24-hour particulate matter data shows considerable variation. This is due to the fact all ozone and a substantial portion of $PM_{2.5}$ are not directly emitted from any source but formed in the atmosphere as other pollutants combine. The rate of formation is very dependent on weather conditions and the presence of precursor pollutants. During years with the highest concentrations, weather conditions favorable to the formation of ozone and particulate matter occurred concurrently with high emissions of precursor pollutants.

The monitored data shown in Table 3 shows that other than ozone, PM_{10}, and $PM_{2.5}$ exceedances as mentioned above, no State or Federal standards were exceeded for the remaining criteria pollutants in the project area.

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3.0 Potential Air Quality Impacts

Air quality impacts are usually divided into short-term and long-term. Short-term impacts are usually the result of construction or grading operations. Long-term impacts are associated with the built out condition of the proposed project.

3.1 Thresholds of Significance

3.1.1 Regional Air Quality

In their "1993 CEQA Air Quality Handbook," the SCAQMD established significance thresholds to assess the impact of project related air pollutant emissions. Table 4 presents these significance thresholds. There are separate thresholds for short-term construction and long-term operational emissions. A project with daily emission rates below these thresholds are considered to have a less than significant effect on regional air quality. It should be noted the thresholds recommended by the SCAQMD are very low and subject to controversy. It is up to the individual lead agencies to determine if the SCAQMD thresholds are appropriate for their projects.

Table 4
SCAQMD Regional Pollutant Emission Thresholds of Significance

	Regional Significance Threshold (lbs/day)					
	CO	**VOC**	**NO_x**	**PM_{10}**	**$PM_{2.5}$**	**SO_x**
Construction	550	75	100	150	55	150
Operation	550	55	55	150	55	150

3.1.2 Local Air Quality

As part of the SCAQMD's environmental justice program, attention was focused on localized effects of air quality. In accordance with Governing Board direction, SCAQMD staff developed the localized significance threshold (LST) methodology and mass rate look-up tables by source receptor area (SRA) that can be used to determine whether or not a project may generate significant adverse localized air quality impacts. The LST's represent the maximum emissions from a project that will not cause or contribute to an exceedance of the most stringent applicable federal or state ambient air quality standard, and are developed based on the ambient concentrations of that pollutant for each source receptor area. The LST methodology is described in "Final Localized Significance Threshold Methodology" dated June 2003 by the SCAQMD and is available at the SCAQMD website (http://aqmd.gov/ceqa/handbook/LST/LST.html).

The LST mass rate look-up tables provided by the SCAQMD allow one to determine if the daily emissions from proposed construction or operational activities could result in significant localized air quality impacts. That is, could the emissions result in a pollutant concentration at a sensitive receptor that exceeds an AAQS or substantially increases pollutant concentrations where the AAQS are already exceeded. If the calculated on-site emissions for the proposed construction or operational activities are below the LST emission levels found on the LST mass rate look-up table, then the proposed construction or operation activity will not result in a significant impact on local air quality.

The LST mass rate look-up tables are applicable to the following pollutants only: oxides of nitrogen (NO_X), carbon monoxide (CO), respirable particulate matter (PM_{10}), and fine particulate matter ($PM_{2.5}$). LSTs are derived based on the location of the project (i.e., the source/receptor area); the emission rates of NO_X, CO, PM_{10}, and $PM_{2.5}$; and the distance to the nearest exposed individual. This distance is based upon the uses around the project and the AAQS averaging times for the pollutants of concern. The shortest AAQS averaging time for CO and NO_2 are for one-hour and the nearest exposed individual is the location where a person could be expected to remain for 1-hour. The shortest averaging time for the PM_{10} and $PM_{2.5}$ AAQS is 24 hours and the nearest exposed individual is the location where a person could be expected to remain for 24-hours. Typically, this is the nearest residential use.

The LST methodology presents mass emission rates for each SRA, project sizes of 1, 2, and 5 acres, and nearest receptor distances of 25, 50, 100, 200, and 500 meters. For project sizes between the values given, or with receptors at distances between the given distances, the methodology uses linear interpolation to determine the thresholds. If receptors are within 25 meters of the site, the methodology document says that the threshold for the 25-meter distance should be used.

The project is located in SRA 17. The closest area where a person could spend 24-hours is the Orange County Juvenile Hall located nearly adjacent to the project site. The nearest area where a person could spend one-hour is the office directly adjacent to the site. Therefore, the thresholds were calculated based on an observer distance of 82 feet (25 meters). The OSHPD Plant and Non-OSHPD Plant sites are less than 1-acre. When the Project site is less than 1-acre the methodology calls for using the 1-acre threshold. This information was used to determine the localized significance thresholds applicable to the project.

The LST thresholds specific for the proposed project are presented in Table 5. A project with on-site daily emission rates below these thresholds is considered to have a less than significant effect on local air quality.

Table 5
Localized Significance Thresholds

	Localized Significance Threshold (lbs/day)			
	CO	**NO_x**	**PM_{10}**	**$PM_{2.5}$**
Construction	485.0	81.0	4.0	3.0
Operation	485.0	81.0	1.0	1.0

3.2 Short-Term Impacts

Temporary impacts will result from project construction activities. Air pollutants will be emitted by construction equipment and fugitive dust will be generated during demolition of the existing improvements as well as during grading of the site.

3.2.1 Construction Emission Calculation Methodology

Emissions during the primary phases of construction were calculated using CalEEMod program (version 2013.1.2). Construction of the two project components, the OSHPD Plant and the Non-OSHPD Plant, will occur under separate design build contracts. Because these projects will be developed under design build contracts, specific details regarding construction activities are not available. CalEEMod includes default activity estimates for construction activities based on the type and size of the project and these defaults were used to estimate the emissions associated with construction of the project.

The OSHPD Plant emissions were estimated for the construction of a 1,450 square foot heavy industrial building, the size of the chiller pad, on 0.34 acres. The modeling also included emissions from the demolition of an existing 1,250 square foot building. The chillers located in the most northern pad of the OSHPD Plant will be connected by pipes to the cooling towers located on the most southern pad. This will involve trenching which is not a standard default construction activity in CalEEMod. Therefore, a trenching activity phase was added to the CalEEMod defaults to account for this.

The Non-OSHPD Plant emissions were estimated for the construction of an 8,000 square foot heavy industrial building on a 0.68-acre site. The modeling also included emissions from the demolition of 13,900 square feet of existing buildings.

The specific activity data used to calculate construction emissions for each of the project components, mirrored from the CalEEMod Output file, are presented in the appendix. The CalEEMod output files are quite lengthy, provide little utility, and are not included with the report. The CalEEMod input and output files are available upon request.

The CalEEMod model calculates total emissions resulting from each construction activity, on-site and off-site, which are compared to the SCAQMD Regional Thresholds presented in Table 4. On-site project emissions, which are compared to the SCAQMD Local Significance Thresholds presented in Table 5, were calculated by scaling the emissions from on-road sources so that only the emissions from on-site portion of the trips are included. Each worker, material removal, or delivery trip was assumed to have a 0.25-mile component within the project site.

Construction of each of the project components was assumed to occur in 2016. Note that delays in the start of construction would not significantly affect emission estimates. In fact, the CalEEMod program includes a reduction in on-road and off-road vehicle exhaust emissions each year to account for new construction equipment and on-road vehicles manufactured under stricter emission standards becoming a larger part of the construction fleet (a fleet average emission factor is used to estimate emissions). For emissions modeling purposes, a delay moving the activity into the following year would actually result in a slight reduction in the

exhaust emissions estimates. Lengthening the duration of each activity would result in the same or lower daily emissions as daily activity levels for emission sources would either not change or decrease as the work is spread out over a longer period of time. A shortening of any of the construction activities assumed could result in higher emissions and would require a re-analysis of the emission impacts.

3.2.2 Regional Construction Emissions

Using the estimates presented above, the air pollutant emissions were calculated and presented in Table 6. The daily emissions are calculated and these represent the highest level of emissions during each construction activity.

Table 6
Total Construction Emissions by Activity

	Daily Emissions (lbs/day)					
Activity	**CO**	**NO_x**	**VOC**	**PM_{10}**	**$PM_{2.5}$**	**SO_x**
OSHPD Plant						
Demolition	9.4	11.4	1.4	1.1	0.8	0.01
Site Preparation	7.6	13.7	1.4	1.4	0.8	0.01
Grading	9.3	11.3	1.3	1.7	1.2	0.01
Trenching	3.0	4.9	0.6	0.4	0.4	0.00
Building Construction	8.3	13.7	1.4	1.0	0.9	0.01
Paving	8.3	10.7	1.2	0.9	0.7	0.01
Painting	1.9	2.4	7.1	0.2	0.2	0.00
Non-OSHPD Plant						
Demolition	10.5	13.0	1.5	2.4	1.1	0.02
Site Preparation	7.6	13.7	1.4	1.4	0.8	0.01
Grading	9.3	11.3	1.3	1.7	1.2	0.01
Building Construction	8.5	13.8	1.4	1.0	0.9	0.01
Paving	8.3	10.7	1.2	0.9	0.7	0.01
Painting	1.9	2.4	41.2	0.2	0.2	0.00
Significance Threshold	**550**	**100**	**75**	**150**	**55**	**150**
Exceed Threshold?	**No**	**No**	**No**	**No**	**No**	**No**

Table 6 shows that no individual construction activity will generate emissions that exceed the SCAQMD Regional Emissions Significance Thresholds. It is not known whether or not any of the individual activities will occur concurrently, however, the total daily emissions, summed over all activities, are less than the thresholds for all pollutants except NO_X. Therefore, all construction activities could occur concurrently and the pollutant emissions would be less than the significance threshold for all pollutants except NO_X. NO_X emissions are anticipated to be less than 13.8 pounds per day for all activities. This means that at least seven activities could occur concurrently with the total daily NO_X emissions remaining below the 100 pounds per day threshold. Construction of the project is not anticipated to

result in more than a few construction activities occurring concurrently, and certainly less than seven. Therefore, construction of the project will not result in pollutant emissions exceeding the SCAQMD regional construction significance threshold. Construction of the project will not result in a significant regional impact.

3.2.3 On-site Construction Emissions

On-site emissions for each of the construction activities were calculated based on the CalEEMod output as discussed in Section 3.2.1 and are presented in Table 7. The applicable LST thresholds are also presented.

Table 7
On-Site Emissions By Construction Activity

	Daily Emissions (lbs/day)			
Activity	**CO**	**NO_x**	**PM_{10}**	**$PM_{2.5}$**
OSHPD Plant				
Demolition	8.8	11.4	0.9	0.8
Site Preparation	7.4	13.6	1.4	0.8
Grading	8.7	11.2	1.6	1.2
Trenching	2.8	4.9	0.4	0.4
Building Construction	8.2	13.7	0.9	0.9
Paving	7.3	10.6	0.7	0.6
Painting	1.9	2.4	0.2	0.2
Non-OSHPD Plant				
Demolition	10.0	13.0	2.3	1.0
Site Preparation	7.4	13.6	1.4	0.8
Grading	8.7	11.2	1.6	1.2
Building Construction	8.2	13.7	0.9	0.9
Paving	7.3	10.6	0.7	0.6
Painting	1.9	2.4	0.2	0.2
Significance Threshold	**485.0**	**81.0**	**4.0**	**3.0**
Exceed Threshold?	**No**	**No**	**No**	**No**

Table 7 shows that no individual construction activity will generate emissions that exceed the SCAQMD Localized Significance Thresholds. As discussed above it is not known whether any individual construction activities will occur concurrently. Because the OSHPD and Non-OSPHD Plant sites are separated the emissions from each site individually are compared to the significance threshold. The total CO and NO_X emissions from all activities for each project component are less than the significance thresholds. However, no more than two or three activities would be expected to occur concurrently. Examination of Table 7, shows that the only way that the PM_{10} threshold is exceeded with three concurrent activities is if Non-OSHPD demolition is one of the activities. However, demolition will need to be completed prior to starting the other construction activities at the Non-OSHPD site and

therefore, this condition will not occur. Construction of the project will not result in emissions exceeding the SCAQMD localized construction significance thresholds and therefore will not result in a significant localized impact.

3.2.4 Diesel Particulate Matter

In 1998, the California Air Resources Board (ARB) identified particulate matter from diesel-fueled engines (Diesel Particulate Matter or DPM) as a Toxic Air Contaminant (TAC). It is assumed that the majority of the heavy construction equipment utilized during construction would be diesel fueled and emit DPM. Impacts from toxic substances are related to cumulative exposure and are assessed over a 70-year period. Cancer risk is expressed as the maximum number of new cases of cancer projected to occur in a population of one million people due to exposure to the cancer-causing substance over a 70-year lifetime (California Environmental Protection Agency, Office of Environmental Health Hazard Assessment, Guide to Health Risk Assessment). Demolition and grading for the project, when the peak diesel exhaust emissions would occur, is expected to take approximately two months, cumulatively, with all construction expected to take less than one year. Because of the relatively short duration of construction compared to a 70-year lifespan, diesel emissions resulting from the construction of the project are not expected to result in a significant impact.

3.3 Long-Term Impacts

The proposed project will not result in any increases to the number of employees or patients at the hospital and therefore will not affect the number of motor vehicles traveling to and from the site each day. The project will enable the continued development of the Medical Center's Long Range Development Plan. The EIR for the Long Range Development Plan concluded that it would result in significant and unavoidable air quality impacts.

The two components of the project that will result in long-term air pollutant emissions during the operation of the project are the diesel emergency generators and the cooling towers.

3.3.1 Cooling Tower Emissions

There are three cooling towers currently being operated for the OSHPD Plant with 2,250 tons of cooling capacity that will be replaced by the project. A new modular cooling tower with an initial cooling capacity of approximately 3,000 tons will be installed for the OSHPD Plant when construction is completed. The tower will be able to accommodate up to 1,000 additional tons of cooling with additional equipment. This equipment will be added in the future to provide 4,000 tons of cooling for the OSHPD plant when the Medical Center's Long Range Development Plan is built out.

There are no existing cooling towers for the Non-OSHPD Plant. A new modular cooling tower with a capacity of approximately 1,000 tons of will be installed for the Non-OSHPD Plant when construction is completed. The tower will be able to accommodate up to 3,000 additional tons of cooling with additional equipment. This equipment will be added in the future as the Long Range Development Plan is built out to, ultimately, provide 4,000 tons of cooling for the Non-OSHPD plant. This plant is anticipated to be operated 12 hours per day.

SCAQMD Guidance recommends the use of an emission factor 1.643 pounds of total particulates per year for each ton of cooling provided, assuming 24 hours per day operation. This emission rate is based on the cooling tower water having a total suspended particulates of 2,500 parts per million, a 3 gallon per minute per ton of cooling circulating water rate and a drift loss of 0.005% (this is a measure of the rate of water evaporation from the cooling tower). This data was used to estimate the emissions from the existing 2,250-ton cooling towers.

The new cooling towers will have a lower water circulation rate, 2.25 gallons per minute per ton of cooling, total dissolved solids of 2,050 parts per million or less, and will include drift eliminators which will reduce the drift los to 0.0025%. This lowers the total particulate emission rate to 0.506 pounds of total particulates each year per ton of cooling. Of the total particulates approximately 70% are PM_{10} and approximately 42% are $PM_{2.5}$.

Using these factors, the daily PM_{10} and $PM_{2.5}$ emissions from the cooling towers were calculated and are presented in Table 8. This table shows that while the project will ultimately increase the cooling tower cooling from 2,250 tons operating 24 hours per day to 4,000 tons operating 24-hours per day and 4,000 tons operating 12-hours per day the total cooling tower particulate emissions are anticipated to be slightly reduced from existing conditions.

Table 8
Cooling Tower Particulate Emissions (lbs/day)

	PM_{10}	$PM_{2.5}$
OSHPD		
Project		
Initial	2.9	1.7
Ultimate	3.9	2.3
Existing	7.1	4.3
Change	***-3.2***	***-1.9***
Non-OSHPD		
Project		
Initial	0.5	0.3
Ultimate	1.9	1.2
Existing	0.0	0.0
Change	***1.9***	***1.2***
Total		
Project		
Initial	3.4	2.0
Ultimate	5.8	3.5
Existing	7.1	4.3
Change	***-1.3***	***-0.8***

3.3.2 Emergency Generator emissions

The project will add a 1,500 kW generator to the OSHPD generator farm which has four 1,000 kW generators. Additionally, two 2,000 kW generators will be installed in the Non-OSHPD plant. Space and infrastructure will be provided to add two additional 2,000 kW generators to the Non-OSHPD plant in the future as the Long Range Development Plan dictates.

As discussed above, the project will be constructed under future design-build contracts. Because of this, the specific make and model of emergency generators to be used by the project are not known. Because these generators will be purchased and installed after January 2015, they will be required to comply with Tier 4 emissions standards. Tier 4 particulate matter and nitrogen oxide emissions are 90 percent lower than Tier 2 standards.

The project engineer provided an emission rate cut sheet for a representative emergency generator. A copy of this cut sheet is presented in the appendix. Emission rates were provided for six operating modes of the generator. Table 9 presents the maximum emissions during any mode of generator operation (maximum emissions occur during Full Standby or Full Prime Modes) along with the average emission during full power continuous operation.

Table 9
Emergency Generator Emissions (lbs/hr/generator)

	CO	NO_x	VOC	PM_{10}	$PM_{2.5}$	SO_x
Maximum	1.16	35.01	0.71	0.45	0.43	0.71
Average	0.77	26.73	0.46	0.15	0.15	0.57

As discussed previously, operation of the emergency generators during emergency conditions is exempted from CEQA as an emergency activity. However, the emergency generators will require regular testing where the generators are operated for approximately thirty minutes once every forty days. Table 9 shows that the pollutant with the greatest amount of emissions is NO_X. Dividing the SCAQMD NO_X Regional significance threshold of 55 lbs/day by the hourly emission rates presented in Table 9 gives the number of hours that the generator could be operated without exceeding the significance threshold. This shows that the generator could be operated at least 1.6 hours per day, based on the maximum emission rate, and up to 2.1 hours per day, based on the average emission rate without exceeding the significance threshold. Therefore, as long as, at most, three emergency generators are tested for 30 minutes each on any one day, testing of the emergency generators will not result in pollutant emissions exceeding the SCAQMD Regional significance thresholds. Further, the CO, NOx PM_{10} and $PM_{2.5}$ emissions will be less than the localized significance thresholds of 485 lbs/day, 81 lbs/day, 1.0 lb/day and 1.0 lb/day respectively with this restriction. This is presented as a mitigation measure in Section 3.0.

3.3.3 Total Project Emissions

The analysis presented above concludes that emissions from testing emergency generators up to 1.6 hours per day will not exceed the SCAQMD's regional or localized significance thresholds. Table 8 shows that the new cooling towers will result in lower particulate emissions than the existing cooling towers that will be removed with the project. Therefore, the total project emissions will not result in a significant regional air quality impact as long as generator testing is limited to a total of 1.6 hours on any day. This is presented as a mitigation measure in Section 3.0.

Table 8 shows that the total project cooling tower particulate emissions will be greater than the 1.0 lb/day localized significance thresholds for PM_{10} and $PM_{2.5}$. The localized significance thresholds are analyzed based on the total emissions, rather than the net change in emissions. These thresholds are screening level emission rates that ensure that the AAQS are not exceeded locally or, where ambient conditions exceed the AAQS, the pollutant concentrations are not substantially increased. Table 3 shows that both state and federal particulate AAQS are exceeded in the project area. Where this occurs, the allowable increase in particulate concentrations is taken from Rule 1303. Table A-2 of Rule 1303 specifies a significant change in air pollutant concentration of 2.5 $\mu g/m^3$ for PM_{10}.

Rule 1303 requires detailed air quality dispersion modeling in order to show that particulate emissions from the cooling towers do not result in a significant change in air pollutant concentrations. However, Appendix A of Rule 1303 provides a screening analysis that, if satisfied, precludes the need for detailed dispersion modeling. Table A-1 of Rule 1303 shows that the screening level emission rate for non-combustion sources is 0.41 lbs/hour of PM_{10} emissions. Projects with emission rates lower than this require no further analysis and are considered compliant with Rule 1303.

Table 8 shows that the cooling towers are anticipated to generate approximately 5.8 lbs/day of PM_{10} emissions. Because particulate pollutant impacts are based on the daily and annual average concentration, per the AAQS, the average hourly emission rate is based on the average daily emissions. Therefore, the cooling towers will have an average PM_{10} emission rate of 0.24 lbs/hour. This is less than the Rule 1303, Table A-1, screening threshold. Note that while the $PM_{2.5}$ standards are the same as the PM_{10} standards, the cooling tower $PM_{2.5}$ emissions are 42% lower than the PM_{10} emissions. Therefore compliance with the PM_{10} standards demonstrates compliance with the $PM_{2.5}$ standards. The particulate emissions from the cooling towers will not result in significant particulate concentrations per the Rule 1303 screening analysis and therefore, will not result in a significant localized impact.

Operation of the project will not result in air pollutant emissions greater than the SCAQMD regional significance thresholds nor will it result in any significant localized impacts. Therefore, operation of the project will not result in a significant air quality impact.

3.4 Compliance with Air Quality Planning

The following sections deal with the major air planning requirements for this project. Specifically, consistency of the project with the AQMP is addressed. As discussed below, consistency with the AQMP is a requirement of the California Environmental Quality Act (CEQA).

3.4.1 Consistency with AQMP

An EIR must discuss any inconsistencies between the proposed project and applicable GPs and regional plans (California Environmental Quality Act (CEQA) guidelines (Section 15125)). Regional plans that apply to the proposed project include the South Coast Air Quality Management Plan (AQMP). In this regard, this section will discuss any inconsistencies between the proposed project with the AQMP.

The purpose of the consistency discussion is to set forth the issues regarding consistency with the assumptions and objectives of the AQMP and discuss whether the project would interfere with the region's ability to comply with Federal and State air quality standards. If the decision-maker determines that the project is inconsistent, the lead agency may consider project modifications or inclusion of mitigation to eliminate the inconsistency.

The SCAQMD's CEQA Handbook states that "new or amended GP Elements (including land use zoning and density amendments), Specific Plans, and significant projects must be analyzed for consistency with the AQMP." Strict consistency with all aspects of the plan is usually not required. A proposed project should be considered to be consistent with the plan if it furthers one or more policies and does not obstruct other policies. The Handbook identifies two key indicators of consistency:

(1) Whether the project will result in an increase in the frequency or severity of existing air quality violations or cause or contribute to new violations, or delay timely attainment of air quality standards or the interim emission reductions specified in the AQMP (except as provided for CO in Section 9.4 for relocating CO hot spots).

(2) Whether the project will exceed the assumptions in the AQMP based on the year of project buildout and phase.

Both of these criteria are evaluated in the following sections.

Criterion 1 - Increase in the Frequency or Severity of Violations?

Based on the air quality modeling analysis contained in this report, there will not be significant short-term construction and long-term operational impacts due to the project based on the SCAQMD thresholds of significance. Emissions generated during construction and operation will not exceed SCAQMD's LST criteria, and therefore, it is unlikely that development of the project will increase the frequency or severity of existing air quality violations in the immediate vicinity of the project. Further, the project is not projected to result in any exceedances due to traffic volume increases at nearby intersections. The proposed project is not projected to

contribute to the exceedance of any air pollutant concentration standards, thus the project is found to be consistent with the AQMP for the first criterion.

Criterion 2 - Exceed Assumptions in the AQMP?

Consistency with the AQMP assumptions is determined by performing an analysis of the project with the assumptions in the AQMP. Thus, the emphasis of this criterion is to ensure that the analyses conducted for the project are based on the same forecasts as the AQMP. The Regional Comprehensive Plan and Guide (RCP&G) consists of three sections: Core Chapters, Ancillary Chapters, and Bridge Chapters. The Growth Management, Regional Mobility, Air Quality, Water Quality, and Hazardous Waste Management chapters constitute the Core Chapters of the document. These chapters currently respond directly to federal and state requirements placed on SCAG. Local governments are required to use these as the basis of their plans for purposes of consistency with applicable regional plans under CEQA.

Since the SCAG forecasts are not detailed, the test for consistency of this project is not specific. The SCAG forecasts are based on the General Plans of municipalities in the basin. The project is consistent with the Medical Center's Long Range Development Plan (LDRP), which is effectively the General Plan for the Center. Further, the analysis presented above shows that the total project emissions are less than the SCAQMD significance thresholds. The emissions increase due to the project is minor and will not interfere with the AQMP or the attainment of the ambient air quality standards. Therefore, emissions from the project site at project completion will not be greater than those anticipated in the AQMP.

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4.0 Mitigation Measures

4.1 Short-Term Impacts

The analysis presented in Section 3.2 concluded that the construction of the project would not result in any significant short-term air quality impacts.

4.2 Long-Term Impacts

The analysis presented in Section 3.3 concluded that the operation of the project would not result in any significant long-term air quality impacts assuming that emergency generator testing is limited to no more than 1.6 hours per day.

> **Mitigation Measure AQ-1:** Testing of the emergency generators installed by this project shall be limited to no more than 1.6 hours per day.

5.0 Unavoidable Significant Impacts

With the mitigation measures described in Section 3.0, all significant impacts will be reduced to a level of insignificance and the project will not result in any unavoidable significant impacts.

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Appendix

CalEEMod Construction Input Summary

CalEEMod Input and Output Files Available Upon Request

Emergency Generator Cut Sheet

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UCI Medical Center OSHPD Energy Plant

CalEEMod Construction Emissions Inputs

Construciton Phasing

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Demolition	Demolition	1/1/2016	1/14/2016	5	10	
2	Site Preparation	Site Preparation	1/15/2016	1/15/2016	5	1	
3	Grading	Grading	1/16/2016	1/19/2016	5	2	
4	Trenching	Trenching	1/20/2016	2/16/2016	5	20	
5	Building Construction	Building Construction	1/20/2016	6/7/2016	5	100	
6	Paving	Paving	6/8/2016	6/14/2016	5	5	
7	Architectural Coating	Architectural Coating	6/15/2016	6/21/2016	5	5	

Construction Areas

Acres of Grading (Site Preparation Phase): 0.5

Acres of Grading (Grading Phase): 0

Acres of Paving: 0

Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 2,175; Non-Residential Outdoor: 725 (Architectural Coating – sqft)

Construction Equipment

Phase Number	Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
1	Demolition	Concrete/Industrial Saws	1	8.00	81	0.73
1	Demolition	Rubber Tired Dozers	1	1.00	255	0.40
1	Demolition	Tractors/Loaders/Backhoes	2	6.00	97	0.37
2	Site Preparation	Graders	1	8.00	174	0.41
2	Site Preparation	Tractors/Loaders/Backhoes	1	8.00	97	0.37
3	Grading	Concrete/Industrial Saws	1	8.00	81	0.73
3	Grading	Rubber Tired Dozers	1	1.00	255	0.40
3	Grading	Tractors/Loaders/Backhoes	2	6.00	97	0.37
4	Trenching	Trenchers	1	8.00	80	0.50
5	Building Construction	Cranes	1	4.00	226	0.29
5	Building Construction	Forklifts	2	6.00	89	0.20
5	Building Construction	Tractors/Loaders/Backhoes	2	8.00	97	0.37
6	Paving	Cement and Mortar Mixers	4	6.00	9	0.56
6	Paving	Pavers	1	7.00	125	0.42
6	Paving	Rollers	1	7.00	80	0.38
6	Paving	Tractors/Loaders/Backhoes	1	7.00	97	0.37
7	Architectural Coating	Air Compressors	1	6.00	78	0.48

Construction Trips and VMT

Phase Number	Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
1	Demolition	4	10.00	0.00	6.00	14.70	6.90	LD_Mix	HDT_Mix	HHDT
2	Site Preparation	2	5.00	0.00	0.00	14.70	6.90	LD_Mix	HDT_Mix	HHDT
3	Grading	4	10.00	0.00	0.00	14.70	6.90	LD_Mix	HDT_Mix	HHDT
5	Building Construction	5	1.00	0.00	0.00	14.70	6.90	LD_Mix	HDT_Mix	HHDT
6	Paving	7	18.00	0.00	0.00	14.70	6.90	LD_Mix	HDT_Mix	HHDT
7	Architectural Coating	1	0.00	0.00	0.00	14.70	6.90	LD_Mix	HDT_Mix	HHDT
4	Trenching	1	3.00	0.00	0.00	14.70	6.90	LD_Mix	HDT_Mix	HHDT

Construction Mitigation Measures

0

UCI Medical Center Non-OSHPD Energy Plnt

CalEEMod Construction Emissions Inputs

Construciton Phasing

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Demolition	Demolition	1/1/2016	1/14/2016	5	10	
2	Site Preparation	Site Preparation	1/15/2016	1/15/2016	5	1	
3	Grading	Grading	1/16/2016	1/19/2016	5	2	
4	Building Construction	Building Construction	1/20/2016	6/7/2016	5	100	
5	Paving	Paving	6/8/2016	6/14/2016	5	5	
6	Architectural Coating	Architectural Coating	6/15/2016	6/21/2016	5	5	

Construction Areas

Acres of Grading (Site Preparation Phase): 0.5

Acres of Grading (Grading Phase): 0

Acres of Paving: 0

Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 13,200; Non-Residential Outdoor: 4,400 (Architectural Coating – sqft)

Construction Equipment

Phase Number	Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
1	Demolition	Concrete/Industrial Saws	1	8.00	81	0.73
1	Demolition	Rubber Tired Dozers	1	1.00	255	0.40
1	Demolition	Tractors/Loaders/Backhoes	2	6.00	97	0.37
2	Site Preparation	Graders	1	8.00	174	0.41
2	Site Preparation	Tractors/Loaders/Backhoes	1	8.00	97	0.37
3	Grading	Concrete/Industrial Saws	1	8.00	81	0.73
3	Grading	Rubber Tired Dozers	1	1.00	255	0.40
3	Grading	Tractors/Loaders/Backhoes	2	6.00	97	0.37
4	Building Construction	Cranes	1	4.00	226	0.29
4	Building Construction	Forklifts	2	6.00	89	0.20
4	Building Construction	Tractors/Loaders/Backhoes	2	8.00	97	0.37
5	Paving	Cement and Mortar Mixers	4	6.00	9	0.56
5	Paving	Pavers	1	7.00	125	0.42
5	Paving	Rollers	1	7.00	80	0.38
5	Paving	Tractors/Loaders/Backhoes	1	7.00	97	0.37
6	Architectural Coating	Air Compressors	1	6.00	78	0.48

Construction Trips and VMT

Phase Number	Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
1	Demolition	4	10.00	0.00	63.00	14.70	6.90	LD_Mix	HDT_Mix	HHDT
2	Site Preparation	2	5.00	0.00	0.00	14.70	6.90	LD_Mix	HDT_Mix	HHDT
3	Grading	4	10.00	0.00	0.00	14.70	6.90	LD_Mix	HDT_Mix	HHDT
4	Building Construction	5	4.00	1.00	0.00	14.70	6.90	LD_Mix	HDT_Mix	HHDT
5	Paving	7	18.00	0.00	0.00	14.70	6.90	LD_Mix	HDT_Mix	HHDT
6	Architectural Coating	1	1.00	0.00	0.00	14.70	6.90	LD_Mix	HDT_Mix	HHDT

Construction Mitigation Measures

0

Exhaust Emission Data Sheet
2000DQKAE
60 Hz Diesel Generator Set
EPA NSPS Stationary Emergency

Engine Information:

Model:	Cummins Inc QSK60-G6 NR2	Bore:	6.25 in. (159 mm)
Type:	4 Cycle, 60°V, 16 Cylinder Diesel	Stroke:	7.48 in. (189 mm)
Aspiration:	Turbocharged and Low Temperature Aftercooled (2 Pump/2 Loop)	Displacement:	3673 cu. In. (60.1 liters)
Compression Ratio:	14.5:1		
Emission Control Device:	Turbocharged with Low Temperature Aftercooled		

	1/4	1/2	3/4	Full	Full	Full
PERFORMANCE DATA	**Standby**	**Standby**	**Standby**	**Standby**	**Prime**	**Continuous**
BHP @ 1800 RPM (60 Hz)	730.5	1461.0	2191.5	2922.0	2647.0	2332.0
Fuel Consumption (gal/Hr)	46.5	82.0	107.4	141.4	124.1	111.6
Exhaust Gas Flow (CFM)	6680	10635	12465	15385	13580	12665
Exhaust Gas Temperature (°F)	780	830	845	900	870	850
EXHAUST EMISSION DATA						
HC (Total Unburned Hydrocarbons)	0.22	0.13	0.10	0.11	0.09	0.09
NOx (Oxides of Nitrogen as NO2)	2.70	3.10	4.70	5.30	6.00	5.20
CO (carbon Monoxide)	0.57	0.36	0.13	0.18	0.16	0.15
PM (Particular Matter)	0.16	0.14	0.04	0.04	0.02	0.03
SO2 (Sulfur Dioxide)	0.14	0.13	0.11	0.11	0.11	0.11
Smoke (Bosch)	0.50	0.60	0.20	0.20	0.10	0.20

All values are Grams per HP-Hour

TEST CONDITIONS

Data is representative of steady-state engine speed (± 25 RPM) at designated genset loads. Pressures, temperatures, and emission rates were stabilized.

Fuel Specification:	ASTM D975 No. 2-D diesel fuel with 0.03-0.05% sulfur content (by weight), and 40-48 cetane number.
Fuel Temperature:	99 ± 9 °F (at fuel pump inlet)
Intake Air Temperature:	77 ± 9 °F
Barometric Pressure:	29.6 ± 1 in. Hg
Humidity:	NOx measurement corrected to 75 grains H2O/lb dry air
Reference Standard:	ISO 8178

The NOx, HC, CO and PM emission data tabulated here are representative of test data taken from a single engine under the test conditions shown above. Data for the other components are estimated. These data are subjected to instrumentation and engine-to-engine variability. Field emission test data are not guaranteed to these levels. Actual field test results may vary due to test site conditions, installation, fuel specification, test procedures and instrumentation. Engine operation with excessive air intake or exhaust restriction beyond published maximum limits, or with improper maintenance, may results in elevated emission levels.

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APPENDIX B

Greenhouse Gas Assessment

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Greenhouse Gas Assessment For:

UCI Medical Center Energy Plant Expansion

Prepared For:

University of California, Irvine
Environmental Planning and Sustainability
380 University Tower
Irvine, CA 92697-2325

Prepared By:

Landrum & Brown
Matthew B. Jones P.E.
19700 Fairchild, Suite 230
Irvine, CA 92618
949•349•0671

December 17, 2015
Report #559701GG201

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1.0 Introduction

This report analyzes the potential greenhouse gas (GHG) climate change impacts associated with expansion of the University of California, Irvine (UCI) Medical Center's Energy Plant. Background information on GHGs and the impacts of climate change are presented along with an estimate of the GHG emissions associated with the Project and an assessment of their impact. Section 1.1 presents a detailed description of the proposed project.

Section 2.0 provides background information on GHGs and climate change. The compounds identified as GHGs and their effect is discussed along with the impacts of climate change and the impacts of adapting to climate change are discussed in Section 2.1. Section 2.2 presents inventories of GHG emissions to provide context for the Project's emissions. Sources of GHG emissions in the State of California are discussed in Section 2.3. Federal, state and local plans, policies, regulations, and laws relating to GHGs and climate change are discussed in Section 2.4.

Potential GHG impacts from the proposed Project are assessed in Section 3.0. The thresholds of significance used to assess the Project's impacts are presented in Section 3.1. The methodology used to estimate project-related GHG emissions is discussed in Section 3.2. The results of the GHG emissions estimate is presented in Section 3.3, and the impact from the Project are discussed in Section 3.4. Mitigation is discussed in Section 4.0.

1.1 Project Description

The overall Project site is the UCI Medical Center Campus, which is located south of Chapman Avenue, north of Dawn Way, east of The City Drive, and west of the Santa Ana (I-5) Freeway. Note that the triangle parking lot north of Chapman Avenue bounded by The City Drive and the Santa Ana (I-5) Freeway is also part of the campus. Figure 1 presents a vicinity map showing the Project location and Figure 2 shows an aerial photograph of Medical Center with the location of the areas that will be affected by the project shown.

The Project proposes the expansion of UCI Medical Center's Energy Plant through the addition and replacement of chiller units with associated cooling towers as well as the addition of diesel emergency generators. The energy plant functions that serve the hospital portions of the campus (Buildings 1A and 3 and a future 300,000 square foot ancillary building) are regulated by the California Office of Statewide Health Planning and Development (OSHPD), while those that serve the non-hospital portions of the campus are not. This results in the Project having two components, the OSHPD Plant and the Non-OSHPD Plant. The OSHPD Plant portion of the Project is located along the eastern boundary of the Medical Center Campus, along I-5, near the southeast corner of the campus as shown on Figure 2. The Non-OSHPD Plant portion of the Project is located near the middle of the campus along the southern boundary.

The existing OSHPD Plant includes 2,250 tons of chillers and an existing 2,250-ton cooling tower. The OSHPD Plant project proposes the removal of an existing 250-ton chiller and the addition of a 1,000-ton chiller in a pre-engineered module that

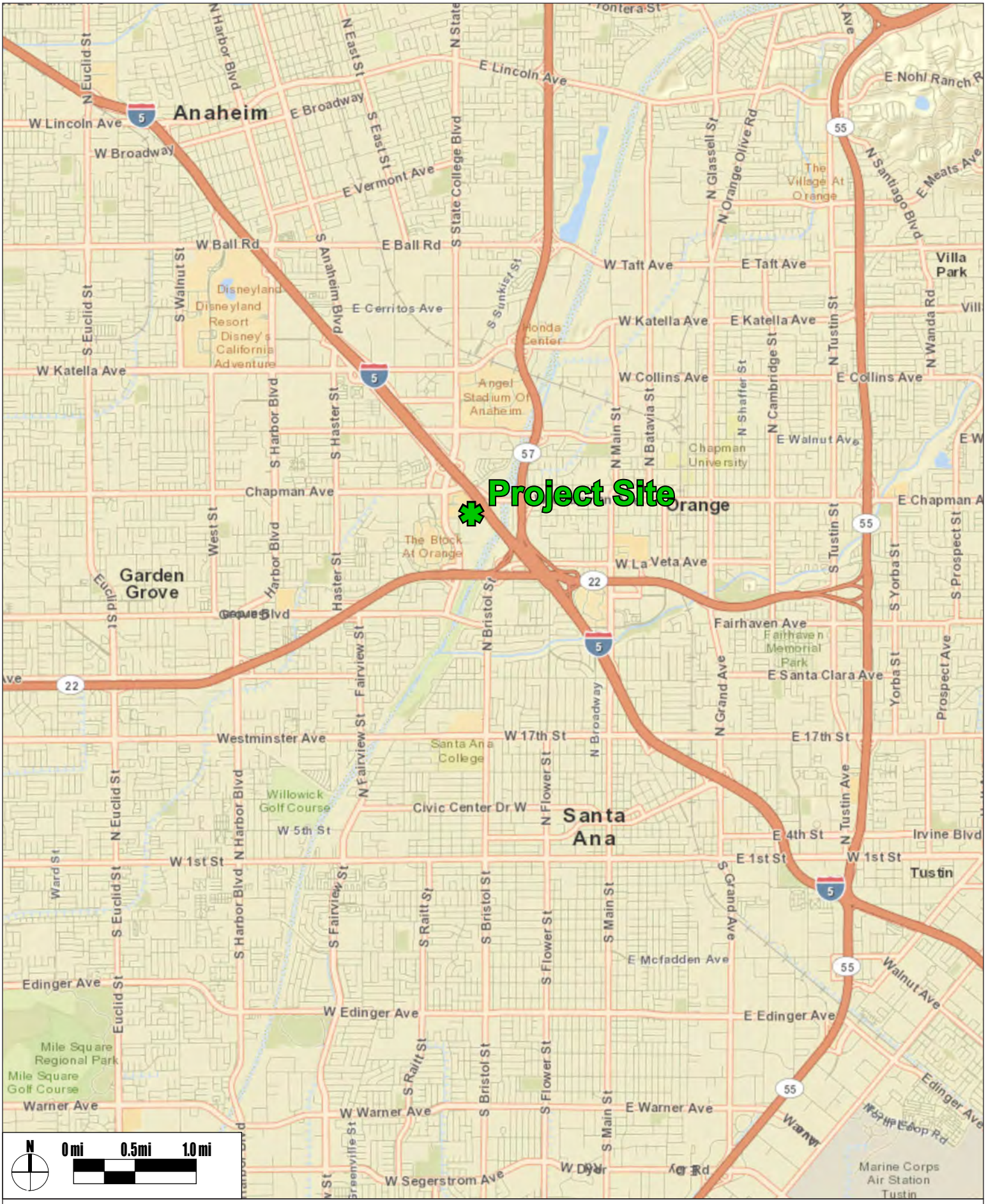


Figure 1
Vicinity Map

UCI Medical Center Energy Plant Expansion

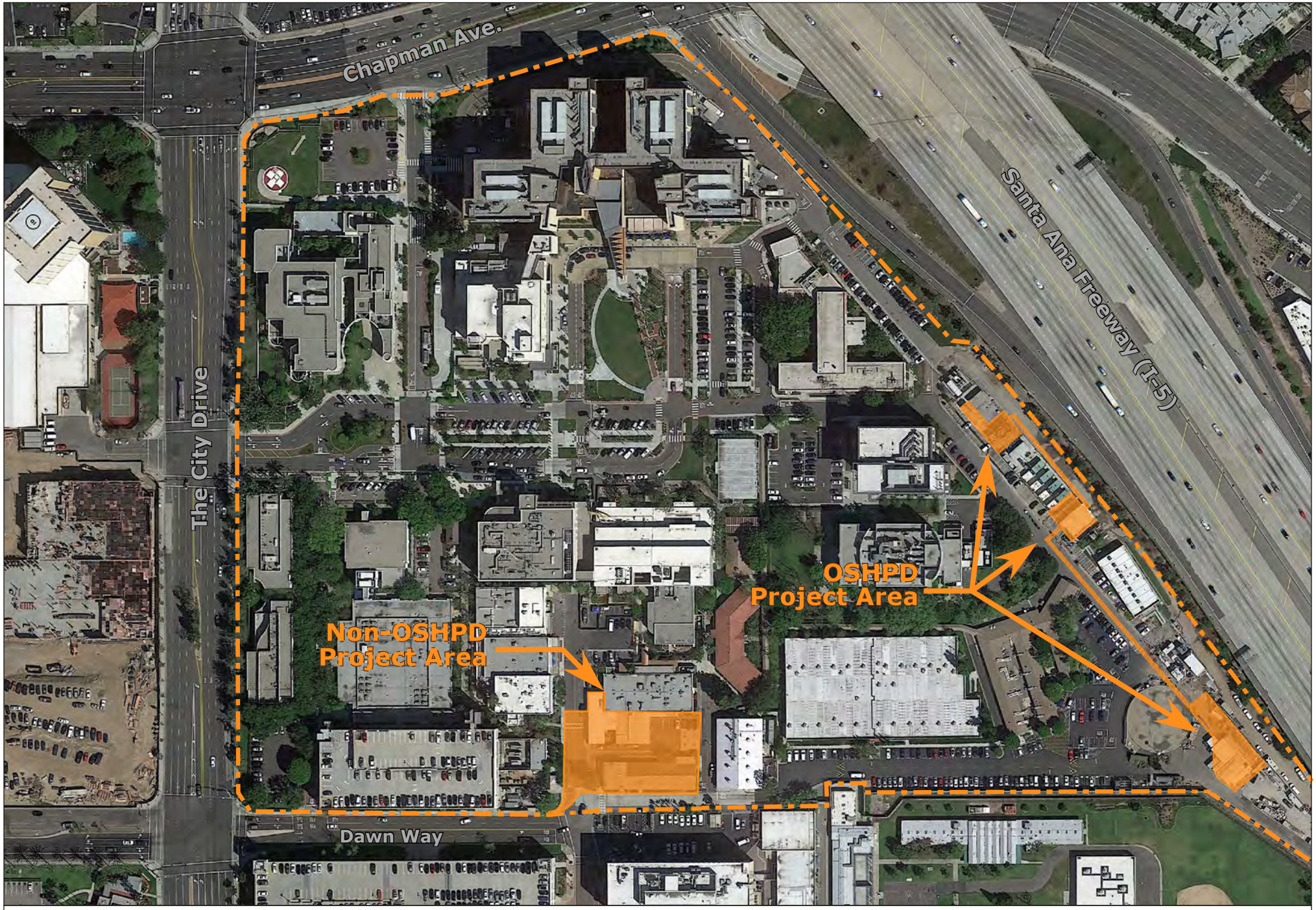


Figure 2
Project Areas

UCI Medical Center Energy Plant Expansion

has the capability of adding a second 1,000-ton chiller. A new 3,000-ton cooling tower will be installed to replace the existing 2,250-ton cooling tower. This modular cooling tower will ultimately be equipped to provide 4,000 tons of cooling at buildout of the Medical Center's Long Range Development Plan (LRDP). The OSHPD Plant component of the Project also includes the installation of a 1,500 kW diesel generator. This generator will be tested for 30 minutes approximately every 40 days. Figure 3 shows an aerial photo with the boundary of the OSHPD Plant project site indicated and Figure 4 shows the proposed site plan.

The Non-OSHPD Plant portion of the Project proposes the addition of 4,000-ton chiller plant in a new 8,000 square foot two story building. A 1,000-ton modular cooling tower will be installed that can be upgraded to ultimately provide 4,000 tons of cooling for the Non-OSHPD chiller plant at buildout of the LRDP. In addition, four 2,000 kW diesel emergency generators will be installed. Initially, only a single generator will be installed. The remaining generators will be installed as the LRDP is completed. These generators will be tested for 30 minutes approximately every 40 days. Figure 5 shows an aerial photo with the boundary of the Non-OSHPD Plant portion of the Project indicated and Figure 6 shows the proposed site plan.

0' 30' 60'

Project Site

Figure 3
OSHPD Project Boundaries
UCI Medical Center Energy Plant Expansion

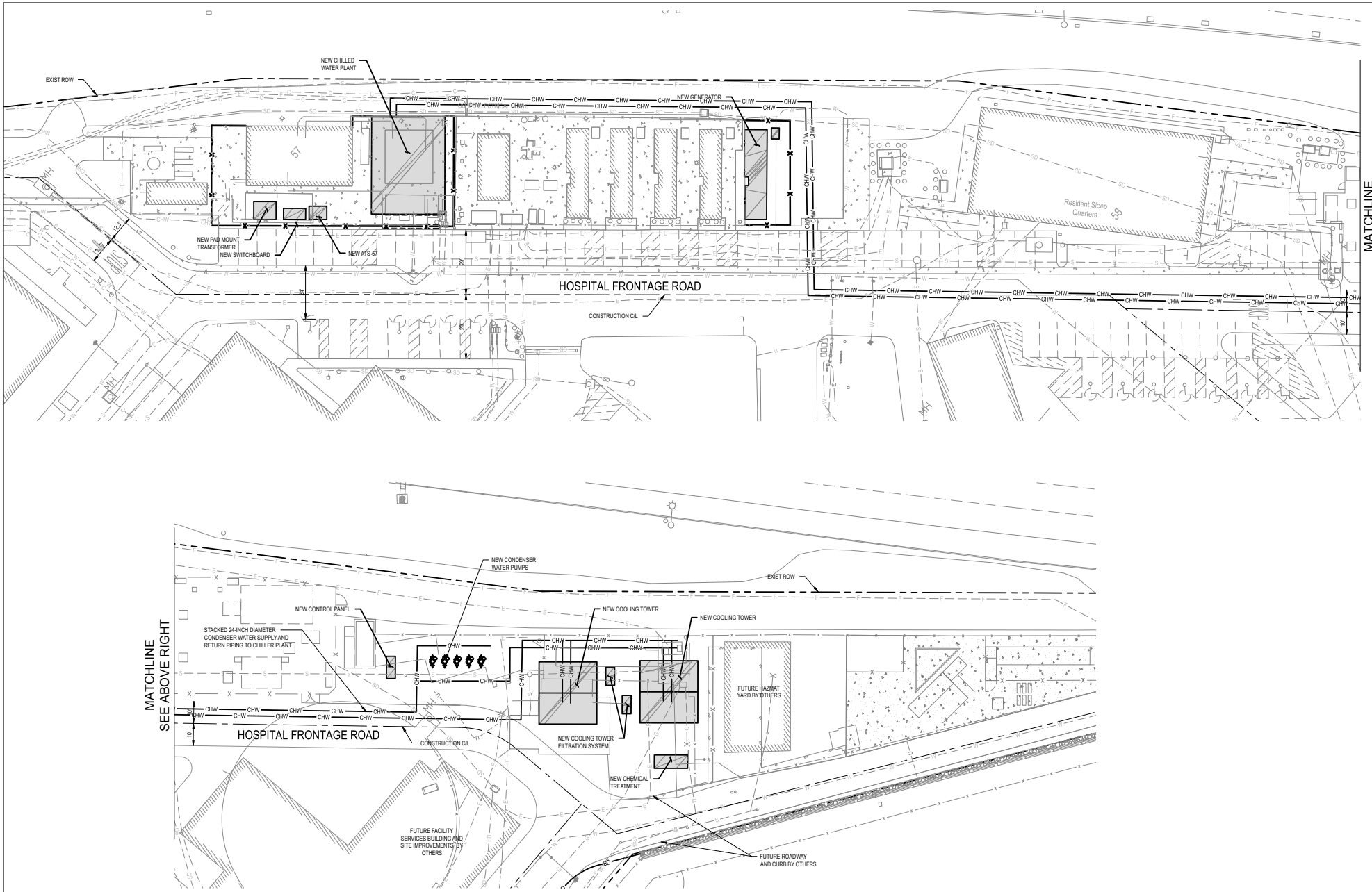


Figure 4
OSHPD Site Plan

UCI Medical Center Energy Plant Expansion

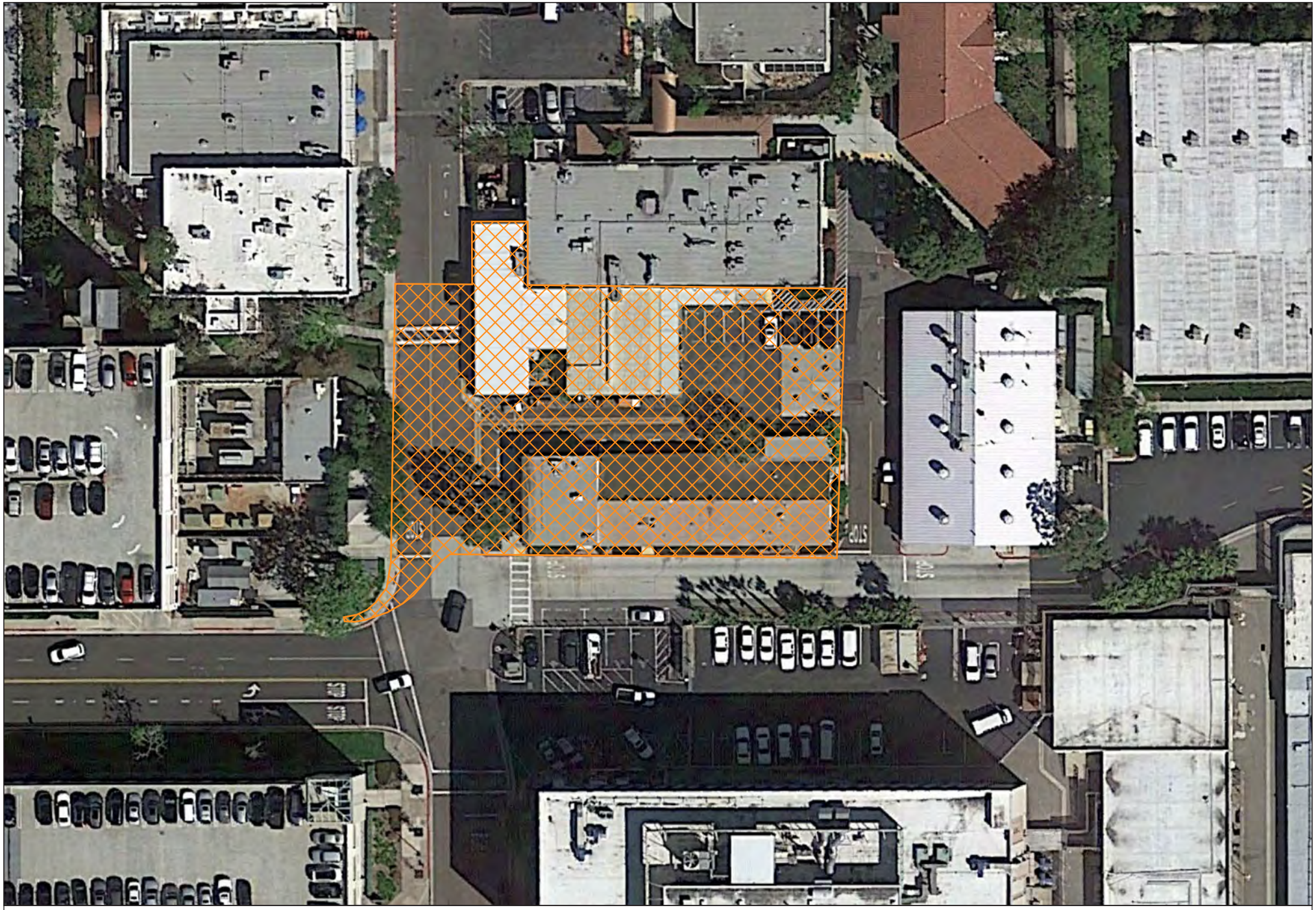


Figure 5
Non-OSHPD Project Boundaries
UCI Medical Center Energy Plant Expansion

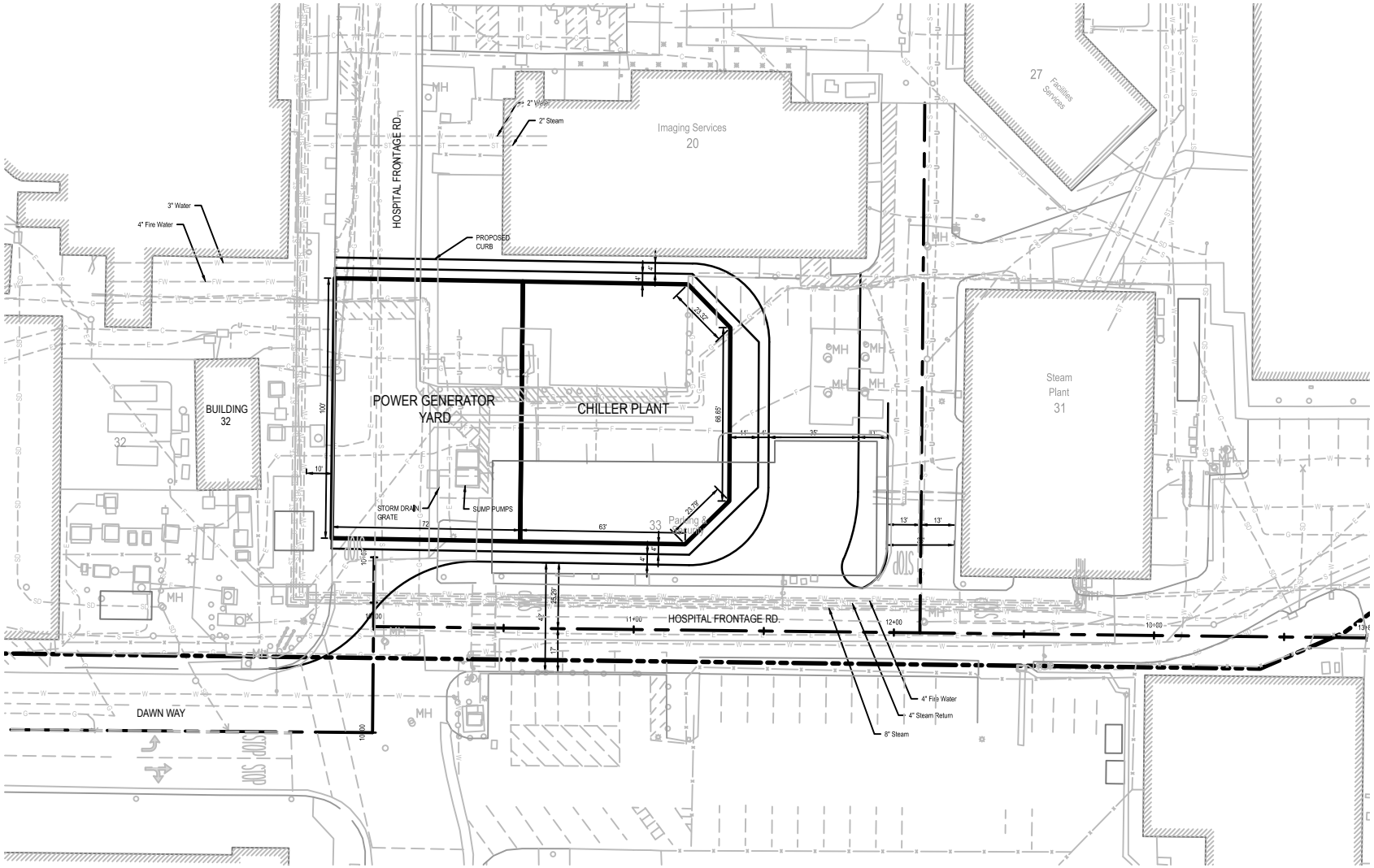


Figure 6
Non-OSHPD Site Plan

UCI Medical Center Energy Plant Expansion

2.0 Existing Setting

2.1 Greenhouse Gas and Climate Change Background Information

The International Panel on Climate Change's (IPCC) Fifth Assessment Report (AR5) affirms that the planet is warming and that humans beings are "extremely likely" (indicating a 95 percent certainty) to be the primary cause. Since global warming and climate change emerged publically as an environmental issue in the 1980s, the scientific evidence has grown even stronger that the climate is changing; the impacts are widespread and occurring now. This evidence includes rising temperatures, shifting snow and rainfall patterns, and increased incidents of extreme weather events.

The global average temperature has increased by approximately 1.6°F (0.9°C) above pre industrial levels due to the release of GHGs. Scientific research indicates that an increase in the global average temperature greater than 3.6°F (2.0°C) poses severe risks to natural systems and human health and well-being. With an additional 2.0°F (1.1°C) increase in temperatures, sea levels are anticipated to rise between 1.3 and 2.6 feet (0.4 to 0.8 meters) over current levels with an upper end estimate of an increase of approximately 3.2 feet (1.0 meters).

2.1.1 Greenhouse Gasses

The "greenhouse effect" is the natural process that retains heat in the troposphere, the bottom layer of the atmosphere. Without the greenhouse effect, thermal energy would "leak" into space resulting in a much colder and inhospitable planet. With the greenhouse effect, the global average temperature is approximately 61°F (16°C). GHGs are the components of the atmosphere responsible for the greenhouse effect. The amount of heat that is retained is proportional to the concentration of GHGs in the atmosphere. As more GHGs are released into the atmosphere, GHG concentrations increase and the atmosphere retains more heat increasing the effects of climate change.

Six gasses were identified by the Kyoto Protocol for emission reduction targets: carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O), hydrofluorocarbons (HFC), perfluorocarbons (PFC), and sulfur hexafluoride (SF_6). Chlorofluorocarbons and other chlorine or bromine-containing gasses are also considered GHG's but these are stratospheric ozone (the beneficial kind that blocks ultraviolet rays from the sun) depleting substances that were phased out under the Montreal Protocol. The IPCC's AR5 report identified additional GHGs including the synthetic gases nitrogen triflouride (NF_3) and sulfuryl fluoride (SO_2F_2). In addition, tropospheric ozone (O_3) and black carbon have been identified as important climate pollutants.

Water vapor is also a GHG. Water vapor is a highly active component of the climate system that responds rapidly to changes in conditions by either condensing into rain or snow, or evaporating to return to the atmosphere. The water content of the atmosphere is constantly being depleted by precipitation as well as being replenished by evaporation. Since its concentration is controlled by the climate itself, water vapor acts as a fast feedback, reacting to, and amplifying the warming provided by the forcing greenhouse gases. Human activity does not significantly affect water vapor concentrations except at local scales.

Black carbon is considered a GHG as well. Black carbon is the most strongly light-absorbing component of particulate matter (PM) emitted from burning fuels. Black carbon contributes to climate change directly by absorbing sunlight, indirectly by depositing on snow, and by interacting with clouds and cloud formation. Additionally, black carbon deposits on glaciers and snow packs increase the solar radiation absorbed, increasing the melting rate. This is a special concern for California because of its dependence on the Sierra snow pack for water.

Black carbon emissions from anthropogenic sources in California have been reduced considerably, by about 70 percent between 1990 and 2010. A large portion of the black carbon emission reductions are due to measures enacted to meet the particulate ambient air quality standards and to reduce Diesel Particulate Matter (DPM) emissions. DPM has been identified by the State as a toxic air contaminant. Current emission reduction programs are anticipated to eliminate approximately 95% of anthropogenic black carbon emissions by 2020. However, the majority of black carbon emissions in California are natural, not anthropogenic. The greatest source of natural black carbon emissions in the state is wildfires, and one of the consequences of climate change is increased wildfire activity.

Carbon dioxide (CO_2) is undoubtedly the most important GHG, methane (CH_4) the second most important, and nitrous oxide (N_2O) close behind. Approximately 80 percent of the total radiative forcing (i.e., the amount of heat stored in the atmosphere) is caused by these three gasses. Since pre-industrial times (circa 1750) carbon dioxide concentrations have increased by about 40 percent, methane concentrations have increased about 150 percent, and nitrous oxide concentrations have increased about 20 percent. These increases are due the use of fossil fuels, fertilizer usage, and from land use and land use change—in particular, agriculture.

Carbon dioxide, methane, and nitrous oxide are emitted by human activities as well as natural sources. Human sources of carbon dioxide include the burning of fossil fuels, deforestation, and cement production. There are also abundant natural sources of carbon dioxide such as wild fires, decomposition, ocean release, respiration, and volcanoes. In fact, the amount of carbon dioxide emissions from natural sources is much greater than from human sources. However, prior to the industrial revolution the amount of carbon dioxide produced by natural sources was completely offset by natural carbon sinks that remove carbon dioxide from the atmosphere. The additional emissions from human sources have upset the balance of the carbon cycle that has existed near equilibrium for thousands of years. Human emissions of methane are much greater than natural emissions and include landfills, livestock farming, as well as the production, transportation and use of fossil fuels. Natural sources of methane include wetlands, termites and the oceans. The primary human sources of nitrous oxide are agriculture, fossil fuel combustion, and industrial process. The main natural sources are soils under natural vegetation and the oceans.

Methane is the principle component of natural gas. It is also produced biologically under anaerobic decomposition in ruminants (e.g., cows) and landfills. Methane is considered the second most important GHG due to its high Global Warming Potential (GWP)—a measure of a GHG's warming effect relative discussed further below—and the fact that methane concentrations have increased considerably as a

result of human activities related to agriculture, fossil fuel extraction and distribution, and waste generation and processing.

Methane is also important because it contributes to background tropospheric ozone and modeling has shown tropospheric ozone concentrations change almost linearly with changes in methane emissions. Tropospheric ozone (i.e. ground level) concentrations have risen about 30 percent since pre-industrial times and ozone is considered by the IPCC as the third most important GHG after carbon dioxide and methane.

All of the other GHG's are emitted by specific industrial activities, such as aluminum or semiconductor manufacturing, or are used as refrigerants and emitted to the atmosphere from leaks or improper handling of the substances. The three main categories of fluorinated gasses, HFCs, PFCs, and SF_6 have no natural sources and only come from human related activities. However, these GHGs are considered important because their relative effect on the climate even at low concentrations. As shown below, the GWP of these gasses are thousands of time greater than carbon dioxide.

Each of the GHGs affects climate change at different rates and persists in the atmosphere for different lengths of time. For example, because of the way it absorbs infrared heat and the length of time it exists in the atmosphere, one sulfur hexafluoride molecule has the same effect as between 17,500 and 23,500 carbon monoxide molecules. The relative measure of the potential for a GHG to trap heat in the atmosphere is called global warming potential (GWP). GWP accounts for both the difference in the amount of heat that is trapped and the lifetime of the GHG, the amount of time it remains in the atmosphere. Table 1 presents the lifetimes and GWP for the primary GHGs. The GHG listed at the top of the table are categorized as long-lived as they exist in the atmosphere for long periods of time, 100 years or more. The three GHG's listed at the bottom of the table are classified as short-lived and persist in the atmosphere for less than 20 years.

The distinction between short-lived and long-lived climate pollutants is important because controlling the short-lived pollutants is a promising method for limiting climate change. The First Update to California's Climate Change Scoping Plan, discussed in Section 2.4.2, states that the use of existing best available control technologies to decrease emissions of short-lived GHGs can reduce the probability of exceeding the $2^{\circ}C$ global temperature increase barrier before the year 2050 to less than ten percent. These existing technologies can reduce the risk of this temperature increase occurring by the year 2100 to less than 50 percent and reduce sea level rise by 25 percent.

Global GHG emissions are measured in million metric tons of carbon dioxide equivalent ("MMT CO_2EQ") units. A metric ton, 1,000 kilograms, is approximately 2,205 lbs. The CO_2 equivalent emissions are calculated by multiplying the quantity of emissions from each GHG by its GWP. Typically, CO_2EQ is based on the 100-year GWP. Emissions of one metric ton of CO_2, N_2O, and CH_4 each, would be equivalent to emissions of 294 MT CO_2EQ (1 MT from the CO_2, 28 MT from the N_2O, and 265 MT from the CH_4).

Table 1
GHG Lifetimes and Global Warming Potentials (GWP)

Pollutant	Lifetime (years)	Global Warming Potential 20-year	Global Warming Potential 100-year[1]
Long-Lived			
Carbon dioxide (CO_2)	~100[2]	1	1
Nitrous oxide (N_2O)	121	264	265
Nitrogen trifluoride (NF_3)	500	12,800	16,100
Sulfur hexafluoride (SF_6)	3,200	17,500	23,500
Perfluorocarbons (PFC)	3,000–50,000	5,000–8,000	7,000–11,000
Short-Lived (<20 years)			
Black Carbon[3]	Days to Weeks	270–6,200	100–1,700
Methane (CH_4)	12	84	28
Hydrofluorocarbons (HFC)[4]	(<1 to >100)	~100–11,000	~100–12,000

1. The 20- and 100-year global warming potential estimates are from the IPCC 2013 Fifth Assessment Report (AR5), which includes the independent scientific assessment of the black carbon radiative, forcing published in early 2014.
2. CO_2 has a variable atmospheric lifetime and cannot be readily approximated as a single number.
3. BC climate effects are highly uncertain, in large part because they depend on the conditions under which they are emitted (i.e., location and time of year). This type of uncertainty does not apply to the Kyoto greenhouse gases.
4. HFCs have a wide range of lifetimes—some long, some short by this definition. Correspondingly, they have a wide range of GWPs.

Source: First Update to the Climate Change Scoping Plan, State of California, 2014

2.1.2 Impact of Climate Change on California and Human Health

The long term environmental impacts of climate change include sea level rise that could cause devastating erosion and flooding of coastal cities and villages, as well as more intense hurricanes and typhoons worldwide. In California, scientists have identified the early signs of climate change: increased average temperatures, changes in temperature extremes, reduced snowpack in the Sierra Nevada, sea-level rise, and ecological shifts. The State is anticipated to retain its Mediterranean climate with relatively cool wet winters and hot, dry summers. Generally, the State is anticipated to experience overall hotter and drier conditions with a continued reduction in winter snow, with concurrent increases in winter rains. Increased average temperatures and accelerating sea-level rise along with its associated coastal erosion are anticipated as well. In addition, the intensity of extreme weather events, such as heat waves, wildfires, droughts and floods, are likely to be some of the earliest climate impacts experienced.

The State's 2009 Climate Change Impacts Assessment (the 2009 Scenarios Project) examined future projections of impacts from climate change. A large source of uncertainty in projecting future impacts is how global GHG emissions will change in the future. Future emissions will depend on if the world remains competitive without cooperation in development, a high GHG emissions scenario, or if the world engages in high levels of environmental and social consciousness and engage in global cooperation for sustainable development, a low GHG emissions scenario.

Based on these two emissions scenarios and six global climate models the climate changes anticipated for the State in the 2009 Scenarios Project include:

- Temperature rise between 1.8° and 5.4° F by 2050
- Temperature rise between 3.6° and 9.0° F by 2100
- 10 to 100 times increase in the frequency of extreme temperatures estimated to occur once every 100 years
- Heat waves are expected to increase in frequency, duration, and area affected
- Precipitation decrease by 12% to 35% by 2050
- Longer dry spells interspersed with occasional intense rainfall event
- Sea level rise between 12 and 18 inches by 2050
- Sea level rise between 21 and 55 inches by 2100

Average temperature increases are expected to be more pronounced in the summer than in the winter. Inland areas are expected to experience more pronounced warming than coastal regions. The frequency of large coastal storms and heavy rainfall events are not anticipated to change significantly. However, coastal impacts from storms will increase due to sea level rese.

An increase in the frequency of extreme events may result in more event-related deaths, injuries, infectious diseases, and stress-related disorders. Particular segments of the population such as those with heart problems, asthma, the elderly, the very young and the homeless can be especially vulnerable to extreme heat. In addition, climate change may increase the risk of some infectious diseases; particularly those diseases that appear in warm areas and are spread by mosquitoes and other insects. These "vector-borne" diseases include malaria, dengue fever, yellow fever, and encephalitis. Further, algal blooms could occur more frequently as temperatures warm—particularly in areas with polluted waters—in which case diseases (such as cholera) that tend to accompany algal blooms could become more frequent. The increased temperatures also result in more harmful air pollution levels.

2.1.3 Adaptation Impact

Adaptation is the reduction of harmful impacts on social and biological systems that will occur due to environmental changes caused by global climate change. Coastal communities will need to adapt to rising sea levels. Other areas will need to adapt to more intense extreme weather events and changes to flooding patterns. It also encompasses making the most of beneficial changes such as longer growing seasons and increased crop yields in some areas.

Global warming is already having a profound impact on water resources. Climate change has already altered the weather patterns and water supply in California leading to increased water shortages (i.e., a dwindling snowpack, bigger flood flows, rising sea levels, longer and harsher droughts). Water supplies are also at risk from rising sea levels. Risks may include degradation of California's estuaries, wetlands, and groundwater aquifers, which would threaten the quality and reliability of California's fresh water supply.

Higher temperatures will also likely increase electricity demand due to higher air conditioning use. Even if the population remained unchanged, toward the end of the century annual electricity demand could increase by as much as 20 percent if temperatures rise into the higher warming range.

Adaptation includes the responses to the changing climate and policies to minimize the predicted impacts (e.g., building better coastal defenses to sea level rise). Adaptation is not included in this report. It should be noted that adaptation is not mitigation. Mitigation includes intervention or policies to reduce GHG emissions or to enhance the sinks of GHGs.

In California, adaptation planning has been one of the primary responses to the threat of climate change. The California Natural Resources Agency published the 2009 California Adaptation Strategy in response to Executive Order S-13-08. The adaptation strategy was updated and renamed the Safeguarding California Plan in 2014. Work continues to develop and implement this plan as discussed in Section 2.4.2.8. The State has also published a website http://cal-adapt.org which provides interactive maps of anticipated climate change impacts along with other adaptation related information.

2.2 Emission Inventories

To put perspective on the emissions generated by a project and to better understand the sources of GHGs, it is important to look at emission inventories. The World Resources Institute has published a website with emission inventories by state and by country (http://cait2.wri.org). Table 2 lists the top ten GHG producing countries in 2011 with the quantity of GHG emissions and the percentage of total world emissions. Because total GHG emissions are largely dependent on the size of the country the amount of emissions per dollar of gross domestic product (GDP) and per person are presented as well. The total worldwide GHG emissions and emissions per GDP and per capita are provided as well. GHG emissions for California are presented at the bottom of the table for comparison.

Table 2
Top Ten CO_2 Producing Nations in 2011

Country	Total GHG Emissions (MMT CO_2EQ)	Percent of World Total	GHG Emissions per GDP ($MTCO_2EQ$/ $ Million GDP)	GHG Emissions per Capita ($MTCO_2EQ$/ person)
1. China	10,553	24%	2,516	7.9
2. United States	6,550	15%	473	21.0
3. India	2,486	6%	1,875	2.0
4. Russian Federation	2,374	5%	2,504	16.6
5. Japan	1,307	3%	283	10.2
6. Brazil	1,131	3%	1,004	5.7
7. Germany	883	2%	289	10.8
8. Indonesia	835	2%	2,074	3.4
9. Canada	716	2%	580	20.9
10. Iran	716	2%	2,862	9.5
Rest of World	*16,266*	*37%*		
World	**43,817**		**821.5**	**6.3**
18. California	429	1%	253.6	11.4

Source: World Resource Institute's Climate Data Explorer (http://cait2.wri.org)

Total world GHG emissions were 43,817 MMT CO_2EQ in 2011. China generated the highest GHG emissions with 24 percent of the total world emissions. Emissions from top four countries, China, United States, India, and Russian Federation are 50 percent of the world total emissions. China and the United States Account for 39 percent of the world total GHG emissions.

There are only seven countries, including the United States, with larger economies (as measured by GDP) than California and 34 countries with larger populations. There are 169 countries with higher GHG emissions per GDP than California and only 30 lower. Central Africa is highest with 45,083 MT CO_2EQ emissions per million dollars in GDP. There are 32 countries with higher emissions per capita than

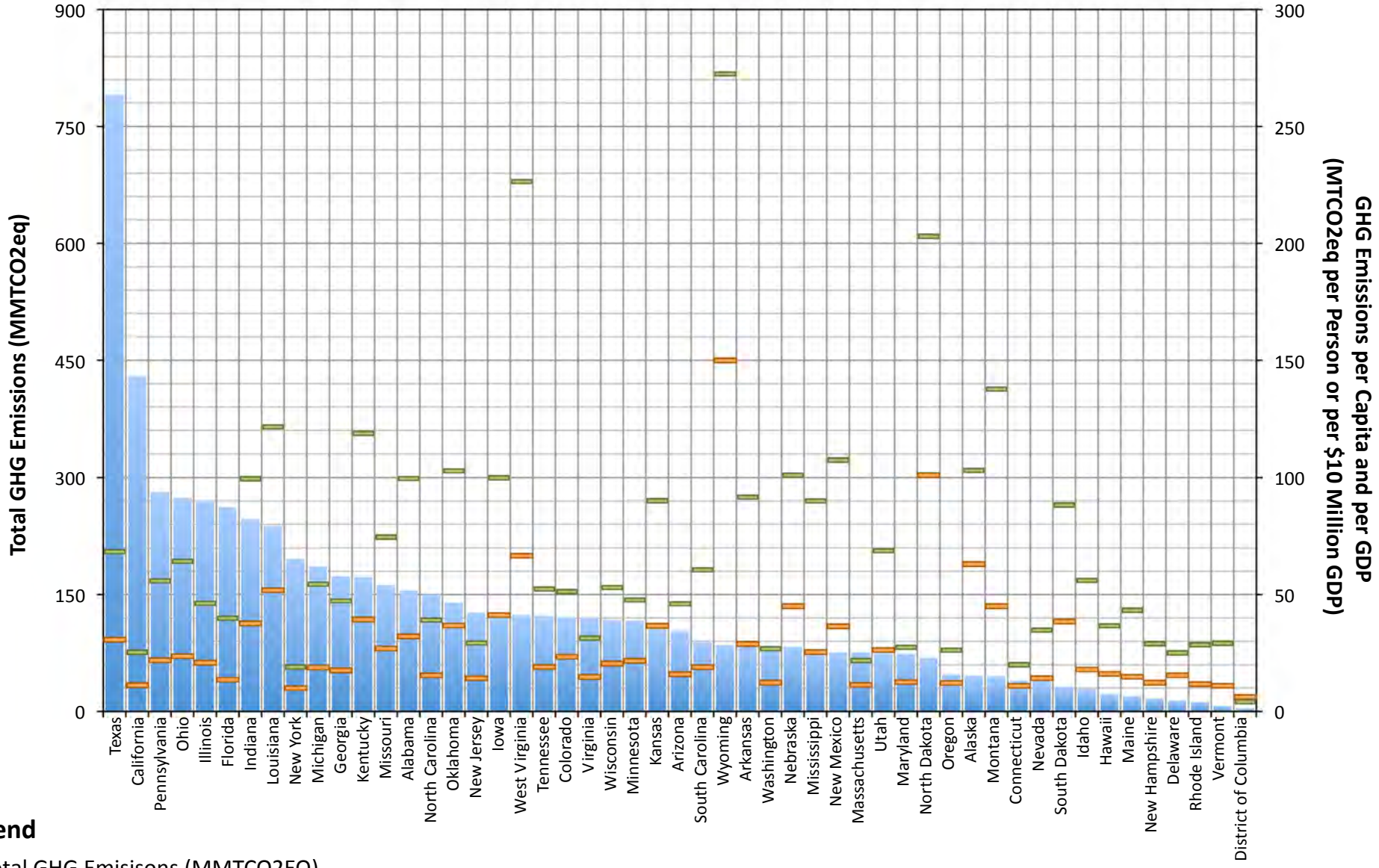
California, and Kuwait has the highest emissions per capita at 62.6 MT CO_2EQ per person.

Within the United States, California has the second highest level of GHG production with Texas having the highest. Figure 7 shows the total GHG emissions from each state. The exhibit also shows the GHG emissions per person and per GDP. In 2011, only three states, New York, Vermont, Connecticut and the District of Columbia, had lower GHG emissions per person than California. Only four states, New York, Connecticut, Massachusetts, and Delaware, and the District of Columbia had lower GHG emissions per GDP.

2.3 Sources of Greenhouse Gases in California

CARB categorizes GHG generation by source into five broad categories. The categories are:

- **Transportation** includes the combustion of gasoline and diesel in automobiles and trucks. Transportation also includes jet fuel consumption and bunker fuel for ships.
- **Agriculture and forestry** GHG emissions are composed mostly of nitrous oxide from agricultural soil management, CO_2 from forestry practice changes, methane from enteric fermentation, and methane and nitrous oxide from manure management.
- **Commercial and residential** uses generate GHG emissions primarily from the combustion of natural gas for space and water heating.
- **Industrial** GHG emissions are produced from many industrial activities. Major contributors include oil and natural gas extraction; crude oil refining; food processing; stone, clay, glass, and cement manufacturing; chemical manufacturing; and cement production. Wastewater treatment plants are also significant contributors to this category.
- **Electric generation** includes both emissions from power plants in California as well as power plants located outside of the state that supply electricity to the state.
- **Recycling and waste** includes primarily landfills.
- **High (GWP**) emissions consist of ozone depleting substance substitutes and electricity grid SF_6 losses.
- **Forestry** emissions are due to wildfires.



Legend

- Total GHG Emisisons (MMTCO2EQ)
- GHG Emissions per Capita (MTCO2eq per Person)
- GHG Emissions per GDP (MTCO2eq per $10 Million GDP)

Source: World Resources Institute Climate Data Explore, CAIT 2, Website (http://cait2.wri.org)

Figure 7
GHG Emissions By State

UCI Medical Center Energy Plant Expansion

The relative amount of GHGs released from each of these categories in California in between 2000 and 2012 is shown in Figure 8. Figure 8 shows that most of California's GHGs are emitted by transportation sources, such as automobiles, trucks, and airplanes. In 2012, combustion of fossil fuels in the transportation sector contributed approximately 37 percent of California's GHG emissions. This category was followed by the industrial sector (22 percent) and the electric power sector (including both in-state and out-of-state sources) (23 percent). It should be noted that prior to 2010, emissions from the electrical power sector were 2 to 23 MT CO_2EQ greater than industrial emissions. However, since 2010 electrical emissions have been 5 to 12 MT CO_2EQ lower than industrial emissions. This is a result of California's commitment to increasing sources of renewable electricity generation. Residential and commercial activity accounted for approximately nine percent of the emissions.

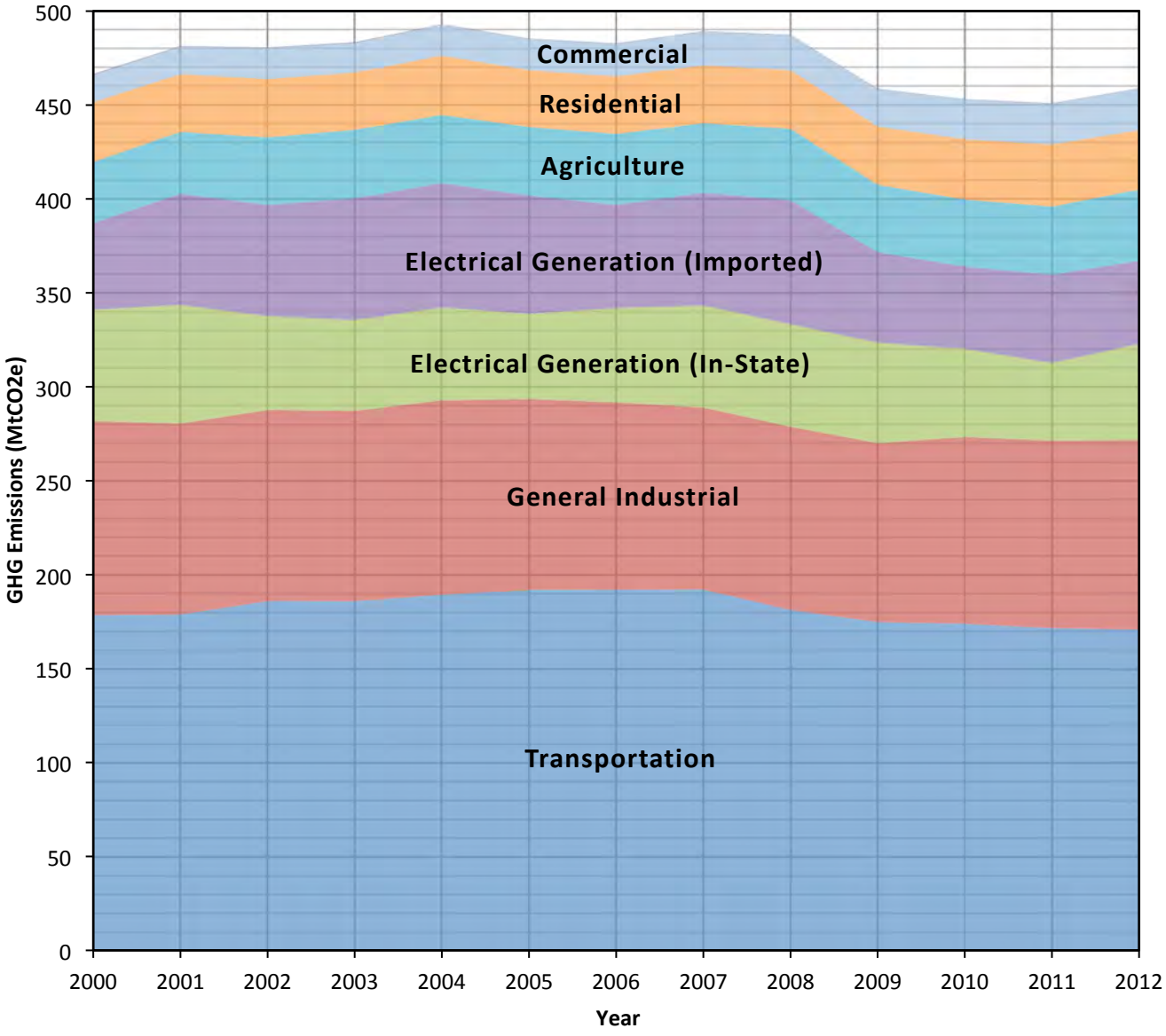
2.4 Regulatory Framework

2.4.1 Federal Plans, Policies, Regulations, and Laws

The federal government began studying the phenomenon of global warming as early as 1978 with the National Climate Protection Act, 92 Stat. 601, which required the President to establish a program to "assist the Nation and the world to understand and respond to natural and man-induced climate processes and their implications." The 1987 Global Climate Protection Act, Title XI of Pub. L. 100-204, directed the U.S. EPA to propose a "coordinated national policy on global climate change," and ordered the Secretary of State to work "through the channels of multilateral diplomacy" to coordinate efforts to address global warming. Further, in 1992, the United States ratified a nonbinding agreement among 154 nations to reduce atmospheric GHGs.

In 1999, a petition requested that EPA begin regulating GHGs. After taking extensive public comment, the EPA denied the petition in 2003. After lower courts denied petitions for review of EPA's decision, twelve states, several cities and environmental organizations sought further review in the Supreme Court. In their decision of *Massachusetts v. EPA* (Supreme Court Case 05-1120,April 2, 2007), the United State Supreme Court held that GHGs fall within the Clean Air Act's definition of an "air pollutant," and directed the EPA to consider whether GHGs are causing climate change. If so, the EPA must regulate GHG emissions from automobiles under the Clean Air Act. In April 2009, the EPA concluded that GHGs are a danger to public health and welfare, establishing a basis for GHG Regulation.

In September 2009, the EPA finalized a GHG reporting and monitoring program. This program requires facilities that emit more than 25,000 MT CO_2EQ to report their GHG emissions annually. In the most recent reporting year, 2013, 7,879 facilities in nine industry sectors reported direct emissions of 3.18 billion MT CO_2EQ, about half of the total GHG emissions in the United States.



Source: 2014 Edition California Greenhouse Gas Emission Inventory 2000-2012, CARB, May 2014

Figure 8
California GHG Emissions by Sector
UCI Medical Center Energy Plant Expansion

In June 2013, the Obama Administration published a Climate Action Plan with three key pillars: cutting carbon pollution emissions, preparing the country for the impacts of climate change, and leading international efforts to combat climate change and prepare for its impacts. The plan proposes cutting emissions under five general categories: (1) power generation, (2) transportation, (3) energy waste in homes, businesses, and factories, (4) specific GHGs (hydrofluorocarbons and methane), and (5) GHG emissions from federal government activities. The plan describes the activities that the administration has already undertaken to prepare for the impacts of climate change and proposes expanding these efforts in three major initiatives: (1) building stronger and safer communities and infrastructure, (2) protecting the economy and natural resources, and (3) using sound science to manage climate change impacts. The two key components to the administration's proposal to lead international efforts include working with other countries to take action to address climate change and international negotiations.

In September 2013, the EPA announced plans to adopt performance standards to limit GHG emissions from new power plants. In June 2014, the EPA announced a plan to reduce GHG emissions from existing power plants by 25 percent below 2005 levels by 2020 and by 30 percent by 2030. In addition, the Plan includes standards to limit emissions from modified and reconstructed power plants. In October 2014, the EPA announced a supplemental proposal to adopt standards for existing power plants. Over 4 million public comments were received regarding these proposals. In January 2015, the EPA announced it would begin the regulatory process for proposing a federal plan to meet goals for cutting carbon pollution from existing power plants. At the same time, the EPA announced plans to issue final rules on a clean power plan for existing power plants and carbon pollution standards for new, modified, and reconstructed power plants in the summer of 2015.

In March 2014, the Obama Administration released its Strategy to Reduce Methane Emissions as a part of its Climate Action Plan. This document describes several actions that the EPA and other federal agencies will take to reduce methane emissions from four source categories, landfills, coalmines, agriculture, and oil and gas. Under this plan, the EPA will propose updated standards to reduce methane emissions from new landfills and take public comment on whether to update standards for existing landfills. The Interior Department's Bureau of Land Management (BLM) will undertake rulemaking to develop a program for the capture and sale, or disposal of, waste methane from mines on lands leased by the Federal government. The U.S. Department of Agriculture (USDA), EPA, and Department of Energy (DOE) in partnership with the dairy industry will release a "Biogas Roadmap" outlining strategies to reduce U.S. dairy sector GHG emissions by 25 percent in 2020.

The Methane Reduction Strategy presents several measures to reduce emissions from oil and natural gas operations. The DOE and EPA will work with states, which are the primary regulators of many aspects of oil and gas production and natural gas distribution, to provide technical assistance in support of state policy actions, and to encourage broad adoption of proven mitigation strategies. The Strategy discusses how EPA regulations to address volatile organic compound (VOC) emissions, an ozone precursor, in natural gas production also reduce methane emissions. Further, the EPA has released a series of white papers on significant

sources of methane emissions from oil and gas operations[1]. The DOE will continue to work with stakeholders to reduce emission from natural gas systems and the EPA will bolster its voluntary Natural Gas STAR Program. The BLM will develop and draft rules to update the agencies requirements for venting and flaring of methane produced from Federal and Indian oil and gas leases. As a part of the Climate Action Plan, the DOE is preparing a Quadrennial Energy Review (QER) that will recommend actions that industry, and Federal and state governments can take to improve energy transmissions, storage, and distribution systems. The QER, slated for publication in spring of 2015, will evaluate methane abatement opportunities from the processing, transmission, storage, and distribution segments of the natural gas supply chain. In addition, the strategy calls for the Pipeline and Hazardous Materials Safety Administration to continue monitoring pipelines and require operators to eliminate leaks and prevent accidental methane releases. Finally, the DOE will support the development of new technologies to enable more cost-effective reductions through $8 billion of loan guarantees for advanced fossil energy projects and a $4.7 million DOE program to speed development of technologies for leak detection and monitoring, pipeline leak repair, smart pipeline sensors, and compressor controls.

In August 2014, the USDA, EPA, and DOE jointly released the Biogas Opportunities Roadmap, a voluntary strategy to reduce agriculture sector methane emissions. Biogas systems capture methane from farming operations and use it to generate electricity. Current biogas operations provide power for the equivalent of almost 70,000 average American homes. The report estimates that, with proper support, more than 11,000 additional biogas systems could be deployed in the US. These systems would provide electricity for more than 3 million average American homes and reduce methane emissions between 4 and 54 MMT CO_2EQ. The roadmap presents a number of steps that USDA, EPA, and DOE will take to accelerate the use of cost-effective methane energy technology to encourage its use.

In January 2015, the Obama administration announced several actions to reduce methane emissions from new or modified oil and gas production facilities. The EPA plans to propose Federal regulations to cut methane emissions from these facilities by 40 to 45 percent from 2012 levels in the next decade. The proposed rules are to be published in the summer of 2015 and completed by 2016. The EPA is expected to rely on mostly voluntary measures to cut methane emissions from existing oil and gas operations.

The federal government has also taken several steps to reduce GHG emissions by increasing automobile fuel economy. In December 2007, Congress increased the corporate average fuel economy (CAFÉ) standards for passenger cars and light trucks to 35 miles per gallon by 2020. In May 2009, the Obama Administration proposed a new national fuel economy program ultimately requiring an average fuel economy standard of 35.5 miles per gallon in 2016. In July 2011, President Obama announced an agreement with thirteen large automakers, representing 90 percent of all vehicles sold in the US, to increase fuel economy to 54.5 miles per gallon for cars and light-duty trucks by model year 2025.

[1] http://www.epa.gov/airquality/oilandgas/whitepapers.html

2.4.2 California State Plans, Policies, Regulations, and Laws

California has distinguished itself as a national and international leader in efforts to address global climate change by enacting several major pieces of legislation, engaging in multi-national and multi-state collaborative efforts, and preparing a wealth of information on the impacts associated with global climate change.

2.4.2.1 Activity Prior to 2005

In 2001, Senate Bills 1771 and 527 created the structure for the California Climate Action Registry. The non-profit Registry assisted organizations to voluntarily establish and record baseline GHG emissions so early action reductions could be considered in future regulations. In 2002, Assembly Bill 1493, Pavely, instructed CARB to develop and adopt GHG emission standards for automobiles. As discussed below, these standards were subject to legal challenges and non-approval by the EPA. However, the regulations that were eventually adopted became the basis of the federal fuel economy standards adopted in 2009. The State established its Renewable Energy Portfolio Standard Program in 2002 with a goal to increase the electricity generated using renewable energy to 20 percent by 2017. The 2005 Energy Action Plan increased this goal to 33 percent by 2020. In December 2004, Governor's Executive Order S-20-04 was issued directing state agencies to reduce energy use in state owned buildings by 20% by 2015 and to increase energy efficiency.

2.4.2.2 Executive Order S-3-05 and California Climate Change Assessments

In June 2005, Governor Arnold Schwarzenegger issued *Executive Order S-3-05*, which set GHG emissions reduction targets for the State of California and laid out responsibilities among the state agencies for implementing the Executive Order and for reporting on progress toward the targets. The Executive Order established GHG emission reduction targets of: 2000 levels by 2010, 1990 levels by 2020, and 80 percent below 1990 levels by 2050.

The Executive Order also established the Climate Change Policy and Climate Action Team, which has completed three Climate Change Assessments and is in the process of completing the fourth. These assessments examine the potential impacts of climate change in California and report potential adaptation impacts. Each assessment consists of a number of reports examining various aspects of climate change and adaptation. Summaries have been prepared for the first and second assessments. All of the reports are available at the State's Climate Change Portal website http://climatechange.ca.gov/climate_action_team/reports/climate_assessments.html.

The *First Climate Change Assessment*, released in 2006, looked at the potential impacts of climate change on key state resources such as the water supply, public health, agriculture, coastal areas, forestry, and electricity production and demand. The assessment influenced the passage of Assembly Bill 32, the *California Global Warming Solutions Act of 2006* discussed below in Section 2.4.2.4

The *Second Climate Change Assessment*, released in 2009, attempted to provide initial estimates of the economic impacts of climate change. It concluded that adaptation—as a complementary approach to mitigation—could substantially reduce

economic impacts of loss and damage from a changing climate. Findings from the Second Assessment were instrumental in preparing California's 2009 Statewide Adaptation Strategy discussed in Section 2.4.2.8.

The *Third Climate Change Assessment*, released in 2012, was shaped by the request for more information on vulnerability and adaptation options discussed in the 2009 California Adaptation Strategy. It made significant progress in projecting climate change impacts, but also in better understanding the interactions of those potential impacts with on the ground exposure, sensitivity, and response capacity of natural and human systems.

California's recently released *Climate Change Research Plan* articulates near-term climate change research needs to ensure that the state stays on track to meet its climate goals. The *Fourth Climate Change Assessment* is the first inter-agency effort to implement a substantial portion of the Plan and is currently being prepared.

2.4.2.3 Subsequent Executive Orders Related to Climate Change

In April 2006, Governor Schwarzenegger issued Executive Order S-06-06, which directs the Secretary of Cal EPA to participate in the Bio-Energy Interagency Working Group to address biofuels and bioenergy from renewable resources. In October of the same year, Executive Order S-20-06 was issued that establishes the responsibilities and roles of the Secretary of Cal EPA and the state agencies in climate change. In January 2007, Executive Order S-01-07 was issued establishing a goal to reduce the carbon intensity of transportation fuels by at least 10% by 2020 and calls for establishment of a Low Carbon Fuel Standard (LCFS). In November 2008, the Governor issued Executive Order S-13-08 directing state agencies to plan for sea level rise and other climate change impacts. This resulted in the preparation of the State' Adaptation Strategy discussed in Section 2.4.2.8.

In March 2012, Governor Edmund G. Brown Jr. issued Executive Order B-16-12, which orders State agencies to facilitate the rapid commercialization of zero-emission vehicles (ZEVs) and set a target for 1.5 million ZEVs in the state by 2025. The Executive Order also set a target for reducing transportation sector GHG emissions of 80 percent below 1990 levels by 2050. In April 2012, the Governor issued Executive Order B-18-12 that required State agencies to reduce GHG emission by 10% in 2015 and 20% in 2020, as measured against a 2010 baseline. In addition, the order sets requirements and goals for State buildings to be Zero Net Energy facilities and requires state agencies to reduce grid based energy purchases. The Executive Order included a Green Building Action Plan, which provided additional details and specific requirements for the implementation of the Executive Order.

In April 2015, Governor Brown issued Executive Order B-30-15 that established a GHG reduction target of 40 percent below 1990 levels by 2030 in order to meet the 2050 emission reduction target established by Executive Order S-03-05. CARB is directed to update the Climate Change Scoping Plan, discussed in Section 2.4.2.9, to express the 2030 target in terms CO_2EQ emissions. The Order also directs the California Natural Resources Agency to update the State's climate adaptation strategy, Safeguarding California, Discussed in Section 2.4.2.8 every three years.

2.4.2.4 California Global Warming Solutions Act of 2006 (AB 32)

In 2006, the State adopted the landmark *California Global Warming Solutions Act of 2006 (AB 32)*. This Act declared that global warming poses a serious threat to the economic well-being, public health, natural resources, and the environment of California. The Act directed CARB to take a number of actions: (1) identify and adopt regulations for discrete early actions that could be enforceable on or before January 1, 2010; (2) identify the statewide level of GHG emissions in 1990 to serve as the emissions limit to be achieved by 2020; (3) prepare and approve a Scoping Plan for achieving the maximum technologically feasible and cost-effective reductions in GHG emissions from sources or categories of sources of GHGs by 2020, and update the Scoping Plan every five years; (4) adopt a regulation that establishes a system of market-based declining annual aggregate emission limits for sources or categories of sources that emit GHG emissions; and (5) maintain and continue reductions in emissions of GHG beyond 2020. In addition, CARB was required to appoint and convene an Environmental Justice Advisory Committee and an Economic and Technology Advancement Committee to advise the Board during implementation of the Act.

The Early Action Plan and Scoping Plans required to be prepared under the Act are discussed in Sections 2.4.2.5 and 2.4.2.9 respectively.

In a December 2006 report, CARB estimated that California emitted between 425 and 468 million metric tons of CO_2EQ in 1990. In December 2007, CARB finalized 1990 emissions at 427 million metric tons of CO_2EQ, which established the 2020 emissions limit.

In December 2008, CARB enacted regulations under AB 32 to require mandatory reporting of GHG emissions capturing approximately 94 percent of industrial and commercial stationary source emissions. Entities required to report emissions included electricity generating facilities, electricity retail providers, oil refineries, hydrogen plants, cement plants, cogeneration facilities, and industrial sources that emit over 25,000 metric tons of CO_2 from stationary source

2.4.2.5 Early Action Plan

In October 2007, CARB published the *Early Action Plan* that identified nine discrete early action GHG reduction measures that were subsequently developed into voluntary programs and regulations. The regulations include: a low carbon fuel standard; landfill methane emission reductions; measures to reduce high GWP refrigerant emissions from vehicle air conditioning systems; requiring vehicle service providers to check and maintain proper tire pressures; requiring large semi truck trailers to incorporate aerodynamic features and low rolling resistance tires along with idle reducing technology; and providing dockside electrical service at shipping ports so that docked ships do not need to operate onboard generators. In addition, regulations were adopted to reduce high GWP GHG emissions associated with semiconductor manufacturing, to restrict the use of SF_6, and to reduce high GWP GHG emissions from consumer products.

2.4.2.6 Senate Bill 97 and CEQA Guidelines

In 2007, Senate Bill 97 was adopted requiring the Governor's Office of Planning and Research (OPR) to prepare amendments to the CEQA Guidelines for the feasible mitigation of GHG emissions and the effects of climate change. Further, the OPR is required to periodically update these guidelines as CARB implements AB 32.

In June 2008, OPR issued a Technical Advisory on CEQA and Climate Change that provided an outline of the elements needed for a CEQA GHG analysis. The amendments to the CEQA Guidelines implementing SB 97 became effective on March 18, 2010.

Those CEQA Guidelines amendments clarified several points, including:

- Lead agencies must analyze the GHG emissions of proposed projects, and must reach a conclusion regarding the significance of those emissions. (CEQA Guidelines § 15064.4.)
- When a project's GHG emissions may be significant, lead agencies must consider a range of potential mitigation measures to reduce those emissions. (CEQA Guidelines § 15126.4(c).)
- Lead agencies must analyze potentially significant impacts associated with placing projects in hazardous locations, including locations potentially affected by climate change. (CEQA Guidelines § 15126.2(a).)
- Lead agencies may significantly streamline the analysis of GHGs on a project level by using a programmatic GHG emissions reduction plan meeting certain criteria. (CEQA Guidelines § 15183.5(b).)
- CEQA mandates analysis of a proposed project's potential energy use (including transportation-related energy), sources of energy supply, and ways to reduce energy demand, including through the use of efficient transportation alternatives. (CEQA Guidelines, Appendix F.)

2.4.2.7 SB 375 – Sustainable Communities and Climate Protection Act

In 2008, the legislature passed SB 375, which built upon AB 32 by connecting the reduction of greenhouse gas emissions from cars and light trucks to regional, and local land use and transportation planning. SB 375 requires the California Air Resources Board (ARB) to establish greenhouse gas emission reduction targets for each region, and each metropolitan planning organization (MPO) to create a Sustainable Communities Strategy (SCS) as part of the Regional Transportation Plan (RTP) to meet regional emissions reduction targets.

2.4.2.8 Statewide Adaptation Strategy and Safeguarding California Plan

Adaptation planning has been one of the primary responses to the threat of climate change in the State of California. In, 2009, the California Natural Resources Agency (CNRA) published the *2009 California Adaptation Strategy* in response to Executive Order S-13-08. A first year progress report was published by the agency in 2010. In April 2012, the California Emergency Management Agency, and CNRA published the *California Climate Change Adaptation Policy Guide* to aid local and regional entities in evaluating vulnerability to climate change impacts and devising

strategies to address these impacts. In July 2014, the CNRA updated the State's adaptation strategy and retitled it *Safeguarding California: Reducing Climate Risk.*

The Safeguarding California Plan provides policy guidance for state decision makers, and is part of continuing efforts to reduce impacts and prepare for climate risks. The Plan highlights climate risks in nine sectors in California: agriculture, biodiversity and habitat, emergency management, energy, forestry, ocean and coastal ecosystems and resources, public health, transportation, and water. The Plan discusses progress to date, and makes realistic specific recommendations for each of these sectors. In October 2014, CRNA published a draft *Safeguarding California: Implementation Action Plans*, which presents ten implementation plans that represent a master blueprint for executing the actions, recommended in the 2014 Plan. Implementation plans are presented for the nine sectors addressed in the initial Safeguarding California Plan as well as land use and community development.

2.4.2.9 Climate Change Scoping Plan

In December 2008, CARB adopted the first Climate Change Scoping Plan required by AB 32. The Scoping Plan is a comprehensive plan to achieve the GHG Emissions reduction targets called for by AB 32. The primary elements of the plan are: expand and strengthen energy efficiency programs, achieve a statewide renewable energy mix of 33 percent; develop a cap-and–trade program; and establish transportation emissions targets and establish fees. Table 3 provides a summary of the GHG emission reduction actions identified in the Scoping Plan. ARB estimated that the implementation of the Scoping Plan measures would reduce statewide GHG emissions needed to meet the 2020 limit. In September 2010, CARB reported that approximately 40 percent of the reduction measures identified in the Plan have been secured.

In May 2014, CARB adopted the First Update to the Scoping Plan. The Update builds upon the 2008 Scoping Plan defining the State's climate change priorities for the following five years. Existing strategies and recommendations are refined and expanded. Opportunities to leverage existing and new funding to further reduce GHG emissions through strategic planning and targeted low carbon investments are identified. The Plan sets the groundwork to reach the post-2020 reduction goals. It also evaluates how to align the State's long-term GHG reduction strategies with other State policy priorities for water, waste, natural resources, clean energy, transportation, and land use.

The First Update presents an outline of the latest understanding of climate science including increased certainty in humans' role in climate change. The State's approach to climate change is discussed, providing the underlying principles for the recommendations in the Plan. The Plan looks back at the GHG emission reductions that have been accomplished to date and presents the next steps needed to achieve the long-term climate goal of emissions 80 percent below 1990 levels by 2050. The Plan discusses the need for integrated and coordinated planning to achieve the State's GHG emissions reduction goals. The importance of transportation, land use and housing planning development is emphasized. Investments needed to enable these reductions are outlined. The Update also

discusses the monitoring and evaluation that will be needed to ensure successful implementation of the State's GHG emissions reduction policies and programs.

Table 3
First Scoping Plan Measures

Cap-and-Trade Program: Implement a broad-based California cap-and-trade program to provide a firm limit on emissions. Link the California cap–and-trade program with other Western Climate Initiative Partner programs to create a regional market system to achieve greater environmental and economic benefits for California. Ensure California's program meets all applicable AB 32 requirements for market-based mechanisms.
Light-Duty Vehicle Standards: Implement adopted Pavley standards and planned second phase of the program. Align zero-emission vehicle, alternative and renewable fuel and vehicle technology programs with long-term climate change goals.
Energy Efficiency: Maximize energy efficiency building and appliance standards, and pursue additional efficiency efforts including new technologies, and new policy and implementation mechanisms. Pursue comparable investment in energy efficiency from all retail providers of electricity in California (including both investor-owned and publicly owned utilities).
Renewables Portfolio Standard: Achieve 33 percent renewable energy mix statewide.
Low Carbon Fuel Standard: Develop and adopt the Low Carbon Fuel Standard.
Regional Transportation-Related GHG Targets: Develop regional GHG emissions reduction targets for passenger vehicles.
Vehicle Efficiency Measures: Implement light-duty vehicle efficiency measures.
Goods Movement: Implement adopted regulations for the use of shore power for ships at berth. Improve efficiency in goods movement activities.
Million Solar Roofs Program: Install 3,000 megawatts of solar-electric capacity under California's existing solar programs.
Medium- & Heavy-Duty Vehicles: Adopt medium- (MD) and heavy-duty (HD) vehicle efficiencies. Aerodynamic efficiency measures for HD trucks pulling trailers 53-feet or longer that include improvements in trailer aerodynamics and use of rolling resistance tires were adopted in 2008 and went into effect in 2010. Future, yet to be determined improvements, includes hybridization of MD and HD trucks.
Industrial Emissions: Require assessment of large industrial sources to determine whether individual sources within a facility can cost-effectively reduce GHG emissions and provide other pollution reduction co-benefits. Reduce GHG emissions from fugitive emissions from oil and gas extraction and gas transmission. Adopt and implement regulations to control fugitive methane emissions and reduce flaring at refineries.
High Speed Rail: Support implementation of a high-speed rail system.
Green Building Strategy: Expand the use of green building practices to reduce the carbon footprint of California's new and existing inventory of buildings.
High Global Warming Potential Gases: Adopt measures to reduce high warming global potential gases.
Recycling and Waste: Reduce methane emissions at landfills. Increase waste diversion, composting and other beneficial uses of organic materials, and mandate commercial recycling. Move toward zero-waste.
Sustainable Forests: Preserve forest sequestration and encourage the use of forest biomass for sustainable energy.
Water: Continue efficiency programs and use cleaner energy sources to move and treat water.
Agriculture: In the near-term, encourage investment in manure digesters and at the five-year Scoping Plan update determine if the program should be made mandatory by 2020.

While the original Scoping Plan provided specific GHG reduction measures in nine different economic sectors, the Update discusses reductions in six key focus areas (energy, transportation, agriculture, water, wasted management, and natural and working lands). Further, the plan addresses short-lived pollutants, green buildings, and the State's Cap and Trade Program. These focus areas include multiple economic sectors and have overlapping and complementary interests that require careful coordination. The following paragraphs provide summaries for the six key focus areas and three associated areas addressed in the Updated Scoping Plan

Energy: Fifty percent of the State's GHG emissions are associated with the energy sector. As discussed below, GHG reductions in other areas, such as transportation, space heating, and industrial processes will involve electrification. This additional demand increases the importance in GHG reductions from the energy sector. The Update calls for State agencies to develop comprehensive and enforceable GHG emission reduction requirements by the end of 2016 that will require the State's electric and energy utilities to achieve near-zero GHG emissions by 2050. This will require emission reductions from generation facilities as well as enhancing transmission and distribution efficiency and general electrical conservation.

Senate Bill 1368 (Perata, Chapter 598, Statutes of 2006) required the California Public Utilities Commission (PUC) to establish the nation's first GHG emissions performance standard for electrical generation applicable to the electricity providers in its jurisdiction including the State's three largest privately owned utilities. These regulations were adopted in 2007.

California's Renewable Portfolio Standard (RPS) was established in 2002 under Senate Bill 1078. This bill required investor owned utilities to generate 20 percent of their electrical from renewable resources by 2017. Senate Bill 107, adopted in 2006, accelerated implementation requiring compliance by 2010. Senate Bill 2 expanded the program in 2011. Currently, the RPS program requires investor-owned utilities (IOUs), electric service providers, and community choice aggregators to increase procurement from eligible renewable energy resources to 33 percent of total procurement by 2020. In 2013, the three largest IOUs procured approximately 23 percent of their electricity from renewable resources.

Due to the variable generation characteristics of renewable resources such as wind and solar, load-following resources are required to maintain grid stability. This is typically provided using quick-start fossil fuel generation plants. Demand response, actions taken by consumers to adjust the amount or timing of energy consumption, provides a more effective method of load-following increasing the potential GHG emission reductions from renewable power generation. In addition, changes to the electricity delivery markets can provide low-cost, low-risk means of providing load balancing. Distributed generation and energy storage are additional demand-side resources that can provide load-following.

The Plan calls for the State's energy agencies to develop rules and regulations to allow demand response resources to participate in wholesale markets. In addition, the Plan identifies other market based changes needed for penetration of variable renewable resources. Enhanced energy efficiency and demand response programs, including education/outreach programs are to be developed. The California Public

Utilities Commission (CPUC) and California Energy Commission (CEC) are directed to streamline the interconnection processes to facilitate distributed generation. The CPUC has adopted an energy storage procurement framework and design program that requires investor-owned utilities to procure 1,325 MW of energy storage by 2024.

The Plan also discusses combined heat and power systems (CHP), also known as cogeneration, which generates electricity and steam in a single system for use by industrial, commercial and institutional applications. In addition to the increased efficiency, CHP also provides distributed generation. Despite previous policy actions, incentives, and being included in the First Scoping Plan, significant barriers to installing CHP remain. The Plan calls for CARB to assess these barriers and propose solutions to achieve the CHP system goals from the initial Scoping Plan and the Governor's Clean Energy Jobs Plan.

Energy efficiency is an important component in reducing GHG emissions associated with the energy sector. This is discussed further under the Green Buildings subheading.

The majority of industrial related GHG emissions are energy related and majority of industrial emission reductions will be realized through the State's Cap-and-Trade program, discussed below. CARB has collected fuel and energy usage and air pollutant emission data from the 43 largest industrial sources in the State. Information on energy efficiency and emission reduction projects enacted by these facilities was also collected. This data will be used by CARB to identify best approaches to increase energy efficiency and reduce emissions at large industrial facilities.

Carbon capture and sequestration (CCS) is another option to reduce emissions from industrial sources and electricity generation facilities. With CCS, carbon emissions are captured before they are released into the atmosphere and then stored. While carbon capture is a fairly well developed technology, sequestration is less well understood. CARB is working with researchers from the Lawrence Berkeley National Laboratory to evaluate quantification methodologies for carbon sequestration. The Update calls for CARB, the Division of Oil, Gas & Geothermal Resources, CEC, and CPUC to work together to develop a quantitative carbon sequestration methodology for California GHG emission and sources.

Transportation, Land Use, Fuels, and Infrastructure: California's transportation system accounts for approximately 36 percent of the State's GHG emissions. Further, it is the primary source of smog-forming and toxic air pollutants in the State. In order to meet the national ambient air quality standard for ozone in 2032, transportation emissions will need to be reduced on the order of 90 percent below 2010 levels in the South Coast and San Joaquin Valley Air Basins. The Update specifies for strategies to reduce transportation emissions: (1) improve vehicle efficiency and develop zero-emission technologies, (2) reduce the carbon content of fuels, (3) plan and build communities to reduce vehicular GHG emissions and provide more transportation options, and (4) improve the efficiency and throughput of existing transportation systems.

In 2004, California was the first state in the nation to require GHG emissions reductions from motor vehicles. Regulations enacted by CARB under Assembly Bill 1493 (Pavley, Chapter 200, Statutes of 2002) formed the foundation for federal GHG and fuel-economy programs for light duty vehicles in the 2012-2016 model years. The Update calls for future light-duty vehicle standards that achieve five percent per year reductions through at least 2030. Light-duty vehicles will need to be largely electrified by 2050 to achieve the State's long-term GHG reduction goal. Large numbers of zero (ZEV) and near-zero (NZEV) emission medium- and heavy-duty vehicles will be required as well.

California and the EPA have adopted "Phase 1" GHG standards for all medium- and heavy-duty vehicles and engines. This standard will reduce emissions from new Class 8 heavy-duty vehicles by four to five percent per year from 2014 to 2018. CARB and the EPA are planning to finalize "Phase 2" standards in 2016 that will continue these reductions beyond 2018. CARB estimates emissions from these vehicles can be reduced by about five percent per year through 2025 using commercially available technologies. However, these reductions are considerably less than what is needed to meet the State's goals. Many zero emission technologies for trucks have progressed to at least the demonstration phase and smaller battery-powered trucks are available. The Plan calls for CARB to engage the Office of Planning and Research (OPR) to expand upon the 2013 ZEV Action Plan for medium- and heavy-duty ZEVs by 2017.

In addition to reducing heavy-duty truck emissions, the Update calls for emission reductions from the entire freight system including ports, rail, aircraft and distribution facilities. The Plan calls for CARB to complete the first phase of a Sustainable Freight Strategy in 2014. This was anticipated to be a concentrated, one-year effort to produce a document to provide a holistic look at the freight system and identify actionable next steps through 2020. In late 2014, CARB announced a shift from coordinating multiple freight plans to instead integrating the State's freight planning. CARB plans to release a document in the spring of 2015 that will identify regulatory and voluntary levers to accomplish a zero/near-zero emission freight system. The document is anticipated to also articulate outstanding questions on technology, infrastructure, and economics that need to be addressed in 2015.

Reducing the carbon content of fuels is an important component of the States GHG reduction plan. Executive Order S-01-07 called for a reduction of the carbon intensity of the State's transportation fuels by at least 10 percent in 2020. CARB identified a low-carbon fuel standard (LCFS) as one of three early action measures in 2007. California's LCFS, adopted in 2009, requires the carbon intensity of transportation fuels to be reduced by at least 10 percent in 2020. In addition, fuels will come under the State's Cap-and-Trade Program in 2015. These programs provide a structure to ensure necessary emission reductions are achieved. However, achieving GHG and air quality goals will require a portfolio of renewable transportation fuels, including electricity and hydrogen, well beyond current trajectories. The Plan calls for CARB to propose enhancements to strengthen the LCFS and consider extending the standard beyond 2015 with more aggressive long-term targets.

The Plan calls for the CPUC, CEC, California Department of Food and Agriculture (CDFA), and CARB to evaluate and adopt necessary regulations and/or policies to further support commercial markets for low-carbon transportation fuels. These may include: reducing off-peak demand charges for electricity to encouraging off-peak plug in vehicle charging; developing large-scale renewable and low-carbon fuel production facilities through infrastructure funding; developing and adopting performance and quality standards; streamlining permitting and siting for hydrogen fueling and charging infrastructure and utility interconnection; and research.

California has developed a critical, unique policy mechanism for reduction transportation sector GHG emissions as a result of Senate Bill 375 (Steinberg, Chapter 728, Statutes of 2008). This bill requires regional and local planning agencies to develop Sustainable Communities Strategies as part of the federally required Regional Transportation Plan (RTP) as well as preparing the State required general plan housing elements to meet these targets. The goal of SB 375 is to reduce GHG emissions from passenger vehicles through better-integrated regional transportation, land use, and housing planning that provides easier access to jobs, services, public transit, and active transportation options.

The State's role in implementing these strategies is to provide ongoing support through access to financial resources and incentives, guidance documents, housing element certification, planning tools, and other forms of assistance. The Update calls for CARB, Caltrans, Strategic Growth Council (SGC) and Department of Housing and Community Development (HCD) along with other State local and regional agencies to coordinate planning and support to ensure that the expected GHG emission reductions from approved SCS are achieved or exceeded.

In 2010, CARB established initial emission targets for Metropolitan Planning Organizations to meet in their Sustainable Communities Strategies. The Update calls for CARB to review these targets in 2014 considering advancements in data, models, analytical methodologies, and technologies that have occurred since 2010. These revised targets will be used by MPOs when updating their Sustainable Communities Strategies consistent with the time frame for updating the RTP under federal law.

California's High-Speed Rail (HSR) is also an important component of the State's GHG emission reduction efforts. European countries have seen more than half of travelers switch from air travel when a high-speed rail alternative is provided. The Update calls for the HSR Authority to continue construction of the HSR system with completion of the initial operating segment by 2022. The segment from Los Angeles to San Francisco is to be completed by 2029. An important component to realize the full emissions reductions from HSR is its connection to link it seamlessly to local public transit systems. The Plan calls for the HSR Authority to work with other rail and mass transit providers to increase ridership regionally and inter-regionally.

The Initial Scoping Plan identified several strategies for improving transportation system efficiency and reducing associated GHG Emissions. Many of them have been implemented or are still under development including; ship electrification at ports, tire pressure maintenance, fuel-efficient tires, and low-friction motor oils.

These strategies are not limited to treating vehicles. Concrete specifications and alternative asphalt pavements provide opportunities for further reductions. Providing access for all roadway users including, bicyclists, pedestrians, transit vehicles, truckers, and motorists encourages the use of lower emitting transportation modes. A complete street is one that is planned, designed, operated and maintained to provide safe mobility for all users. Caltrans has adopted a *Complete Streets Implementation Action Plan* and revised its *Highway Design Manual* to better provide access for all transportation modes.

Current smart phone and vehicle "apps" can provide real-time travel information along with routing and driving suggestions to reduce emission from existing vehicles. Coordinating signal timing and providing drivers with real-time information about signal status can reduce emissions in urban driving by up to 10 percent. Existing and emerging technologies will lead to an increasingly connected and automated transportation system that could have dramatic efficiency and emissions benefits. These include vehicle-to-vehicle and vehicle-to-infrastructure communications and, ultimately, autonomous vehicles. However, early studies have demonstrated both emission decreases and increases depending on how the systems are implemented and the degree to which they may induce additional vehicle travel.

The Update notes that incentive funding is essential to encourage the use of alternative transportation modes, develop and deploy low-carbon fuels, spur fleet turnover, and continue to develop advanced technologies. The Plan calls for the State to leverage available public money to scale-up clean technology markets and strategies and ensure the necessary infrastructure investments. CARB, CEC, CPUC, and CDFA will support growing markets for clean passenger transportation, advanced technology trucks and equipment, and low-carbon transportation fuels and energy, including any necessary infrastructure. Caltrans will work with local and regional agencies to consider lifecycle benefits and impacts for transportation infrastructure projects. Caltrans and regional transportation agencies will increase investment in expanded transit and rail services, active transportation, and other VMT-reduction strategies in their next regional transportation plans. SGC will support SCS implementation. This will include integration of the regional transportation and Regional Housing Needs Allocation planning as well as providing local assistance for transit, active transportation, and affordable transit-oriented housing development.

Agriculture: In 2012, agriculture accounted for about eight percent of the State's total GHG emissions. Agriculture is the largest water user in the state. Minimizing water usage is one of the primary means for reducing agricultural related GHG emissions by reducing emissions from energy sources required to transport the water. In addition, improved water usage and farming techniques, including precision irrigation may lead to reduced fertilizer use. Fertilizers generate nitrous oxide emissions when they are applied and can increase emissions that occur during tilling. Tilling releases carbon dioxide as well.

Livestock manure is also a significant source of methane emissions as is rice production. Both methane and nitrous oxide are short-lived climate pollutants that are primary targets for GHG reductions due to their high GWP. Agriculture can also

contribute to reducing energy sector GHG emissions by providing biomass feedstock for bioenergy production. Agriculture can also be a carbon sink, where carbon is stored (sequestered) in both crops and soil.

As the state's population increases, pressures to convert agricultural operations to urban and suburban developments increase as well. On a per acre basis, GHG emissions from urban areas are much greater than those from agricultural operations. Therefore, conservation of agricultural lands is important in meeting the state's long-term GHG emission goals. The Plan calls for the Office of Planning and Research (OPR), the California Natural Resources Agency (CNR), the California Environmental Protection Agency (CalEPA), California Department of Food and Agriculture (CDFA) and CARB to convene an interagency workgroup to develop recommendations and targets for incorporating farmland conservation in local and regional land use planning.

The Scoping Plan Update calls for the establishment of mid-term and long-term 2050 GHG emission targets for the agricultural sector. CARB will convene an interagency working group to establish these targets; develop recommendations to reduce water delivery GHG emissions; and develop tools for agricultural facility operators. These tools will allow operators to estimate GHG emissions and sequestration as well as to analyze emission reduction options. The Plan also calls for research to better quantify agriculture GHG emissions and reduction options along with the benefits of highly efficient farming practices. Incentives to employ these farming practices are to be provided. The CDFA is to strengthen technical assistance and financial incentives to help agricultural operators reduce GHG emissions. The plan also calls for evaluating fertilizer usage data collected by Regional Water Quality Boards to improve estimates of fertilizer related emissions.

The First Scoping Plan included a voluntary strategy of the installation of manure digesters at dairies and other livestock operations. Digesters capture the methane from manure storage lagoons and use it to generate electricity. However, economic obstacles have considerably limited the installation of new digesters. The Update calls for CARB to work with federal, state, and local agencies as well as stakeholders, farmers and utilities, to remove these obstacles. Further, CARB's Dairy Digester Workgroup will develop recommendations for methane capture standards by 2016.

The Bioenergy Interagency Working Group (BIWG), composed of state agencies with important biomass connections, prepared a Biomass Action Plan for the state in 2006 that was last updated in 2012. The Update calls for the BIWG to act to promote the input of digester biogas into natural gas pipelines and bioenergy into the electric grid. In addition, the BIWG is to evaluate the state's capacity for biomass energy generation and to develop methods to quantify GHG reductions relative to the biomass life-cycle.

Water: GHG emissions from the water sector are primarily due to the energy used to convey, treat, and heat the water. Approximately 19 percent of the State's electricity and 30 percent of non-power plant natural gas consumption is used by the water sector. Water conservation reduces GHG emissions by reducing the amount of energy required to transport and treat the water. Water conservation is

also needed because of the State's ongoing drought. The drought also impacts energy by reducing hydroelectricity production and requiring more groundwater pumping due to reduced surface flows. The Update calls for closer coordination between water and energy managers. Water conservation is also needed to improve the State's resilience to the more frequent and severe droughts anticipated due to climate change.

A key component of California's 2009 Water Conservation Act (Senate Bill x7-7) is a goal to reduce urban per-capita water use by 20 percent by 2020. The State has also set ambitious goals for the development of alternative water sources such as recycled water and storm water. Over $1.15 billion in grant and loan programs have been provided for recycling and storm water capture infrastructure. The State is also implementing several targeted efficiency, recycling, and conservation programs as part of an integrated water management plan.

The Update calls for a conservation-first policy for water-sector investment. The Department of Water Resources (DWR) and State Water Resources Control Board (SWRCB) are to give priority to funding for integrated water management plans with robust water and energy efficiency and conservation measures. SWRCB and the regional water quality control boards are to incentivize resource-recovering wastewater treatment projects.

The Update discusses cites several measures from California Water Action Plan (CWAP) that will also reduce GHG emissions. The CWAP calls for the DWR, SWRCB, California Public Utilities Commission (CPUC), the California Energy Commission (CEC), California Department of Food and Agriculture (CDFA) and CARB to guide the adoption of policies for water sector investment and action that result in GHG emission reductions. The DWR, SWRCB, CPUC, in consultation with the CDFA, are to implement water rate structures that accurately reflect the economic, social, and environmental value of water while maintaining affordable basic services. Further, the SCRCB are to develop a comprehensive ground water management strategy with the DWR and CDFA providing technical and financial assistance to meet and exceed Senate Bill x7-7 reduction targets. Finally, the CWAP calls for promotion of water-energy conservation outreach and education from the DWR, SWRCB, CPUC, CEC and California Independent System Operator (CAISO).

Waste Management: The primary source of GHG emissions from the waste management sector is the direct release of methane from the decomposition of organic materials in landfills. Emissions are also generated by the movement and processing of waste. Recycling, reusing, and reducing waste materials not only reduces waste processing emissions, but also reduces upstream emissions associated with the production and transport of products. In 1989, Assembly Bill 939 required municipalities to reduce the amount of waste going to landfills by 50 percent in 2000. In 2012, the amount of waste was reduced by 66 percent. Assembly Bill 341 (Chesbrow, Chapter 476, Statutes of 2011) sets a goal that 75% of waste be reduced, recycled, or composted by 2020. This goal is anticipated to reduce annual GHG emissions by 20 to 30 $MMTCO_2EQ$.

The Update calls for CARB and CalRecycle to identify financing, funding, and incentive mechanisms for infrastructure development to support the Waste

Management Sector Goals. Further, these agencies are to develop methods to estimate GHG emission reduction potential for various recycling and remanufacturing strategies. CalRecycle and the Department of General Services are tasked with taking the lead in improving the State's procurement of recycled-content materials. The Plan also calls for manufacturers to take greater responsibility for end-of-life product management, along with product design changes that minimize environmental impacts.

To address methane emissions, the Update calls for CARB and CalRecycle to develop programs to eliminate the disposal of organic material at landfills. CARB is to identify opportunities for additional methane control at landfills and ways to increase the utilization of captured methane. Methane captured from landfills can also be used to generate electricity. The Plan calls for the consideration of legislation, direct regulation, or inclusion of landfills in the Cap-and-Trade Program. Further, CARB is to lead a process of recommending actions to address permitting and siting challenges with composting and anaerobic digestion to provide destinations for the diverted organic materials. Efforts to divert greenwaste (biomass) from the waste stream complement energy sector goals to further develop resources for renewable biomass electricity generation.

Natural and Working Lands: Natural and working lands act as both a source of GHG emissions, from fires and natural decay, and as a carbon sink, with vegetation growth removing CO_2 from the atmosphere. CO_2 sequestration from natural and working lands is a significant opportunity to reduce GHG emissions. However, emissions quantification research undertaken as a result of the First Scoping Plan indicates that loss of forest and other natural lands represents a potentially more significant source of CO_2 than previously estimated. Nonetheless, this new knowledge will help identify the steps needed to reverse adverse trends and inform new efforts to manage natural and working lands for net climate benefits. The Plan calls for continuing this research to reduce uncertainty in GHG emission estimates for natural and working lands. The Update notes the need for early action in this category as activities to increase carbon storage such as reforestation or restoration will require time to fully realize the benefits. For example, trees planted today will reach their maximum sequestration capacity in 20 to 50 years.

The Update calls for the California Natural Resources Agency (CNRA) and CalEPA to prepare a Forest Carbon Plan in 2016, which will set quantitative near-, mid-, and long-term planning targets to ensure a net increase in forest carbon storage. This will include an evaluation of emissions and sequestration from different forestland ownership types and consideration of targets for each type. The Forest Carbon Plan will identify actions to meet the targets and develop recommendations for funding actions to ensure that forests in California provide lasting long-term carbon storage.

The Update calls for the development of a carbon life cycle analysis for wood products by CAL Fire and the Board of Forestry and Fire Protection. This will identify emissions associated with the processing and transport of wood product through the supply chain as well as emission differences due to the location of the source wood. This will allow for the development of guidelines to identify and incentivize the use of wood products with smaller GHG footprints.

As with agricultural lands discussed above, conservation of natural and working lands is important for the State to achieve its GHG goals. The plan calls for the Office of Planning and Research (OPR), CNRA, CalEPA, California Department of Food and Agriculture (CDFA), California Department of Fish and Wildlife (CDFW), CAL FIRE, and CARB to form a workgroup to engage local and regional land use agencies to establish a coordinated land use program. The program will set planning targets that identify, prioritize and incentivize land use conservation, increase urban forestry canopy cover, bolster development of green infrastructure, and limit the conversion of both agricultural croplands and natural and working lands. The Update also calls for the CNRA, CalEPA, CDFA, CDFW, CAL FIRE, and CARB to convene a natural and working lands climate investment working group and prepare a report outlining funding needs, opportunities, and priorities for the Natural and Working Lands Sector

As discussed above, bio-energy production provides a cleaner alternative to fossil fuel energy production. Forest management practices can result in materials being burned in open piles producing both criteria air pollutant and GHG emissions. Diverting these materials to bio-energy production would minimize these emissions and offset fossil fuel emissions. The Update calls for the Bioenergy Interagency Working Group to evaluate the potential biomass energy generation capacity and to develop life cycle emissions estimates for biomass. The Group is also to strengthen, refine, and implement actions contained in its Bioenergy Action Plan related to use of forest biomass.

Urban forests are identified as an opportunity for reducing GHG emissions and can significantly reduce the disproportionate environmental impacts on the State's environmental justice communities. Trees in urban environments provide shading and cooling benefits reducing urban temperatures and energy needs. In addition, they reduce storm water runoff, clean the air, and promote active transportation. The Update calls for the expansion of urban forestry and green infrastructure programs and investments, particularly in environmental justice communities.

Short-Lived Climate Pollutants: Short-lived climate pollutants (SLCPs) include black carbon, methane, tropospheric ozone, and some hydrofluorocarbons (HFCs). Black carbon and ozone are already regulated by CARB. In 2020, black carbon levels are anticipated to be 95 percent below late 1960 levels due to diesel controls and burning restrictions. Peak ozone levels have been reduced by more than 75% since the 1960's. Substantial further reductions in peak ozone levels are needed to meet the 2008 Ozone National Ambient Air Quality Standards (NAAQS) by 2032. In the fall of 2014, Governor Jerry Brown signed SB 605, the Short-Lived Climate Pollutant Act of 2014. This Bill mandated that the state complete a comprehensive inventory of SLCPs along with a plan for reducing SLCPs such as methane by the end of 2015. Continuing diesel controls on black carbon emissions and reducing emissions to achieve the ozone NAAQS are two measures identified in the Update along with the work completed under SB 605.

Atmospheric measurements suggest that actual methane emissions are 1.3 to 1.7 times higher than estimated in CARB's emission inventory. State and federal agencies, universities and national laboratories have put into place a comprehensive set of research studies to identify the sources of these emissions

and whether additional controls are feasible and cost effective. In 2014, the federal Climate Action Plan—Strategy to Reduce Methane Emissions was published by the Obama Administration (this is discussed further in Section 2.4.1 above). As discussed previously Methane has 84 times the global warming potential (GWP) of CO_2 over a 20-year span and 28 times the GWP over a 100-year span. Strategies to address methane emissions in the Update are identified in the sector discussions on energy, agriculture, and waste discussed previously.

A subcategory of SLCPs, high GWP gasses (GWP greater than 150), have an even higher significance on climate change than other SLCPs. These gasses are manufactured, have no natural sources, and have been used for decades, primarily in refrigerators, air conditioners, and foam insulation. While emissions of these gases are only three percent of the State's GHG emissions, they are the fastest growing GHG source in the State. This is largely the result of the Montreal Protocol mandates requiring hydrofluorocarbons (HFCs) replace ozone-depleting substances (ODS). HFC emissions are anticipated to increase by about 40 percent between 2012 and 2020. Without controls, HFC emissions are anticipated to double by 2050 and account for approximately half of the State's long-term GHG emission target.

CARB's Refrigerant Management Program, a measure from the First Scoping Plan, is expected to result in the biggest reductions of high GWP gas emissions. The motor vehicle air conditioning credit program part of the Low Emissions Vehicle (LEV III) regulation is also expected to result in considerable reductions of these missions.

The use of Low GWP substitutes for HFCs and ODSs is becoming increasingly feasible and cost-effective. The Update calls for CARB to require the use of low GWP gases where feasible and cost effective. In addition, the State is to work with the US EPA to establish a national standard aligned with the European Union's proposed phase down of HFC production and importation. The plan also calls for an upstream mitigation fee on the sales of high-GWP gasses and equipment pre-charged with high-GWP gasses. This fee would incentivize the transition to low-GWP substitutes and improve refrigerant recovery practices.

By restricting production and consumption, the Montreal Protocol has significantly reduced ODS emissions. However, it appears that end-of-life emissions from legacy equipment are still significant. The Update states that an 80 percent reduction in these end-of-life OSD emissions can be obtained by 2030 by incentivizing recovery and destruction of these OSDs. The Update calls for CARB to incentivize the recovery of OSDs at the end of life through a combination of strategies including adjusting current OSD destruction protocols or implementing mitigation.

Green Buildings: Electricity, gas, and water consumed by buildings are the second largest source of statewide GHG emissions. However, this is not a comprehensive accounting of GHG emissions associated with buildings. It does not include the complete lifecycle emissions of building materials and materials consumed for upkeep and maintenance of the buildings. In addition, siting and integration of buildings into communities affect GHG emissions. A better understanding of lifecycle emissions and community effects is needed to identify GHG emission reduction opportunities. The Update calls for CARB to explore methodologies to fully quantify emissions from new and existing buildings.

Green buildings use an integrated process that incorporates GHG emissions and sustainability to improve the design and construction of new buildings, as well as to retrofit, maintain, and operate existing buildings. The California Green Building Standards (CALGreen) Code was adopted for voluntary implementation in 2008. The code became mandatory in 2010, but only for additions and alterations for non-residential buildings and new construction of low-rise residential buildings. In 2014, the scope of the code was expanded to all residential buildings, including high-rise, as well as additions and alterations.

The 2013 triennial revision to the CALGreen standards provides for 25 percent more efficient residential buildings and 30 percent more efficient non-residential buildings. However, 55 percent of residences and 40 percent of commercial buildings were constructed before California's energy efficiency standards were established. Assembly Bill 758 (Skinner, Chapter 470, Statutes of 2009) requires the California Energy Commission (CEC) to develop and implement an energy efficiency program for existing buildings. This program, currently being drafted, will include recommendations for improving Title 24 compliance rates for building upgrades. Increased compliance is to be achieved through enhanced usability for building additions and alterations, energy disclosure approaches, and aggressive but practical solutions to increase the energy efficiency of existing buildings. The CPUC's Big Bold Energy Efficiency Strategies set policy goals to achieve zero-net-energy in all new residential buildings by 2020 and commercial buildings by 2030.

The Update calls for CARB to continue research to better quantify the potential GHG reductions from certified green buildings as well as strengthening the next two triennial editions (2016 and 2019) of the CALGreen code with additional mandatory GHG emission reduction provisions. Further, the update calls for the continued development and implementation of green building retrofit requirements at time-of-sale or other trigger mechanism

Executive Order B-18-12, discussed above, sets environmental requirements for new and renovated state buildings and the Update calls for achieving this order. The order calls for half of all new state facilities designed and constructed after 2020, and all new state buildings and renovations starting design in 2025, to be zero net energy. The Update calls on CARB to build on existing zero net energy building goals and activities. Zero net carbon buildings are key for achieving the State's GHG goal. The Update calls for CARB to establish target dates and pathways towards zero net carbon buildings by 2017 and to develop a mechanism to track progress towards statewide green building goals by 2018.

Cap-and-Trade Regulation: The First Scoping Plan recommended development of a State Cap-and-Trade Program. In 2013, CARB launched the second largest GHG Cap-and-Trade Program in the world. The program was linked to the Canadian Province of Québec's Program in 2014. The State's Cap and Trade Program establishes a hard and declining cap on approximately 85 percent of the statewide GHG emissions. CARB distributes allowances equal to the total allowable emissions to regulated entities. Each entity must hold allowances or other compliance instruments equal to its emissions. A portion of the allowances is auctioned by the state and proceeds are used to fund projects that reduce GHG emissions. The

Program also includes an Adaptive Management Plan to track and correct unintended consequences of Regulations that CARB continues to implement.

Initially, electrical generating utilities, electricity importers, and large industrial facilities were subject to the Program. Fuel distributers were brought under the cap in 2015. The hard cap and high percentage of emissions covered provides assurance that the State's 2020 emission limit will be met. The Update calls for CARB to develop a plan for a post-2020 Program. Under the Cap-and-Trade Program, companies can use credits to offset a portion of their emissions. Offset credits are rigorously verified GHG emission reductions from projects outside the scope of the Cap-and-Trade regulation and are provided as a cost-containment mechanism. The current Regulation includes offset protocols for four project areas; forestry, urban forestry, manure digesters, and the destruction of ozone depleting substances. Protocols for the capture and destruction of fugitive methane emissions from mines and rice production are being implemented. The Update notes that there are not enough offsets to meet the demand if every entity chooses to use its maximum offsets and discusses the difficulties in developing such programs in the current regulatory environment. The Update calls for consideration of international sector-based offset programs and identifies carbon-capture and sequestration as another option to reduce emissions and/or provide offsets under the Program.

2.4.3 South Coast Air Quality Management District Plans, Policies, and Regulations.

The South Coast Air Quality Management District ("SCAQMD") adopted their *Policy on Global Warming and Stratospheric Ozone Depletion* in April 1990. The policy commits the SCAQMD to consider global impacts in rulemaking and in drafting revisions to the Air Quality Management Plan. In March 1992, the SCAQMD Governing Board reaffirmed this policy and adopted amendments to the policy to include the following directives:

- Phase out the use and corresponding emissions of chlorofluorocarbons (CFCs), methyl chloroform (1,1,1-trichloroethane or TCA), carbon tetrachloride, and halons by December 1995;
- Phase out the large quantity use and corresponding emissions of hydrochlorofluorocarbons (HCFCs) by the year 2000;
- Develop recycling regulations for HCFCs (e.g., SCAQMD Rules 1411 and 1415);
- Develop an emissions inventory and control strategy for methyl bromide; and,
- Support the adoption of a California GHG emission reduction goal.

The legislative and regulatory activity detailed above is expected to require significant development and implementation of energy efficient technologies and shifting of energy production to renewable sources.

In September 2008, the SCAQMD adopted a Climate Change Policy that calls on the District to actively seek opportunities to reduce emissions of criteria, toxic, and

climate change pollutants and maximize synergistic effects of strategies that reduce emissions in more than one of these categories. The Agency is to also assist businesses and local governments implementing climate change measures, decrease the agency's footprint, and provide climate change information to the public. The Policy directs ten actions for the District staff to take.

The Policy directs District Staff to work with other entities to develop quantification protocols, rules, and programs related to greenhouse gases and to actively pursue funding opportunities for research and emission reduction projects. Staff is to use its experience and lessons learned from the Regional Clean Air Incentives Market (RECLAIM), a criteria air pollutant emissions cap-and-trade program operated for many years by the SCAQMD, to help assist other agencies develop GHG cap-and-trade programs. Staff is to review and comment on proposed legislation related to climate change and GHGs. When Technology Advancement Office (TAO) projects have equal benefits for criteria and toxic pollutants, priority is to be given to project that also reduce GHGs. Staff is to develop an interim GHG CEQA significance threshold, provide guidance on analyzing GHG emissions and mitigation, consider and mitigate GHG impacts in SCAQMD lead agency documents, and comment on GHG impact and mitigation analyses when SCAQMD is a responsible agency. Staff is to revise SCAQMD's Guidance Document for Addressing Air Quality Issues in General Plans and Local Planning to include information on GHG strategies. The Basin's greenhouse gas inventory is to be updated in conjunction with each Air Quality Management Plan. Staff is to make recommendations to the Board to reduce GHG emissions from District Operations. The District is to develop and distribute multi-lingual educational material concerning climate change and available actions to reduce greenhouse gasses. Staff is to conduct and participate in conferences related to climate change as well.

In December 2008, the SCAQMD Board established Regulation XXVII, *Climate Change*, and adopted Rules 2700, and 2701. Rule 2700 provides definitions for the Regulation. Rule 2701, *SoCal Climate Solutions Exchange*, establishes a voluntary program to encourage, quantify, and certify voluntary, high quality certified GHG emission reductions in the District. This rule establishes procedures and requirements for generating certified GHG emission reductions for CEQA mitigation or other programs. Further, the rule establishes procedures to transfer ownership of certified reduction credits. In February 2009, the Board adopted Rule 2702 of the Regulation, Greenhouse Gas Reduction Program. The Program provides a way for SCAQMD to receive requests for emission reduction credits and to use monies collected with the requests to fund projects that generate certified emission reductions per rule 2701.

In December 2008, the SCAQMD Board also adopted significance thresholds for CEQA projects where the District is the lead agency. The guidance document prepared by SCAQMD staff for the Board's consideration of this threshold also suggested significance thresholds for general development project for which the District is not the lead agency. At the time, the Board felt that additional information and development was needed for the general development CEQA GHG significance threshold. The lead agency threshold adopted by the Board and currently incomplete development of a threshold for general development projects is discussed further in Section 3.1.2

In 2009, the Board adopted a *Green Policy* to help reduce the agency's carbon footprint from building operations, purchases, and employee work-related activities. One aspect of this policy was to establish a "Green Team" to evaluate potential practices, purchases, and other actions that can help to improve the current situation. The "Green Team" is comprised of staff from every SCAQMD department.

In September 2011, the SCAQMD Board adopted the *AQMD Air Quality Energy Policy* that integrates air quality, energy, and climate change issues in a coordinated and holistic manner. The Policy includes a set of ten policies to guide and coordinate AQMD efforts and a set of ten actions that are deemed necessary to support the policies. The Policy is neither a regulatory mandate nor a regulation. It is intended to provide general guidance to direct decisions made by the AQMD to reach air quality goals with full consideration of associated energy goals. The Ten policies established by the Policy are:

1) Promote zero and near-zero emission technologies through ultra clean energy strategies, to meet air quality, energy security, and climate change objectives.
2) Promote zero and near-zero emission technologies in both stationary and mobile applications to the extent feasible.
3) Promote diversification of electricity generation technologies to provide reliable, feasible, affordable, sustainable, and zero or near-zero emission electricity supply for the Basin in partnership with local power producers.
4) Promote demand side management programs to manage energy demand growth. Such programs include, but are not limited to, energy conservation, energy efficiency and load-shifting measures.
5) Promote in-Basin distributed electricity generation, with emphasis on distributed renewable electricity generation, to reduce reliance on energy imports or central power plants, and to minimize the air quality, climate and cross-media environmental impacts of traditional power generation.
6) Promote electricity storage technology to improve the supply reliability, availability, and increased generation technology choices.
7) Require any new/repowered in-Basin fossil-fueled generation power plant to incorporate Best Available Control Technology (BACT) as required by District rules, considering energy efficiency for the application. These power plants shall also comply with any requirements adopted by the California Air Resources Board (CARB), California Energy Commission (CEC), Public Utilities Commission (PUC), California Independent System Operator (ISO), or the governing board of a publicly-owned electric utility, as well as state law under the California Environmental Quality Act (CEQA).
8) Advocate, within the existing CEQA review process, maximum cost effective mitigation in the communities affected by emission increases resulting from the siting of new or repowered power plants.
9) Educate and incentivize the public and businesses to shift toward the lowest emission technologies, considering emissions of criteria pollutants,

toxic air contaminants, greenhouse gases, energy efficiency, and the potential to create local jobs.

10) Incorporate energy efficiency and conservation as an emissions reductions strategy for stationary and mobile sources through AQMD's planning, rule making, advocacy, and CEQA commenting activities.

The ten actions specified by the Policy to implement the ten policies are:

1) Advocate for, conduct, and/or support detailed technical studies to identify viable zero and near-zero emission technologies and associated energy delivery and capacity needs to support these technologies as part of the clean air strategy for the Basin.
2) Conduct appropriate internal and third party socioeconomic studies to identify the societal costs and benefits for the implementation of zero and near-zero emissions strategies, including but not limited to, further electrification and impacts on businesses and jobs.
3) Where feasible, develop an AQMD action plan to develop and deploy electrification and other zero and near-zero emissions measures for various sectors, including identification of implementation barriers and strategies to overcome such barriers.
4) Conduct studies to identify measures to reduce emissions from the transportation sector, including incentivizing early introduction of zero and near-zero emission measures and identify potential new transportation funding mechanisms to support substantial penetration of such technologies within the transportation sector.
5) Further develop and demonstrate low emitting biogas technologies and other clean energy sources from biomass.
6) Coordinate this Energy Policy with California state energy policy as promulgated by the California Energy Commission (CEC), California Public Utilities Commission (PUC), and the California Air Resources Board (CARB), and assure that rules and regulations adopted by the Board are not in conflict with state and federal laws. Actively participate in CEC, PUC, and CARB proceedings to promote policies and regulatory actions that further clean air objectives, consistent with state and federal law.
7) Convene a stakeholder working group (including, but not limited to, representatives from the building industry, local fire departments and building departments, and utilities) to develop and recommend standardized installations of electricity recharging, natural gas refueling, and other zero/near-zero emission refueling equipment for residential and commercial building applications to facilitate greater plug-in electric vehicle (PEV), natural gas vehicle (NGV), fuel cell vehicle, and other zero or near-zero emission vehicle market penetration.
8) Advocate for electricity rate structures that incentivize off-peak charging for PEVs through the Statewide PEV Collaborative (comprised of CEC, PUC, CARB, local air districts and utilities) while remaining sensitive to potential impacts on rates for existing customers.

9) Partner with local utilities and local government stakeholders to promote energy conservation and efficiency.

10) Compile and track Basin-wide energy usage and supply profiles in conjunction with each Air Quality Management Plan (AQMP) update

2.4.4 University of California Plans, and Policies

In July 2003, the University of California (UC) regents approved sustainability policy principles which were used to develop the *Presidential Policy on Green Building Design and Clean Energy Standards* issued by the President in June 2004. This document was subsequently renamed the *Policy of Sustainable Practices* and updated and expanded in January 2006, March 2007, September 2009, July 2011, and most recently in June 2015. The Policy establishes goals in nine areas of sustainable practices: (1) green building, (2) clean energy, (3) transportation, (4) climate protection, (5) sustainable operation, (6) waste reduction and recycling, (7) environmentally preferable purchasing, (8) sustainable foodservice, and (9) sustainable water systems.

Chancellors for each of the campuses and the Director of the Lawrence Berkeley National Laboratory are responsible for implementation of the Policy. An annual report to the Regents assesses location achievements with regard to the Policy. The internal Audit Department may conduct periodic audits to assess compliance with the Policy.

The climate protection goals defined in the Policy set out the University's overall GHG reduction goals. The Policy calls for each campus and the UC Office of the President to develop strategies to achieve climate neutrality from emissions sources directly under control of the facilities by 2025. These sources include on site energy production sources (central plants, local boilers, emergency generators), operational GHG releases (from research and medical procedures, refrigeration and air conditioning systems), fugitive emissions (leaks in mechanical systems), fleet vehicles (service vehicles and shuttles), and purchased electricity. Each campus and the UC Office of the President is to develop strategies to achieve climate neutrality from certain indirect emissions from outside the campus boundary as well (primarily air travel paid for or through the UC). Further, the Policy requires GHG emissions reductions consistent with AB 32, specifically, reducing GHG emissions to 1990 levels by 2020.

The policies established for each of the eight other areas of sustainable practices are presented below. The Policy also presents procedures required to implement the policies and to report on the results of implementation. As they are detailed and not easily summarized, one can refer to the Policy document itself for these specific implementation procedures (available at http://ucop.edu/sustainability/ under the Policies and Reports heading).

Green Building Design

- New buildings (other than acute care) shall outperform California Building Code (CBC) energy efficiency standards by 20 percent and strive to outperform the standards by 30 percent. Standards for energy efficiency

for acute care facilities will be developed in consultation with campuses and medical centers.

- New buildings shall achieve LEED "Silver" certification at a minimum and strive to achieve LEED-NC "Gold" certification.
- New laboratory buildings shall achieve a minimum LEED "Silver" certification as well as meeting at least one of the prerequisites of the Laboratories for the 21st Century (Labs21) Environmental Performance Criteria (EPC). Laboratory spaces in new buildings shall meet the prerequisites of Labs21 EPC. Energy efficiency of systems not addressed by the CBC energy efficiency standards shall be optimized.
- Renovation of buildings (other than acute care) that require 100% replacement of mechanical, electrical, and plumbing systems and replacement of over 50% of all non-shell areas (interior walls, doors, floor coverings and ceiling systems) shall achieve LEED "Silver" certification at a minimum and strive to achieve LEED-NC "Gold" certification. Laboratory spaces shall meet the prerequisites of Labs21 EPC. Further, such projects shall out perform CBC Title 24, Part 6 currently in effect by 20%
- Renovation projects (other than acute care) with a cost of $5 million or greater that do not fall under the previous item shall, at a minimum, achieve LEED-CI certified rating and shall register with the utilities' Savings by Design program, if eligible.

Clean Energy:

- Reduce consumption of non-renewable energy by using a portfolio approach that includes a combination of energy efficiency projects, the incorporation of local renewable power measures for existing and new facilities, green power purchase from the electrical grid, and other energy measures with equivalent demonstrable effect on the environment and reduction in fossil fuel usage.
- Provide up to 10 megawatts of on-site renewable power as of 2014.
- Use energy efficiency retrofit projects to reduce system-wide growth-adjusted energy consumption by 10% or more as of 2014 from the year 2000 base consumption level.

Sustainable Transportation:

- Each location will develop GHG emission reduction goals for transportation including emission categories for fleet, commute, and business travel. Each location is to report annually on progress toward achieving the goals.
- Location fleets shall implement practicable and cost-effective measures including, but not necessarily limited to, the purchase of the cleanest and most efficient vehicles and replacement tires, the use of alternative fuels, and other sustainability measures.
- Pursue the expansion of Transportation Demand Management (TDM) programs and projects to reduce the environmental impacts from commuting. In conjunction with this effort, locations will engage in

advocacy efforts with local transit districts to improve routes to better serve student and staff ridership.

- To the extent practicable, locations will develop a business-case analysis for any proposed parking structure projects.

Sustainable Building Operations for Campuses:

- Each campus will submit for certification one pilot building at a LEED-EBOM "Certified" level or higher.
- Each campus shall register a master site to certify campus-wide LEED-EBOM credits and prerequisites to streamline the certification of multiple buildings through the LEED-EBOM rating system by July 1, 2015. Each campus shall certify their campus-wide credits as soon as possible after the master site has been registered.
- Each campus shall seek to certify as many buildings as possible through the LEED-EBOM rating system, within budgetary constraints and eligibility limitations

Recycling and Waste Management:

- Prioritize waste reduction in the following order: reduce, reuse, and then recycle.
- Implement measures to achieve the University's goal for diverting municipal solid waste from landfills is as follows: 50% as of June 30, 2008, 75% as of June 30, 2012, and zero waste by 2020.

Environmentally Preferable Purchasing:

- Maximize the procurement of environmentally preferable products and services as environmentally preferable purchasing underlies and enables all other areas of sustainable practice in this Policy.
- Use the University's purchasing power to target environmentally preferable products and services for volume-discounted pricing to make them cost-competitive with conventional products and services.
- Work with existing and potential suppliers to leverage the University's purchasing power and market presence to develop sustainable choices or products and services without available environmentally preferable alternatives.
- Integrate sustainability requirements into practices for competitive bidding in materiel and services procurement, allowing for suppliers that meet these requirements to earn additional evaluation points.
- Packaging for all products procured should be designed, produced, and managed in an environmentally sustainable manner. Seek products that have take-back programs, as appropriate.
- When requested, suppliers citing environmentally preferable purchasing claims shall provide proper certification or detailed information on environmental claims, including benefits, durability, and take-back, reuse, and recyclable properties. Additionally, suppliers are responsible for

providing proof of University of California-accepted third-party certification based upon the requirements of the University's Procurement Services Department.

Sustainable Foodservices

- Each campus and Medical Center foodservice operation shall strive to procure 20% sustainable food products by the year 2020, while maintaining accessibility and affordability for all students and Medical Center foodservice patrons.
- Each campus and Medical Center shall provide patrons with access to educational materials that will help support their food choices.
- Campus and Medical Center departments, organizations, groups, and individuals shall engage in activities with their surrounding communities that support common goals regarding sustainable food systems.
- Campus and Medical Center foodservice operations shall strive to earn third-party "green business" certifications for sustainable dining operations.
- Retail foodservice tenants shall strive to meet the four policies presented above. The requirement for procurement of 20% of sustainable food products may be met by aggregating the purchases of all retail entities under the jurisdiction of a single operational unit on location.
- The requirements of Sustainable Foodservices will be included in leases as new leases and contracts are negotiated or existing leases are renewed. Locations will work with existing tenants to advance sustainable foodservice practices as much as possible within the timeframe of current leases.

Sustainable Water Systems

- Each location will strive to reduce potable water consumption adjusted for population growth by 10% by year 2017 and 20% by the year 2020. Locations that have already achieved this target are encouraged to set more stringent goals to further reduce potable water consumption.
- Each location will develop and maintain a Water Action Plan that identifies long-term strategies for achieving sustainable water systems.

2.4.5 University of California, Irvine Plans, and Policies

The UC Irvine *Climate Action Plan* (CAP) provides a roadmap for the University to achieve its institutional climate protection commitments in support of the University of California sustainability policy and campus sustainability goals discussed above in Section 2.4.4. The CAP was initially adopted in 2007 and CAP initiatives implemented to date have resulted in an estimated reduction of 20,000 metric tons of GHG emissions per year. The CAP was most recently updated in 2013.

The climate protection strategy presented in the 2013 CAP Update is based on four guiding principles: (1) Achieving UCI's climate protection goals requires full engagement of the UCI community, (2) UCI's climate protection strategy will focus on direct actions that result in measurable reductions in emissions, (3) UCI will balance environmental and financial stewardship by investing in GHG reduction programs, systems, and projects that are economically sustainable and provide a

reasonable economic payback based on sound financial analyses, and (4) UCI will fulfill its climate protection commitment in support of the campus's strategic academic mission.

The CAP recognizes that behavioral and operational changes throughout the campus will be required to achieve significant GHG reductions. Shifting the culture of a large complex public institution is a long-term proposition that will require the participation of the entire UCI community. The CAP acknowledges the University's institutional values and community leadership support direct actions that result in measurable GHG emission reductions. These values prescribe limited reliance on the procurement of emission offsets or other financial instruments to reach GHG reduction goals. Further, the CAP specifies that investments in GHG reduction programs need to be economically sustainable given the long-term planning horizon of the CAP and the permanent nature of the emission reduction requirements. The CAP also recognizes that the University's climate protection commitment must be fulfilled in partnership with faculty and students in support of the University's strategic academic mission of teaching, research, public service, and patient care.

The CAP presents three climate protection goals for the reduction of GHG emissions: (1) by 2014 reduce GHG emission to year 2000 levels; (2) by 2020 reduce emissions to year 1990 levels; (3) as soon as feasible (post-2020), and by 2050, achieve climate neutrality (zero-net emissions). These are consistent with AB 32, the UC Policy on Sustainable Practices, and the American College and University President's Climate Commitment (ACUPCC) emission inventory and reporting and planning requirements.

The policy, vision, guiding principles and goals presented in the CAP are applied equally to both the main UCI campus as well as the UCI Medical Center. However, The CAP notes that the two faculties require specific metrics and implementation planning due to their geographic separation, distinct infrastructure systems and operational characteristics. Because of this, the CAP presents separate GHG emission estimates and reduction plans for each facility. The CAP addresses GHG emissions from land areas, facilities, and operations that are under the financial and operational control of UCI. Properties on located on the campus but built owned and operated by non-university entities are not included within the scope of the cap.

The CAP presents estimated annual GHG emissions from the two facilities for 2011 that is reproduced in Table 4. The quantity of emissions from the Main Campus mandates its participation in the California Cap and Trade Program. This requires annual reporting of GHG emissions and acquisition of Carbon Emission Allowances as discussed in Section 2.4.2. The Medical Center's GHG emissions are below the threshold for Cap and Trade program participation.

Table 4
2011 UCI GHG Emissions by Source

Source	Main Campus MT CO2EQ (% of Total)	Medical Center MT CO2EQ (% of Total)
Combustion	69,795 (52.9%)	10,415 (38.1%)
Fleet Vehicles	2,035 (1.5%)	--
Process	88 (0.1%)	--
Purchased Electricity	10,620 (8.0%)	16,950 (61.9%)
Commuting	20,826 (15.8%)	--
Air Travel	25,846 (19.6%)	--
Other	2,722 (2.1%)	--
Total	**131,932**	**27,365**

Table 4 shows that energy production and use account for the majority of UCI's GHG emissions. The Main Campus relies on a central energy plant and distribution system that utilizes a combined heat and power (CHP) system. As discussed in Section 2.4.2, expanding the use of CHP systems was identified in both the First and Second Scoping Plans. While the CHP system serves as a model for energy efficiency and flexible delivery of energy, it relies on combustion of natural gas as its energy source. This results in natural gas combustion being the largest source of GHG emissions at the Main Campus and the central focus of emissions reductions. The CHP does not provide all of the electricity required for the campus and the remainder is purchased from the grid. The University is developing a portfolio of on-site renewable and clean energy systems to reduce grid-purchased electricity. At the time the CAP was prepared one megawatt (MW) of photovoltaic (PV) panels were installed and an additional 3.1 MW of PV panels were being installed.

The Medical Center currently relies on purchased grid electricity for the majority of its power needs. The generation and transmission of this electricity is the primary source of GHG emissions from the Center. The Medical Center does not have any on-site renewable energy installations, but opportunities are under evaluation as part of the CAP. Natural gas combustion at the central steam plant and distributed boiler systems serve the majority of thermal energy needs and account for the next largest increment of GHG emissions.

The CAP implementation strategy for the Main Campus focuses on deep energy efficiency, deployment of on-site green energy systems, and system-level improvements to the campus micro-grid over the short-term. Additional deep energy programs, large-scale deployment of renewable energy systems, and adoption of biofuels for central energy systems are prescribed for long-term emission reductions. The CAP notes that long-term carbon neutrality will require fundamental shifts in the production and delivery of energy on the campus.

The strategy for the Medical Center focuses on operational efficiencies, deep energy efficiency, on-site green energy, and changes to the purchased energy mix. The CAP notes that short-term, 2014 horizon year, emission reduction opportunities at the Medical Center are constrained by pending redevelopment plans to replace many aging or inefficient buildings under the Long Range Development Plan (LRDP). This limits the ability to invest in mid- to long-term energy efficiency or renewable projects based on an uncertain or limited project lifetime.

Table 5 presents the GHG reductions required to meet the CAP goals. Metrics are tracked for the core campus, student services functions (i.e., student housing, student center, and student recreation facilities), and transportation based emissions. Figure 9 presents "wedge diagrams" showing the Main Campus and Medical Center's historical GHG emissions and future emissions with projected reductions from implementation of the CAP.

Table 5
GHG Reductions Required to Meet CAP Goals

Source	Reduction Required (MT CO2EQ/year) by Year 2014	2020	2050
Main Campus	16,700	66,300	41,600
Medical Center	11,200	3,700	12,500
Student Affairs	1,600	4,300	1,800
Commuting	500	4,500	16,650
Air Travel	2,600	2,200	19,100
Total	**32,600**	**81,000**	**91,650**

The dark green areas (Energy Efficiency) in Figure 9 show the reductions from energy efficiency projects, implementing "Smart Labs" and Green IT, and reducing emissions of GHG refrigerants, laboratory gasses, medical cases and industrial gasses. Reductions from behavioral or energy management changes including projects and programs led by campus energy management staff and peer-to-peer initiatives involving student, faculty, and staff leaders are also included in this category. The yellow areas (Green Building) show GHG reductions provided by the UC policy to require all new buildings to be certified LEED Silver.

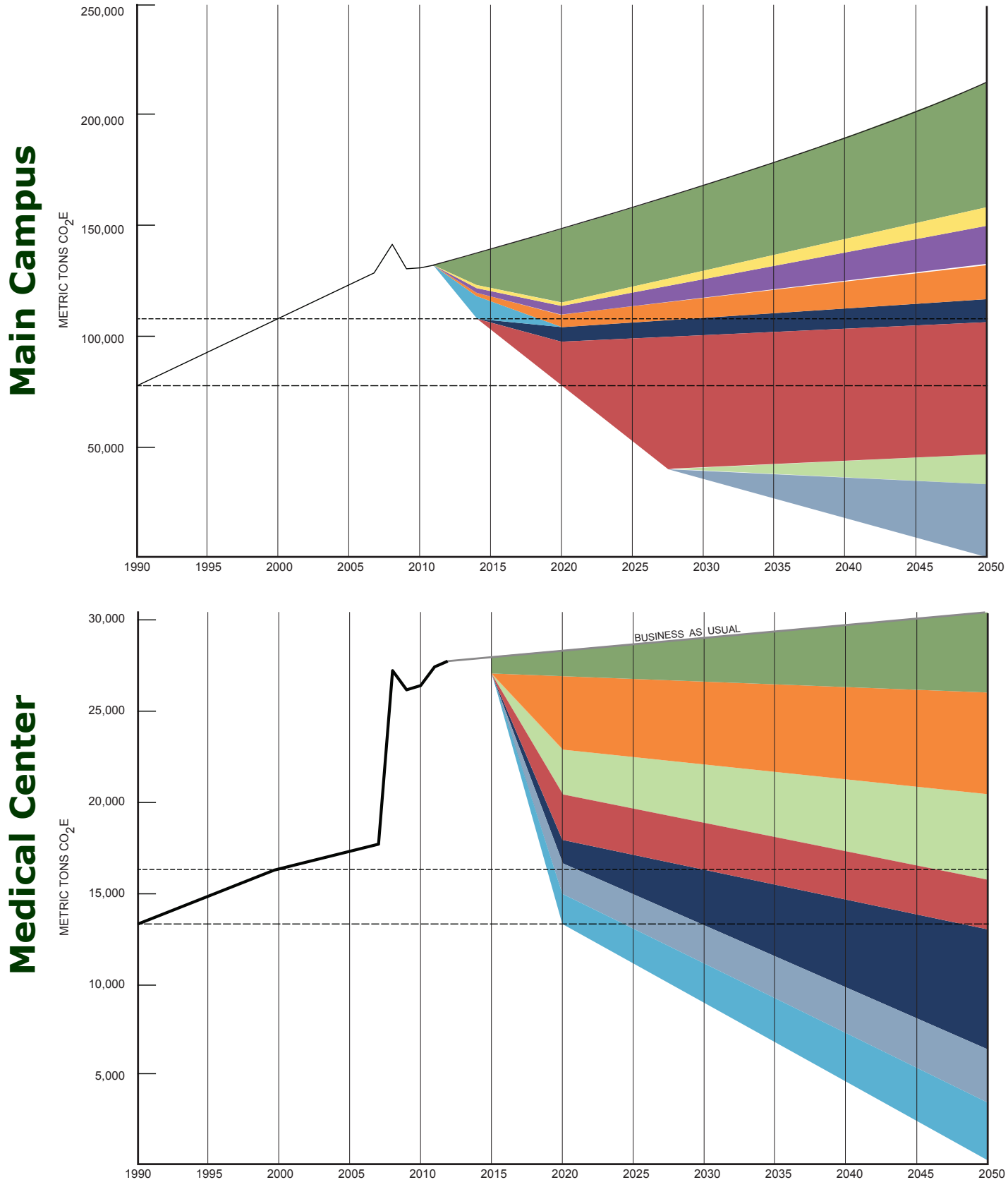


Figure 9
UCI CAP GHG Emissions Projections
UCI Medical Center Energy Plant Expansion

The purple area (Sustainable Transportation) in the Main Campus chart shows emission reductions from transportation sources. While 67% of faculty and 47% of students live on campus, commuting students, faculty and staff account for approximately 16% of UCI's GHG emissions. The University has implemented a robust Transportation Demand Management (TDM) program to reduce commuter vehicle miles traveled. In addition to the TDM program, market changes, and regulatory requirements are anticipated to result in additional commuter emission reductions. UCI is currently assessing options for converting fleet vehicles to alternative fuels. Air travel accounts for 20% of the Main Campus emissions. The CAP identifies logistic and behavioral changes that reduce air travel demand as a source of reduction of these emissions along with carbon offset programs targeted for air travelers.

The orange (On-Site Renewable Energy) and light-green (Off-Site Renewable Energy) areas show the reduction opportunities from renewable and green energy systems. As discussed above, the University has implemented significant on-site renewable energy systems and will continue to evaluate and implement additional on-site and off-site green energy technologies.

The navy areas (Purchased Electricity Mix) show the GHG emission reductions that will be experienced through the California Renewable Portfolio Standard (RPS) discussed in Section 2.4.2, which requires utilities to increase the renewable energy portion of their generation portfolio. The University anticipates leveraging the RPS-induced emission reductions by securing purchased electricity resources that exceed RPS requirements.

The light blue areas (Carbon Offsets) show the reductions available from carbon offset programs. As discussed above, the purchase of carbon offsets and other monetized environmental attributes are viewed by the University as temporary measures to address gaps in achieving emission targets until direct actions can be fully implemented. However, University sponsored reduction projects in the local off-campus community, local offset programs, provide opportunities for GHG reductions as well as teaching and public service. The capture and long-term storage of carbon provides opportunity, but will require increased understanding of sequestration, developing reliable metrics, and technology advances.

The CAP discusses the significant constraints and challenges that the University must recognize and address in exploiting the broad range of available GHG reduction opportunities. The enormous scale of the required emission reductions provide significant challenges in implementing scalable, economically viable solutions that will result in substantive changes in emissions. The scale of the emission reduction requirement is driven by the significant growth at both the Main Campus and the Medical Center in the last two decades. The fact that the Main Campus's CHP energy system is the primary source of energy for the campus limits the scope of emission reduction measures that can be perused. Modern research laboratories that make up a large portion of existing space, recent space growth, and future space and program growth at the Main Campus and consume significant amounts of energy compared to other building types. State-of-the-art inpatient, ambulatory care, and research laboratories at the Medical Center share the same characteristics. The feasibility of many proposed initiatives is affected by limited

funding sources and the dynamic nature of economic variables such as utility prices, carbon pricing and project costs. Further, current public utility regulations limit the opportunity for UCI to implement renewable energy production and distribution at the scale required to have a substantive impact on GHG emissions. The implementation of the Medical Center's LRDP is identified as a challenge to achieving GHG reductions as many existing facilities are targeted for future replacement, which impacts energy efficiency and on-site renewable energy and other facility related strategies that rely on multi-year payback for financial viability.

The CAP provides a roadmap for the Main Campus and Medical Center to allow the University to meet its institutional climate commitments. The strategy of the CAP, which guides the allocation of resources and identifies key priorities, is defined by a list of Strategic Priorities to guide reductions in the short-term, prior to 2014, the mid-term, between 2015 and 2020, and long-term measures to achieve climate neutrality between 2020 and 2050. The strategic priorities for the 2014 planning horizon focus on high yield initiatives that are financially viable under current economic conditions and supporting actions that build a foundation for future emission reductions. The mid-term strategic priorities include large-scale initiatives that may be dependent on technology and supply chain advances, new funding sources, or systems established in the short-term planning horizon. The strategic priorities for the Main Campus and Medical Center for the three time-periods are presented below.

Main Campus 2007-2014 Strategic Priorities

- Minimize energy demand in existing facilities and operations through campus-wide deep energy efficiency by pursuing all technically and economically feasible opportunities, optimizing use of California Statewide Energy Partnership (SEP) funding, and other available financial incentives.
- Offset 25% to 50% of emissions from new building construction through green building practices that incorporate deep energy efficiency.
- Secure on-site renewable energy generation to the maximum extent feasible within current limits of campus micro-grid, CHP-driven central energy systems, and pricing.
- Minimize non-CHP natural gas combustion by replacing distributed thermal systems with more efficient CHP thermal energy.
- Work in collaboration with UC and community partners to secure affordable and scalable off-site renewable power sources.
- Implement fuel switching (biofuels or low-carbon fuels) as feasible for stationary and mobile emission sources.
- Pursue behavioral changes to offset building energy use, process gas use, and transportation-related emissions through policy, bottom-up, and peer-to-peer leadership.
- Implement land use and transportation policy that promotes sustainable development, resource conservation, and limits commuter miles.

- Pursue bio-methane sources for CHP through project partnerships or commodity acquisition that is scalable to 2020 goals.
- Optimize campus micro-grid and central energy systems to maximize system efficiency and capacity to accept large-scale post-2014 renewables (e.g. smart grid systems, load shifting).
- Pursue regulatory changes that support renewable energy generation and distribution by California Universities to support large-scale post-2014 renewables.
- Utilize emission offsets as an interim measure if needed to close 2014 gap, focusing on CARB-certified Cap and Trade eligible offsets.
- Continue to pursue project partnerships involving UCI research programs and campus operations.

Main Campus 2015-2020 Strategic Priorities

- Continue to minimize building energy demand through post-SEP deep energy efficiency opportunities as emerging technologies and economic variables allow.
- Construct new facilities with zero-net energy goal (minimum goal of >50% energy savings from Business as Usual).
- Secure large-scale on-site and off-site renewable power supplies for the Main Campus and Medical Center to offset 50% of purchased electricity emission for the Main Campus and Medical Center.
- Implement large-scale fuel switching for distributed energy generation sources (fuel cells, boilers) and mobile sources (fleet).
- Secure large-scale bio-methane sources to accommodate fuel switching at CHP plant to offset 50% of central plant emissions at the Main Campus and Medical Center.
- Reduce commuter GHG emissions by 25% through TDM, land use policy, and technology advances in vehicle design.
- Reduce or offset 25% of air travel emissions through behavioral changes and/or offset programs.
- Secure credible local offsets or sequestration to close any remaining gaps.

Main Campus 2020-2050 Climate Neutrality

The scale of GHG emission reductions required for post-2020 climate neutrality for a major research university campus is enormous and will require fundamental shifts in fuel sources, energy systems, and transportation. The post-2020 CAP strategy will involve technology, funding, and public policy factors that cannot be fully predicted at this time. At a conceptual level, achieving this goal would require technologies and polices that allow achievement of the following goals:

- Central energy systems will rely on 100% climate neutral CHP fuel source or replacement of CHP system with carbon neutral energy technology.
- Full deployment of renewables will supplement central energy systems to meet all distributed generation needs.

- Any grid-purchased electricity would be restricted to carbon neutral generation sources or offset by utility provider.
- All new facilities constructed would achieve zero-net energy.
- Commuter transportation sources must approach zero emission through a combination of trip reduction measures, low-carbon vehicle/fuel systems, or credible offsets.
- Air travel emissions must be fully offset through credible offset programs.
- Secure offsets or large-scale sequestration to close gap from mobile emissions and other emission sources that cannot be directly offset.

Medical Center 2007-2014 Strategic Priorities

- Minimize energy demand in existing facilities and operations through campus-wide deep energy efficiency by pursuing all technically and economically feasible opportunities optimizing use of SEP funding and other available financial incentives.
- Offset emissions from new building construction through green building practices that incorporate deep energy efficiency.
- Secure on-site renewable energy generation to the maximum extent feasible within current limits of Medical Center energy systems.
- Minimize natural gas combustion by replacing distributed thermal systems with more efficient systems including fuel cell, thermal energy storage, or other technologies.
- Work in collaboration with Main Campus and UC partners to secure affordable and scalable off-site renewable power sources.
- Implement fuel switching (biofuels or low-carbon fuels) as feasible for stationary and mobile emission sources.
- Pursue behavioral changes to offset building energy use, process gas use, and transportation-related emissions through policy, bottom-up, and peer-to-peer leadership.
- Implement land use and transportation policy that promotes sustainable development, resource conservation, and promotes transit use.
- Optimize medical center micro-grid and central energy systems to maximize system capacity to accept large scale post-2014 renewables (e.g. smart grid systems, fuel cell, thermal energy storage, load shifting).
- Pursue regulatory changes that support renewable energy generation and distribution by California Universities to support large-scale post-2014 renewables.
- Utilize emission offsets as an interim measure if needed to close 2014 gap.

Medical Center 2015-2020 Strategic Priorities

- Continue to minimize building energy demand through post-SEP deep energy efficiency opportunities as emerging technologies and economic variables allow.
- Construct new facilities with zero-net energy goal (minimum goal of >50% energy savings) as feasible given code and regulatory requirements for patient care facilities.
- Secure large-scale on-site and off-site renewable power supplies to offset 50% of purchased electricity Medical Center emissions.
- Implement large scale fuel switching for distributed energy generation sources (fuel cells, boilers) and mobile sources (fleet).
- Secure large-scale bio-methane sources through direct access, nomination, or swaps to accommodate fuel switching at steam plant to with a goal of offsetting 50% of steam plant emissions.
- Reduce commuter GHG emissions by 25% through TDM, land use policy, and technology advances in vehicle design.
- Reduce or offset 25% of air travel emissions through behavioral changes and/or offset program.
- Secure credible emission offsets or sequestration to close any remaining gaps.

Medical Center 2020-2050 Climate Neutrality

The scale of GHG emission reductions required for Post- 2020 climate neutrality for a major academic medical center is enormous and will require fundamental shifts in fuel sources, energy systems, and transportation. The CAP project list does not address specific post-2020 Medical Center actions as these involve technology, funding, and public policy factors that cannot be predicted at this time. At a conceptual level achieving this goal would require technologies and polices that would allow achievement the following strategic initiatives:

- Central energy systems will rely on 100% climate neutral fuel source or replacement of existing systems with carbon neutral energy technology.
- Full deployment of renewables will supplement central energy systems to meet all distributed generation needs.

Per the CAP's guiding principles discussed above, all CAP funding and investment is to be economically viable and provide a reasonable economic payback based on sound financial analysis. However, the CAP notes that a fundamental challenge to determining financial viability is establishing a cost for carbon emissions, as there is no currently widely accepted value. California's cap-and-trade system is anticipated to provide a basis for determining the value of carbon emission reductions. Monitoring the cost of carbon will be an integral part of implementing the CAP.

As there is no specific funding source or budget for the CAP, implementation will require opportunistic funding approaches through a variety of sources including university funds, public and private financing, energy incentives, grants, collaborative efforts between research programs and operations, along with other

funding opportunities. The CAP presents a comprehensive list of projects supporting the short-term and mid-term strategies (pre 2020) that provides guidance in prioritizing project. This list is maintained to monitor and track progress and is updated through the biannual planning cycle recognizing that long-term climate protection initiatives may involve emerging technologies, dynamic economic variables, or opportunistic funding sources.

3.0 Potential Greenhouse Gas Impacts

3.1 Significance Thresholds

As discussed in Section 2.4.2.6, SB 97 required the Governor's Office of Planning and Research (OPR) to amend the CEQA guidelines to address climate change and GHG emission impacts. The CEQA Guidelines were updated in March 2010. Appendix G of the CEQA Guidelines, Environmental Checklist Form presents two questions to determine the significance of a Project's GHG Emissions;

> a) Would the Project generate GHG emissions, either directly or indirectly, that may have a significant impact on the environment?
>
> b) Would the Project conflict with an applicable plan, policy or regulation adopted for the purpose of reducing the emissions of GHGs?

At this time, a widely accepted quantitative threshold for determining whether GHG emissions will have a significant impact on the environment, needed to answer the first question, has not been established. In a June 2008 Technical Advisory, OPR requested that the California Air Resources Board (CARB) make recommendations for GHG related thresholds of significance. In response to this request, CARB published *Preliminary Draft Staff Proposal (Recommended Approaches for Setting Interim Significance Thresholds for Greenhouse Gases under the California Environmental Quality Act)* in October 2008. In December 2008, CARB held a workshop that presented potential performance standards for residential and commercial projects discussed in the Preliminary Draft Staff Proposal. At that workshop, staff indicated that a revised draft proposal would be released later that month and the proposal would be considered at the Board meeting at the end of the following month. CARB received numerous public comments on the preliminary draft document and workshop. A revised draft proposal was never released and the project was discontinued. As discussed above, OPR released the revised CEQA guidelines in March 2010 without receiving further guidance from CARB due to the requirement in SB 97 that the guidelines be adopted prior to June 1, 2009. While the CARB document was never finalized it provides some guidance regarding quantitative thresholds and is discussed below in Section 3.1.1

SCAQMD, the Bay Area Air Quality Management District (BAAQMD) and several other local air pollution control agencies have made efforts to establish quantitative GHG impact thresholds. In 2010, the BAAQMD adopted significance thresholds for both air quality and GHGs. However, the California Building Industry Association (CBIA) sued the BAAQMD because they did not conduct a CEQA review. The trial court found that the BAAQMD was required to perform the environmental analysis required by CEQA prior to adoption the Significance Thresholds. This decision was overturned by the First District Court of Appeal. The CBIA has appealed the decision to the California Supreme Court. The Supreme Court agreed to hear the case in November 2013 and briefings were filed in 2014. The Court heard oral arguments in October 2015 and a decision is expected before the end of the year. Because of the uncertainty caused by this case, SCAQMD paused its development of GHG thresholds while awaiting a decision. However, prior to this pause, SCAQMD GHG adopted a significance threshold to apply to projects where it is the lead agency that includes a framework for significance thresholds applicable to commercial and residential development projects. SCAQMD's significance threshold

development is discussed in 3.1.2. The thresholds proposed by CARB and SCAQMD will be used as guidance for a quantitative assessment of the project's GHG impact potential.

3.1.1 California Air Resource Board Draft Proposed Significance Thresholds

In October 2008, CARB released a *Preliminary Draft Staff Proposal (Recommended Approaches for Setting Interim Significance Thresholds for Greenhouse Gases under the California Environmental Quality Act)* to provide the Office of Planning and Research guidance on appropriate significance thresholds. The Proposal notes that CARB staff focused on interim standards for common project types that, collectively, are responsible for substantial GHG emissions—specifically, industrial, commercial and residential projects—due to the expedited schedule and that the proposed thresholds would be subject to further review, revision, and development. The document notes that climate change is a quintessential cumulative impact because it is caused by numerous "collectively significant projects taking place over a period of time" (CCR Title 14 § 15355, subd. (b)).

CARB staff rejected a "zero threshold" that would identify any new source of GHGs as significant and asserted that non-zero thresholds were supported by substantial evidence. This is because some level of GHG emissions in the near-term and at mid-century is still consistent with climate stabilization, and current and anticipated regulations and programs apart from CEQA will proliferate and increasingly reduce the GHG contributions of past, present, and future projects. The primary goal of the threshold is to make substantial contributions to reducing the State's GHG emission peak, to cause that peak to occur sooner, and to put the State on track to meet its emission reduction targets. This is to be achieved by developing thresholds that result in a substantial portion of GHG emissions from new projects being subject to CEQA's mitigation requirement.

CARB staff determined that sector specific thresholds were appropriate because some sectors contribute more substantially to the problem and different levels of emission reductions are expected of different sectors. Further, the staff felt that different types of thresholds—quantitative, qualitative, and performance-based—could apply to different sectors because they can and must be treated separately given the state of the science and data. Staff developed separate significance threshold proposals for (1) industrial projects, and (2) residential and commercial projects. The thresholds for both sectors recommend that projects that are exempt under existing statutory or categorical exemptions would have a less than significant impact related to climate change.

Under the CARB draft significance threshold non-exempt industrial projects would be found to have a less than significant impact related to climate change if they: (1) meet a performance standard for construction-related emissions, (2) meet a performance standard for transpiration emissions, and (3) generate no more than 7,000 MT CO_2EQ per year from non transportation sources [i.e., combustion related components equipment (e.g.; boilers), process losses, purchased electricity, and water usage and discharge]. The specific performance standards under the first two criteria were to be developed as the thresholds were further refined.

Based on CARB analysis, approximately 90% of industrial projects are anticipated to emit more than 7,000 MT CO_2EQ per year, therefore; approximately 90% of industrial projects would have a significant impact and be required to implement all feasible mitigation. CARB proposed using this quantitative emissions threshold at least until such a time that performance standards, such as AB 32 regulatory requirements are in place and ensure mitigation of significant impacts of GHG emissions from projects in the Industrial sector

Non-exempt residential and commercial projects would be found to have a less than significant impact related to climate change if they comply with a previously approved GHG emissions reduction program that satisfies California Code of Regulations, title 14, section 15064 (h)(3). This requires the plan to: (1) meet a community level GHG target consistent with the statewide emissions limit in AB32, (2) be consistent with the transportation related GHG reduction target adopted by CARB pursuant to SB 375, (3) include a GHG inventory and mechanisms to regularly monitor and evaluate emissions, (4) include specific, enforceable, GHG requirements, (5) incorporate mechanisms that allow the plan to be revised in order to meet targets; and (6) have a certified final CEQA document.

Residential and commercial projects that are not exempt or included in a previously approved GHG reduction plan could demonstrate a less that significant impact by showing that the project: (1) meets a performance standard for construction-related emissions, (2) meets an energy performance standard, (3) meets a water use performance standard, (4) meets a waste performance standard, (5) meets a transportation performance standard, and (6) generates annual GHG emissions less than a level to be determined as the thresholds are developed.

As with the commercial projects, the specific performance thresholds under the first five criteria were to be developed as the proposal was refined. California Energy Commissions Tier II Energy Efficiency goals for their solar energy incentive program were identified as an appropriate performance standard for energy. At the time, this represented a 30 percent reduction in building combined space heating, cooling, and water heating energy compared to the 2008 Title 24 Standards. Current, 2013, Title 24 standards achieve this level of efficiency. Existing green building rating systems like LEED, GreenPoint Rated, the California Building Code were identified as starting points for developing performance standards for the criteria 1, 3, 4, and 5. The proposal also allowed lead agencies to find that a project's mitigation is "equivalent" to the performance standards to allow for cost-effective and innovative approaches to reducing emissions.

The sixth criterion was established because CARB staff felt that, under some circumstances, projects that meet the performance standards, or include equivalent mitigation measures, could have cumulatively considerable, and therefore significant, impacts. Therefore, in addition to meeting performance standards or including equivalent mitigation measures, a project would not be able to have emissions greater than a specified about to be considered to have an insignificant climate change impact. CARB requested public and stakeholder input on an appropriate threshold for this criterion.

In December 2008, CARB Staff held a meeting to present potential performance standards and measures for residential and commercial projects summarized in the following bullet points:

Construction

- Provide alternative transportation mode options or incentives for workers on days that construction requires 200 or more workers; and
- Recycle and/or salvage at least 75 percent of non-hazardous construction and demolition debris by weight; and
- Use recycled materials for at least 20 percent of construction materials. Recycled materials may include salvaged, reused, and recycled content materials.

Energy

- Meet California Energy Commissions voluntary Tier II Energy Efficiency standards at the time building construction begins.

Water

- Reduce indoor potable water use by at least 20%.
- Reduce outdoor potable water use by at least 50%.

Waste

- Design facilities and structures to encourage participation in existing recycling and/or composting programs; and
- Install adequate, accessible recycling and compositing receptacles in common or public areas; and
- Provide ease access to central recycling and composting receptacles or collections areas.

Residential Transportation

- Demonstrate that average vehicles miles traveled per household per year (VMT/hh-yr) is projected to exceed 14,000 VMT/hh-yr.
- Represents carbon-efficient, compact development with close proximity to transit and variety of services.

Commercial Transportation

- Project located with ½ mile of residential zone or neighborhood with an average density of at least 10 du/net-acre; and
- Project located within ½ mile of at least 10 neighborhood services; and
- Provide pedestrian access between project and services; and
- Institute a comprehensive transportation demand management (TDM) program to reduce employee trips by at least 20%

At the meeting, Staff indicated that an updated Draft Recommendation would be issued later that month after receipt and review of public comments and the proposal would be brought in front of the Board in January. However, due to the

number and scope of comments received on the draft proposal, and SB97's requirement for OPR to adopt guidelines by June 2009 the process was abandoned and not developed further.

3.1.2 SCAQMD's Significance Thresholds

In December 2008, the South Coast Air Quality Management District (SCAQMD) adopted GHG significance threshold for Stationary Sources, Rules and Plans where the SCAQMD is lead agency. The threshold uses a tiered approach. The project is compared with the requirements of each tier sequentially. A project that complies with any tier would not result in a significant impact.

Projects that qualify for any exemption from CEQA comply with the first Tier and are not considered to result in a significant impact. Projects that are consistent with a GHG reduction plan that has a certified final CEQA document and complies with AB 32 GHG reduction goals are compliant with the second tier and will not result in a significant impact.

The third tier excludes projects with annual emissions lower than a screening threshold. For industrial stationary source projects, the SCAQMD adopted a screening threshold of 10,000 MT CO_2EQ/year. This threshold was selected to capture 90 percent of the GHG emissions from these types of projects where the combustion of natural gas is the primary source of GHG emissions. SCAQMD concluded that projects with emissions less than the screening threshold would not result in a significant cumulative impact.

Tier 4 outlined three potential compliance options. Under the first option, the project would comply with the Tier if design features and/or mitigation measures resulted in emissions 30 percent lower than business as usual emissions. Under the second option, the project would comply if it had early compliance with AB 32 through early implementation of CARB's Scoping Plan measures. Under the third option, the project would comply with the Tier if it met sector based performance standards. However, the specifics of the Tier 4 compliance options were not adopted by the SCAQMD board to allow further time to develop the options and coordinate with CARB's GHG significance threshold development efforts.

Projects that implement offsite mitigation (GHG reduction projects) or purchase offsets to reduce GHG emission impacts to less than the proposed screening level would be considered compliant with Tier 5.

While not adopted by the SCAQMD Board, the guidance document for the lead agency threshold also suggested using the same, tiered, approach for residential and commercial projects. Staff recommended a Tier 3 screening threshold of 3,000 MTCO_2EQ/year. However, the Board felt additional analysis was required along with coordination with CARB's GHG significance threshold development efforts prior to adopting a threshold applicable to general development projects. SCAQMD formed a working group to further develop the GHG significance thresholds.

At the most recent SCAQMD GHG working group meeting in November 2009, SCAQMD staff presented two options for Tier 3 screening thresholds for residential and commercial projects. The first option proposed a 3,500 MT CO_2EQ/year threshold for residential projects, a 1,400 MT CO_2EQ/year threshold for commercial

projects, and a 3,000 MT CO_2EQ/year for mixed-use projects. The second option would apply the 3,000 MT CO_2EQ/year screening threshold for all commercial/residential projects. Lead agencies would be able to select either option. These thresholds are based on capturing 90 percent of the emissions from these types of projects and requiring them to comply with the higher tiers of the threshold (i.e., performance requirements or GHG reductions outside of the project) to not result in a significant impact.

Staff also presented compliance options for the Tier 4 performance standards. The first option would be a reduction of 23.9 percent in GHG emissions over the base case. This percentage reduction represents the land use sector portion of the CARB Scoping Plan's overall reduction of 28 percent. This target would be updated as the AB 32 Scoping Plan is revised. The base case scenario for this reduction still needs to be defined. Residual emissions would need to be less than 25,000 MT CO_2EQ/year to comply with the option. Staff-proposed efficiency targets for the third option of 4.6 MT CO_2EQ/year per service population (population employment) for project level analysis and 6.6 MT CO_2EQ/year for plan level analyses. For project level analyses, residual emissions would need to be less than 25,000 MT CO_2EQ/year to comply with this option. As discussed above, SCAQMD suspended further development of the thresholds after this due to the uncertainty brought about by the unresolved legal actions against the Bay Area Air Quality Management District's CEQA thresholds.

3.1.3 Significance Thresholds Used to Determine Significance

CARB's proposed thresholds were not developed sufficiently to be used determine the significance of a project. SCAQMD's proposed threshold structure is considerably similar to CARB's proposal and includes specific proposals for the Tier 3 screening threshold and Tier 4 performance standards directly comparable to estimated GHG emissions.

The proposed project is not otherwise exempted from CEQA and therefore not compliant with the first Tier of the SCAQMD threshold. While the University of California, Irvine Campus has developed a Climate Action Plan (CAP), discussed in Section 2.4.5, applicable to both the main campus and the Medical Center that demonstrates compliance with AB 32's emission reduction goals, a CEQA environmental document was not prepared and finalized for the CAP. Therefore, while the project is consistent with UCI's CAP, it does not comply with Tier 2 of the thresholds for this reason.

The change in GHG emissions due to the project is estimated below. These emissions will be compared with the 3,000 MT CO_2EQ per year Tier 3 screening threshold and the 4.6 MT CO_2EQ/year Tier 4 performance threshold to determine the significance of the Project related GHG emissions. The SCAQMD methodology recommends that total construction emissions be amortized over a 30-year period or the project's expected lifetime if it is less than 30 years.

3.2 Project Emissions Calculation Methodology

GHG emissions during construction and operation of the project were estimated using the methodologies presented below. Section 3.2.1 presents the methodologies used to estimate construction related GHG emissions and Section 3.2.2 presents the methodologies used to estimate operational GHG emissions.

3.2.1 Construction Emissions

The CalEEMod program (version 2013.1.2) was used to calculate the emissions associated with construction of the project. CalEEMod is a computer model developed by a group of California air districts and currently maintained by the California Air Pollution Control Officials Association (CAPCOA) that uses emission factors from CARB's EMFAC2011 model for on-road vehicle emission estimates and emission factors from CARB's OFFROAD model for off-road vehicle and equipment emission estimates. The sources of GHG emissions during construction include off-road construction vehicles and equipment, on-road haul trucks, and employee vehicles.

A description of the general construction activities and the equipment expected to be utilized for these activities are described in the following section. This information was used to develop input data for the CalEEMod model to estimate GHG emissions from construction activities. The specific input data used to model construction emissions, reflected from the CalEEMod output file is presented in the Appendix. CalEEMod does not provide a method to report input parameters. The output files include most but not all input parameters but are quite lengthy and do provide limited utility. Computer readable copies of the CalEEMod input and output files are available upon request.

3.2.1.1 Construction Activities

Construction of the two project components, the OSHPD Plant and the Non-OSHPD Plant, will occur under separate design-build contracts. Because these projects will be developed under design-build contracts, specific details regarding construction activities are not available. CalEEMod includes default activity estimates for construction activities based on the type and size of the project. These defaults were used to estimate the activities and emissions associated with construction of the project using the project types defined in the model and project specific areas.

The OSHPD Plant emissions were estimated for the construction of a 1,450 square foot heavy industrial building, the size of the chiller pad, on 0.34 acres. The modeling also included emissions from the demolition of an existing 1,250 square foot building. The Chillers located in the most northern pad of the OSHPD Plant will be connected by pipes to the cooling towers located on the most southern pad. This will involve trenching which is not a standard default construction activity in CalEEMod. Therefore, a trenching activity phase was added to the CalEEMod defaults to account for this.

The Non-OSHPD Plant emissions were estimated for the construction of an 8,000 square foot heavy industrial building on a 0.68-acre site. The modeling also included emissions from the demolition of 13,900 square feet of existing buildings.

The specific activity data used to calculate construction emissions for each of the project components, mirrored from the CalEEMod Output file, are presented in the appendix. The CalEEMod output files are quite lengthy, provide little utility, and are not included with the report. The CalEEMod input and output files are available upon request.

Construction of each of the project components was assumed to occur in 2016. Delays in the start for each phase of construction would not significantly affect emission estimates. In fact, the on-road and off-road vehicle emission factors in the CalEEMod program include a reduction in vehicle exhaust emissions each year. This accounts for new construction equipment and on-road vehicles manufactured under stricter emission standards becoming a larger part of the construction fleet (a fleet average emission factor is used to estimate emissions). For emissions modeling purposes, a delay moving the activity into the following year would actually result in a slight reduction in the exhaust emissions estimates. Because the construction GHG emissions estimate are cumulative, shortening or lengthening the duration of construction would not change the amount of work required nor the quantity of GHG emissions.

3.2.2 Operational Emissions

The development of the project will not result in any additional vehicle trips, as it will not increase the number of employees or clients visiting the Medical Center. The two sources of increased GHG emissions associated with the operation of the project are the additional electricity that will be generated to power the chillers and cooling towers, and the testing of the diesel emergency generators. Note that operation of the emergency generators during emergencies is exempt from environmental analysis as an emergency activity. However, the generators will undergo testing approximately every 40 days where they will be operated for thirty-minutes. These emissions are considered part of the normal operation of the project and must be included in the emission estimate used to evaluate the significance of the Project.

The daily electrical use for the OSHPD and Non-OSHPD Energy Plants under existing conditions and under future conditions with the full buildout of the Medical Centers' Long Range Development Plan (LRDP) are presented in Table 6. These values were provided by the Project's design engineers.

Table 6
Energy Plant Electrical Use (MWhr/day)

	OSHPD Plant	Non-OSHPD Plant	Total Project
Existing	58	68	126
Future With LRDP Buildout	166	106	272
Increase Due to Project	**108**	**38**	**146**

The increase in electrical usage presented in Table 6 only accounts for the change in electricity used by the Medical Center's energy plants. As discussed below in Section 3.4, the energy plant changes proposed by this project are needed to

enable build out of the LRDP. Buildout of the LRDP will remove older, less energy efficient buildings with independent cooling systems (e.g., rooftop air handling units) and replace them with modern buildings constructed to current energy efficiency standards. As discussed in Section 2.4.4, all new buildings constructed by the University are to outperform California Building Code energy efficiency standards by 20 percent and strive to outperform them by 30 percent. Additionally, buildings are to achieve LEED "silver" certification and strive to achieve LEED-NC "Gold" certification.

Further, this Project will enable the decommissioning of existing building specific cooling systems for some existing buildings that will remain with the LRDP. The change in electrical use in Table 6 does not include reductions in electricity used for cooling of buildings that will be demolished under the LRDP or those whose building specific cooling systems will be decommissioned because of the Project. Therefore, the estimate of the change in electrical consumption with the Projects is conservative (i.e., high) and actual emissions will be somewhat lower than projected.

To determine the GHG emissions from electrical usage, the electrical usage is multiplied by emission factors that relate the amount of GHG emissions to the electrical usage. The electricity used by the Medical Center is supplied by Southern California Edison. CalEEMod includes GHG emission factors for electrical generation for the various electricity suppliers in the State. The emission factors for Southern California Edison used in CalEEMod are presented in Table 7.

Table 7
Southern California Edison GHG Emission Factors (lbs/MW-hr)

	CO_2	CH_4	N_2O
Pounds of Emissions per Megawatt-Hour	630.9	0.029	0.00617

The electrical GHG emission factors presented in Table 7 are based on data collected prior to 2010. Therefore, the emission factors do not include the effects of adopted regulations that require electrical generators to increase the amount of energy generated by renewable resources. These regulations will result in considerable reductions in the amount of GHG emissions per megawatt hour in the future. Further, as discussed in Section 2.4.5, the University of California, Irvine Climate Action Plan calls for the Medical Center to exploit on-site renewable energy generation to the maximum extent feasible, to optimize the Medical Centers micro-grid and central energy systems to accept large scale renewable sources, and to secure affordable and scalable off-site renewable power sources. These actions will further lower the emissions per megawatt-hour of electricity used. Therefore, electrical GHG emissions estimated using the emission factors presented in Table 7 results in a conservative (i.e., high) estimate of the GHG emissions associated with the operation of the Project.

Emissions from the testing of the diesel generators were calculated using emission factors from the 2014 Edition of *California's 2000-2012 GHG Emissions Inventory Technical Support Document*. This methodology estimates GHG emissions based on

the amount of diesel fuel used by the generators. The specific make and model of generators to be used in the project is not known, as they will be selected by the design-build contractor. The project applicant provided fuel usage information for a 2,000 kW diesel generator, which indicated a maximum fuel use of approximately 141.4 gallons per hour. A worksheet showing the emissions calculations and specific factors used is presented in the appendix.

3.3 Estimate of Project Greenhouse Gas Emissions

Using the methodologies discussed in Section 3.2.1, GHG emissions associated with the Project were calculated and are presented below. Emissions associated with construction activities are presented in Section 3.3.1. Operational emissions are presented in Section 3.3.2.

3.3.1 Construction Emissions

Using the methodologies described in Section 3.2.1, CO_2, CH_4, and N_2O emissions during construction of the Project were calculated and are presented in Table 8. The total annual metric tons of CO_2EQ emissions for each construction activity are presented.

Table 8
Total Construction CO_2 Emissions

Activity	Annual Emissions (MT/Year) CO_2	CH_4	N_2O	CO_2EQ
OSHPD Plant Construction				
Site Preparation	0.5	0.00	0.00	0.5
Grading	1.2	0.00	0.00	1.2
Trenching	3.6	0.00	0.00	3.6
Building Construction	54.0	0.02	0.00	54.3
Paving	2.9	0.00	0.00	2.9
Painting	0.6	0.00	0.00	0.6
Non-OSHPD Plant Construction				
Site Preparation	0.5	0.00	0.00	0.5
Grading	1.2	0.00	0.00	1.2
Building Construction	56.4	0.02	0.00	56.8
Paving	2.9	0.00	0.00	2.9
Painting	0.7	0.00	0.00	0.7
Total Emissions	**124.3**	**0.0**	**0.0**	**125.1**
Project Life Average Annual Construction Emissions*	**4.1**	**0.0**	**0.0**	**4.2**

*Based on 30 Year Project Life Per SCAQMD Significance Thresholds

Table 8 also shows the project lifetime average annual construction emissions. The SCAQMD GHG guidance recommends that construction emissions be amortized over

a 30-year project lifetime and added to the operational emissions to determine significance. This is done in the next section.

3.3.2 Operational Emissions

The impact of the proposed project is measured against the net increase in emissions that will result from the implementation of the project. Using the methodologies described in Section 3.2.2, the GHG emissions associated with the project were calculated. The results of this analysis are presented in Table 9. Table 9 presents an estimate of the CO_2EQ emissions resulting from the proposed changes to the Medical Center's energy plants at buildout of the Medical Center's Long Range Development Plan. The annualized construction emissions are added to the operational emissions to give the total increase in annualized emissions due to the project.

Table 9
Annual Project CO_2 Emissions

Activity	Annual Emissions (MT/yr.) CO_2	CH_4	N_20	CO_2EQ
Electricity	15,250	0.70	0.15	15,311
Generator Testing	32.9	0.00	0.00	33.3
Total Emissions	**15,336**	**0.70**	**0.15**	**15,344**
Annualized Construction Emissions	4.1	0.00	0.00	4.2
Total Annual Project Emissions	**15,287**	**0.70**	**0.15**	**15,348**
			Screening Threshold:	**3,000**
			Exceed Threshold?	**Yes**
			Number of Employees[1] (Service Pop.):	**4,618**
			Emissions Per Service Population:	**3.32**
			Performance Standard Per Service Population?	**4.60**
			Exceed Performance Standard?	**No**

1. Source: http://uci.edu/facts/campus-data.php

3.4 Impacts from Project

The analysis presented above shows that the net increase in GHG emissions due to the project are projected to exceed the SCAQMD suggested Tier 3 screening level significance threshold of 3,000 metric tons per year. However, the emissions per service population are less than the recommended Tier 4 performance standard of 4.60 metric tons of CO_2 equivalent per year. Further, the total emissions are less than the 25,000 MT CO_2EQ residual as required by the SCAQMD threshold. Thus, the project will not result in a significant GHG impact and no project specific mitigation measures are required.

As discussed in Section 3.2.2, the increase in electrical consumption used to calculate the Project's GHG emissions does not include reductions in electrical usage that are enabled by the Project. The Project will allow existing building independent

cooling systems (e.g., rooftop air handling units) to be decommissioned and replaced by cooling water from the Energy Plant. As discussed below, the project also enables the buildout of the Medical Center's Long Range Development Plan (LRDP) which will replace older buildings with newer, more energy efficient, buildings that will utilize the chilled water from the Project. Further, the electrical generation emission factors used for the GHG emissions calculations do not include the effects of the State's Renewable Portfolio Standard, which will require utilities to provide 33% of their electricity from renewable resources by 2020, and UCI's Climate Action Plan to maximize renewable electricity generation. Therefore, the Project's emissions will be even lower than shown.

The purpose of this Project is to enable the continued development of the Medical Center's LRDP adopted in 2003 which updated the previous LRDP adopted in 1976. While full development of the LRDP is anticipated to increase the gross square footage of building space at the Medical Center by approximately 66%, the LRDP includes the demolition and replacement of approximately 65% of the building square footage that existed in 2003.

At the time the LRDP was adopted, approximately 55% of the Medical Center's building square footage was built prior to 1980. Approximately 46% was built prior to 1970 prior to the incorporation of energy efficiency standards into building codes. At buildout of the LRDP, only about 1% of the Medical Center's square footage will have been built prior to 1980. Buildout of the LRDP will result in approximately 83% of the Medical Center square footage being newly constructed.

Modern building technologies have substantially increased energy efficiencies over those built prior to 1980. As discussed in Section 2.4.2, retrofitting or replacing older buildings to reduce energy usage and GHG emissions is one of the primary components of the California Air Resources Board's First Update to the Climate Change Scoping Plan. The continued development of the LRDP is consistent with the Scoping Plan in this respect. Further, this component of the LRDP will provide centralized cooling for existing and new building space more efficiently than the existing distributed building specific equipment (e.g., rooftop air handling units).

Therefore, while the Project is shown to result in increased GHG emissions. That increase is due to the increased building space proposed by the LRDP to provide increased medical and educational services. What is not clearly reflected in this increase is that the development of the LRDP, enabled by this project, allows those services to be provided in a more energy efficient manner and result in lower GHG emissions than would occur without the project and LRDP.

Additionally, as discussed in Section 2.4.4, UCI implements a climate action plan that is compliant with AB 32 (described in Section 2.4.2,) and policies contained in the University of California Policy on Sustainable Practices to further reduce GHG emissions on the campus. The proposed project would also incorporate project relevant specific policies contained in these plans. Therefore, the project will not considerably contribute to significant cumulative impacts associated with global climate change due to GHG emissions or interfere with California's ability to achieve its GHG reduction goals.

4.0 Mitigation Measures

The analysis presented above shows that the net increase in GHG emissions due to the project are projected to exceed the SCAQMD suggested screening level significance threshold of 3,000 metric tons per year. However, the emissions per service population are less than the 4.60 metric tons of CO_2 equivalent per year and the total emissions are less than the 25,000 MT CO_2EQ residual as required by the SCAQMD threshold. Thus, no project specific mitigation measures are required for the project to result in a less than significant GHG impact.

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Appendix

CalEEMod Construction Input Summaries

CalEEMod Input and Output Files Available Upon Request

Diesel Generator GHG Emissions Calculation Worksheet

UCI Medical Center OSHPD Energy Plant

CalEEMod Construction Emissions Inputs

Construciton Phasing

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Demolition	Demolition	1/1/2016	1/14/2016	5	10	
2	Site Preparation	Site Preparation	1/15/2016	1/15/2016	5	1	
3	Grading	Grading	1/16/2016	1/19/2016	5	2	
4	Trenching	Trenching	1/20/2016	2/16/2016	5	20	
5	Building Construction	Building Construction	1/20/2016	6/7/2016	5	100	
6	Paving	Paving	6/8/2016	6/14/2016	5	5	
7	Architectural Coating	Architectural Coating	6/15/2016	6/21/2016	5	5	

Construction Areas

Acres of Grading (Site Preparation Phase): 0.5

Acres of Grading (Grading Phase): 0

Acres of Paving: 0

Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 2,175; Non-Residential Outdoor: 725 (Architectural Coating – sqft)

Construction Equipment

Phase Number	Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
1	Demolition	Concrete/Industrial Saws	1	8.00	81	0.73
1	Demolition	Rubber Tired Dozers	1	1.00	255	0.40
1	Demolition	Tractors/Loaders/Backhoes	2	6.00	97	0.37
2	Site Preparation	Graders	1	8.00	174	0.41
2	Site Preparation	Tractors/Loaders/Backhoes	1	8.00	97	0.37
3	Grading	Concrete/Industrial Saws	1	8.00	81	0.73
3	Grading	Rubber Tired Dozers	1	1.00	255	0.40
3	Grading	Tractors/Loaders/Backhoes	2	6.00	97	0.37
4	Trenching	Trenchers	1	8.00	80	0.50
5	Building Construction	Cranes	1	4.00	226	0.29
5	Building Construction	Forklifts	2	6.00	89	0.20
5	Building Construction	Tractors/Loaders/Backhoes	2	8.00	97	0.37
6	Paving	Cement and Mortar Mixers	4	6.00	9	0.56
6	Paving	Pavers	1	7.00	125	0.42
6	Paving	Rollers	1	7.00	80	0.38
6	Paving	Tractors/Loaders/Backhoes	1	7.00	97	0.37
7	Architectural Coating	Air Compressors	1	6.00	78	0.48

Construction Trips and VMT

Phase Number	Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
1	Demolition	4	10.00	0.00	6.00	14.70	6.90	LD_Mix	HDT_Mix	HHDT
2	Site Preparation	2	5.00	0.00	0.00	14.70	6.90	LD_Mix	HDT_Mix	HHDT
3	Grading	4	10.00	0.00	0.00	14.70	6.90	LD_Mix	HDT_Mix	HHDT
5	Building Construction	5	1.00	0.00	0.00	14.70	6.90	LD_Mix	HDT_Mix	HHDT
6	Paving	7	18.00	0.00	0.00	14.70	6.90	LD_Mix	HDT_Mix	HHDT
7	Architectural Coating	1	0.00	0.00	0.00	14.70	6.90	LD_Mix	HDT_Mix	HHDT
4	Trenching	1	3.00	0.00	0.00	14.70	6.90	LD_Mix	HDT_Mix	HHDT

Construction Mitigation Measures

0

UCI Medical Center Non-OSHPD Energy Plnt

CalEEMod Construction Emissions Inputs

Construciton Phasing

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Demolition	Demolition	1/1/2016	1/14/2016	5	10	
2	Site Preparation	Site Preparation	1/15/2016	1/15/2016	5	1	
3	Grading	Grading	1/16/2016	1/19/2016	5	2	
4	Building Construction	Building Construction	1/20/2016	6/7/2016	5	100	
5	Paving	Paving	6/8/2016	6/14/2016	5	5	
6	Architectural Coating	Architectural Coating	6/15/2016	6/21/2016	5	5	

Construction Areas

Acres of Grading (Site Preparation Phase): 0.5

Acres of Grading (Grading Phase): 0

Acres of Paving: 0

Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 13,200; Non-Residential Outdoor: 4,400 (Architectural Coating – sqft)

Construction Equipment

Phase Number	Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
1	Demolition	Concrete/Industrial Saws	1	8.00	81	0.73
1	Demolition	Rubber Tired Dozers	1	1.00	255	0.40
1	Demolition	Tractors/Loaders/Backhoes	2	6.00	97	0.37
2	Site Preparation	Graders	1	8.00	174	0.41
2	Site Preparation	Tractors/Loaders/Backhoes	1	8.00	97	0.37
3	Grading	Concrete/Industrial Saws	1	8.00	81	0.73
3	Grading	Rubber Tired Dozers	1	1.00	255	0.40
3	Grading	Tractors/Loaders/Backhoes	2	6.00	97	0.37
4	Building Construction	Cranes	1	4.00	226	0.29
4	Building Construction	Forklifts	2	6.00	89	0.20
4	Building Construction	Tractors/Loaders/Backhoes	2	8.00	97	0.37
5	Paving	Cement and Mortar Mixers	4	6.00	9	0.56
5	Paving	Pavers	1	7.00	125	0.42
5	Paving	Rollers	1	7.00	80	0.38
5	Paving	Tractors/Loaders/Backhoes	1	7.00	97	0.37
6	Architectural Coating	Air Compressors	1	6.00	78	0.48

Construction Trips and VMT

Phase Number	Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
1	Demolition	4	10.00	0.00	63.00	14.70	6.90	LD_Mix	HDT_Mix	HHDT
2	Site Preparation	2	5.00	0.00	0.00	14.70	6.90	LD_Mix	HDT_Mix	HHDT
3	Grading	4	10.00	0.00	0.00	14.70	6.90	LD_Mix	HDT_Mix	HHDT
4	Building Construction	5	4.00	1.00	0.00	14.70	6.90	LD_Mix	HDT_Mix	HHDT
5	Paving	7	18.00	0.00	0.00	14.70	6.90	LD_Mix	HDT_Mix	HHDT
6	Architectural Coating	1	1.00	0.00	0.00	14.70	6.90	LD_Mix	HDT_Mix	HHDT

Construction Mitigation Measures

0

UCI Medical Center Energy Plant
Diesel Generator GHG Emissions Calculation Worksheet

	NON OSHPD	OSHPD	Total
Number of Generators			
Initial	2	1	3
Ultimate	4	1	5
Testing			
hr/month/ge	0.38	0.38	0.38
Operation (hours/year)			
Initial	9.12	4.56	13.68
Ultimate	18.24	4.56	22.8
Fuel Rate			
gal/hr	141.4	141.4	141.4
Fuel Usage (gal/year)			
Initial	1,290	645	1,934
Ultimate	2,579	645	3,224
Emission Rates (lbs/gal)			
CO_2	22.514	22.514	22.514
N_2O	0.00073	0.00073	0.00073
Emission Rates (lbs/hr)			
CH_4	0.0289	0.0289	0.0289
Initial Emisisons (MT/yr)			
CO_2	13.2	6.6	19.8
CH_4	0.0001	0.0001	0.0002
N_2O	0.0004	0.0002	0.0006
CO_2EQ	**13.3**	**6.7**	**20.0**
Ultimate Emisisons (MT/yr)			
CO_2	26.3	6.6	32.9
CH_4	0.0002	0.0001	0.0003
N_2O	0.0009	0.0002	0.0011
CO_2EQ	**26.6**	**6.7**	**33.3**

GHG Emissions From Diesel Fuel Combustion Factors

CO2 Emissions =Fuel Use * Geat Content of Fuel (BTU/unit of fuel) * Emission Factor (CO2/BTU)

Heat Content of Diesel Fuel: 138,000 BTU/gal

Emission Factor: 0.074 grams/BTU

CH4 Emissions =0.0408 * TOG Emissions

N2O emissions = 0.3316 grams/gallon of fuel

Source: 2014 Edition California's 2000-2012 Greenhouse Gas Emissions Inventory Technical Support Document

APPENDIX C

Trip Generation

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Stantec Consulting Services Inc.
38 Technology Drive Suite 100, Irvine CA 92618-5312

December 9, 2014
File: 2073006820

Attention: Lindsey Hashimoto
Environmental Planning and Sustainability
University of California, Irvine
750 University Tower
Irvine, CA 92697-2325

Dear Ms. Hashimoto,

Reference: UCI Medical Center OSHPD and non-OSHPD Chiller Plants Trip Generation

The University of California, Irvine (UCI) is proposing Medical Center Facility Projects as part of implementing the approved Long Range Development Plan (LRDP) for the Medical Center campus in the City of Orange. These Facility Projects are to be developed in four phases/stages. The first project (Phase 1) consists of building OSHPD and non-OSHPD Chiller Plants.

The OSHPD and non-OSHPD Chiller Plants, located on the southeast portion of the Medical Center campus, would total 16,000 square feet. The Chiller Plants would not increase the number of existing staff, faculty, or patients, and would not change any of the on-site or off-site parking. Therefore, the proposed OSHPD and non-OSHPD Chiller Plants are not expected to generate new vehicle trips or change existing traffic patterns.

The proposed OSHPD and non-OSHPD Chiller Plants would have no significant impact on the surrounding circulation system.

If you have any questions, please call me.

Sincerely,

STANTEC CONSULTING SERVICES INC.

Cathy Lawrence, PE
Transportation Engineer
Phone: (949) 923-6064
Cathy.Lawrence@stantec.com

c. Daryl Zerfass, Stantec Consulting Services Inc.

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APPENDIX D

CEQA Notices

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UNIVERSITY OF CALIFORNIA, IRVINE

BERKELEY • DAVIS • IRVINE • LOS ANGELES • MERCED • RIVERSIDE • SAN DIEGO • SAN FRANCISCO SANTA BARBARA • SANTA CRUZ

Environmental Planning and Sustainability

380 University Tower
Irvine, CA 92697-2325
(949) 824-6316

NOTICE OF INTENT TO ADOPT A MITIGATED NEGATIVE DECLARATION

Project Title: Central Energy Plant Expansion
Project Location: University of California, Irvine Medical Center
Lead Agency: University of California, Irvine
County: Orange

In accordance with State CEQA Guidelines and University of California Procedures for implementation of the California Environmental Quality Act, an Initial Study for the Central Energy Plant Expansion project was prepared by the University of California, Irvine (University), and it was determined that a Mitigated Negative Declaration is the appropriate level of analysis.

The University of California, Irvine Medical Center (UCIMC) is located at 101 The City Drive South in the city of Orange and is bound by Interstate 5 (I-5) to the east, Chapman Avenue to the north, The City Drive to the west, and Dawn Way to the south. The proposed project consists of the demolition of an approximately 6,000-gross-square-foot (GSF) structure and construction of four components to provide increased chiller capacity to the UCIMC. Two of the components will serve inpatient facilities that fall within the jurisdiction of the Office of Statewide Health Planning and Development (OSHPD) and the other two will serve non-OSHPD facilities. The OSHPD components include expansion of the existing on-site OSHPD chiller plant and modification of the associated OSHPD power generator yard; non-OSHPD components include construction of a new 8,800 GSF non-OSHPD chiller plant and an associated power generator yard.

The project has been analyzed in the Draft Initial Study/Mitigated Negative Declaration (Draft IS/MND) and determined that, with the incorporation of mitigation, it will not have a significant effect on the environment. The document is available at: http://www.eps.uci.edu/EnvironmentalPlanning/index.html. Hard copies of the Draft IS/MND and referenced documents are available for review during business hours at the University of California, Irvine's Office of Environmental Planning and Sustainability. Comments will be received December 23, 2015 through January 22, 2016.

E-mail comments to hashimol@uci.edu or mail to:

Lindsey Hashimoto, Associate Planner
Office of Environmental Planning and Sustainability
University of California, Irvine
380 University Tower, Irvine, CA 92697

The Draft IS/MND, along with comments received during the public review period, will be considered by the Chancellor in conjunction with project approval. If adopted by the University, the Draft IS/MND will be finalized.

Richard Demerjian, Director

Print Form

Appendix C

Notice of Completion & Environmental Document Transmittal

Mail to: State Clearinghouse, P.O. Box 3044, Sacramento, CA 95812-3044 (916) 445-0613
For Hand Delivery/Street Address: 1400 Tenth Street, Sacramento, CA 95814

SCH #

Project Title: Central Energy Plant Expansion

Lead Agency: University of California, Irvine | Contact Person: Richard Demerjian, Director
Mailing Address: 380 University Tower, Irvine, CA 92697 | Phone: (949) 824-7058
City: Irvine | Zip: 92697 | County: Orange

Project Location: County: Orange | City/Nearest Community: Orange
Cross Streets: Dawn Way and The City Drive | Zip Code: 92868
Longitude/Latitude (degrees, minutes and seconds): 33 ° 47 ′ 9.48 ″ N / 117 ° 53 ′ 18.34 ″ W | Total Acres: 1.0
Assessor's Parcel No.: | Section: | Twp.: | Range: | Base:
Within 2 Miles: State Hwy #: Interstate 5 | Waterways:
Airports: | Railways: | Schools:

Document Type:

CEQA: ☐ NOP ☐ Draft EIR | NEPA: ☐ NOI | Other: ☐ Joint Document
☐ Early Cons ☐ Supplement/Subsequent EIR | ☐ EA | ☐ Final Document
☐ Neg Dec (Prior SCH No.) | ☐ Draft EIS | ☐ Other:
☒ Mit Neg Dec Other: | ☐ FONSI

Local Action Type:

☐ General Plan Update ☐ Specific Plan ☐ Rezone ☐ Annexation
☐ General Plan Amendment ☐ Master Plan ☐ Prezone ☐ Redevelopment
☐ General Plan Element ☐ Planned Unit Development ☐ Use Permit ☐ Coastal Permit
☐ Community Plan ☐ Site Plan ☐ Land Division (Subdivision, etc.) ☒ Other: Design Approval

Development Type:

☐ Residential: Units Acres
☐ Office: Sq.ft. Acres Employees
☐ Commercial: Sq.ft. Acres Employees
☐ Industrial: Sq.ft. Acres Employees
☐ Educational:
☐ Recreational:
☐ Water Facilities: Type MGD
☐ Transportation: Type
☐ Mining: Mineral
☐ Power: Type MW
☐ Waste Treatment: Type MGD
☐ Hazardous Waste: Type
☒ Other: Chiller Plant

Project Issues Discussed in Document:

☒ Aesthetic/Visual ☐ Fiscal ☒ Recreation/Parks ☐ Vegetation
☐ Agricultural Land ☒ Flood Plain/Flooding ☒ Schools/Universities ☒ Water Quality
☒ Air Quality ☒ Forest Land/Fire Hazard ☒ Septic Systems ☒ Water Supply/Groundwater
☒ Archeological/Historical ☒ Geologic/Seismic ☒ Sewer Capacity ☐ Wetland/Riparian
☐ Biological Resources ☐ Minerals ☒ Soil Erosion/Compaction/Grading ☒ Growth Inducement
☐ Coastal Zone ☒ Noise ☒ Solid Waste ☒ Land Use
☒ Drainage/Absorption ☒ Population/Housing Balance ☒ Toxic/Hazardous ☒ Cumulative Effects
☐ Economic/Jobs ☒ Public Services/Facilities ☒ Traffic/Circulation ☒ Other: Greenhouse Gas

Present Land Use/Zoning/General Plan Designation:

UC Irvine is not subject to local zoning requirements. Permitted uses in the 2003 UCIMC LRDP allow service functions.

Project Description: *(please use a separate page if necessary)*

The proposed project consists of the demolition of an approximately 6,000-gross-square-foot (GSF) structure and construction of four components to provide increased chiller capacity to the University of California, Irvine Medical Center (UCIMC). Two of the components will serve inpatient facilities that fall within the jurisdiction of the Office of Statewide Health Planning and Development (OSHPD) and the other two will serve non-OSHPD facilities. The OSHPD components include expansion of the existing on-site OSHPD chiller plant and modification of the associated OSHPD power generator yard; non-OSHPD components include construction of a new 8,800 GSF non-OSHPD chiller plant and an associated power generator yard.

Note: The State Clearinghouse will assign identification numbers for all new projects. If a SCH number already exists for a project (e.g. Notice of Preparation or previous draft document) please fill in.

Reviewing Agencies Checklist

Lead Agencies may recommend State Clearinghouse distribution by marking agencies below with and "X".
If you have already sent your document to the agency please denote that with an "S".

____	Air Resources Board	____	Office of Historic Preservation
____	Boating & Waterways, Department of	____	Office of Public School Construction
____	California Emergency Management Agency	____	Parks & Recreation, Department of
____	California Highway Patrol	____	Pesticide Regulation, Department of
S	Caltrans District #12	____	Public Utilities Commission
____	Caltrans Division of Aeronautics	S	Regional WQCB #8
____	Caltrans Planning	____	Resources Agency
____	Central Valley Flood Protection Board	____	Resources Recycling and Recovery, Department of
____	Coachella Valley Mtns. Conservancy	____	S.F. Bay Conservation & Development Comm.
____	Coastal Commission	____	San Gabriel & Lower L.A. Rivers & Mtns. Conservancy
____	Colorado River Board	____	San Joaquin River Conservancy
____	Conservation, Department of	____	Santa Monica Mtns. Conservancy
____	Corrections, Department of	____	State Lands Commission
____	Delta Protection Commission	____	SWRCB: Clean Water Grants
____	Education, Department of	____	SWRCB: Water Quality
____	Energy Commission	____	SWRCB: Water Rights
S	Fish & Game Region #5	____	Tahoe Regional Planning Agency
____	Food & Agriculture, Department of	S	Toxic Substances Control, Department of
____	Forestry and Fire Protection, Department of	S	Water Resources, Department of
____	General Services, Department of		
____	Health Services, Department of	____	Other: ____
____	Housing & Community Development	____	Other: ____
X	Native American Heritage Commission		

Local Public Review Period (to be filled in by lead agency)

Starting Date December 23, 2015 Ending Date January 22, 2016

Lead Agency (Complete if applicable):

Consulting Firm: ____
Address: ____
City/State/Zip: ____
Contact: ____
Phone: ____

Applicant: University of California, Irvine
Address: 380 University Tower
City/State/Zip: Irvine, CA 92697-2325
Phone: (949) 824-7058

Signature of Lead Agency Representative: ____ **Date:** 12.21.15

Authority cited: Section 21083, Public Resources Code. Reference: Section 21161, Public Resources Code.

AFFIDAVIT OF PUBLICATION

STATE OF CALIFORNIA,)
) ss.
County of Orange)

I am a citizen of the United States and a resident of the County aforesaid; I am over the age of eighteen years, and not a party to or interested in the above entitled matter. I am the principal clerk of **The Orange County Register**, a newspaper of general circulation, published in the city of Santa Ana, County of Orange, and which newspaper has been adjudged to be a newspaper of general circulation by the Superior Court of the County of Orange, State of California, under the date of November 19, 1905, Case No. A-21046, that the notice, of which the annexed is a true printed copy, has been published in each regular and entire issue of said newspaper and not in any supplement thereof on the following dates, to wit:

December 23, 2015

"I certify (or declare) under the penalty of perjury under the laws of the State of California that the foregoing is true and correct":

Executed at Santa Ana, Orange County, California, on

Date: December 23, 2015

Signature

The Orange County Register
625 N. Grand Ave.
Santa Ana, CA 92701
(714) 796-2209

PROOF OF PUBLICATION

NOTICE OF INTENT
TO ADOPT A MITIGATED NEGATIVE DECLARATION
CENTRAL ENERGY PLANT EXPANSION PROJECT
UNIVERSITY OF CALIFORNIA, IRVINE

In accordance with California Environmental Quality Act (CEQA) Guidelines and University of California Procedures for Implementation of CEQA, an Initial Study for the Central Energy Plant Expansion project was prepared by the University of California, Irvine (University), and it was determined that a Mitigated Negative Declaration is the appropriate level of analysis.

The University of California, Irvine Medical Center (UCIMC) is located at 101 The City Drive South in the city of Orange and is bound by Interstate 5 (I-5) to the east, Chapman Avenue to the north, The City Drive to the west, and Dawn Way to the south. The proposed project consists of the demolition of an approximately 6,000-gross-square-foot (GSF) structure and construction of four components to provide increased chiller capacity to the UCIMC. Two of the components will serve inpatient facilities that fall within the jurisdiction of the Office of Statewide Health Planning and Development (OSHPD) and the other two will serve non-OSHPD facilities. The OSHPD components include expansion of the existing on-site OSHPD chiller plant and modification of the associated OSHPD power generator yard; non-OSHPD components include construction of a new 8,800 GSF non-OSHPD chiller plant and an associated power generator yard.

The project has been analyzed in the Draft Initial Study/Mitigated Negative Declaration (Draft IS/MND) and determined that, with the incorporation of mitigation, it will not have a significant effect on the environment. The document is available at http://www.eps.uci.edu/EnvironmentalPlanning/index.html. The 30-day public review period will begin December 23, 2015 through January 22, 2016. Comments may be e-mailed to hashimol@uci.edu or written comments mailed to Lindsey Hashimoto, Associate Planner, University of California, Irvine, Office of Environmental Planning and Sustainability, 380 University Tower, Irvine, CA 92697. If you have any questions regarding this project, please call (949) 824-8692.

Published: Orange County Register Dec. 23, 2015 R-3052 10122094

Print Form

Notice of Determination

Appendix D

To:

☐ Office of Planning and Research

U.S. Mail: P.O. Box 3044, Sacramento, CA 95812-3044

Street Address: 1400 Tenth St., Rm 113, Sacramento, CA 95814

☐ County Clerk
County of: _____
Address: _____

From:

Public Agency: University of California, Irvine
Address: 4199 Campus Drive, Suite 380
Irvine, CA 92697-2325
Contact: Richard Demerjian
Phone: (949) 824-7058

Lead Agency (if different from above):
_____
Address: _____
_____
Contact: _____
Phone: _____

SUBJECT: Filing of Notice of Determination in compliance with Section 21108 or 21152 of the Public Resources Code.

State Clearinghouse Number (if submitted to State Clearinghouse): 2015121101

Project Title: Central Energy Plant Expansion

Project Applicant: University of California, Irvine

Project Location (include county): City of Orange, Orange County

Project Description:

The proposed project consists of the demolition of an approximately 6,000-gross-square-foot (GSF) structure and construction of four components to provide increased chiller capacity to the UCI Medical Center (UCIMC). Two of the components will serve inpatient facilities that fall within the jurisdiction of the Office of Statewide Health Planning and Development (OSHPD) and the other two will serve non-OSHPD facilities. The OSHPD components include expansion of the existing OSHPD chiller plant and modification of the associated OSHPD power generator

This is to advise that the University of California, Irvine has approved the above
(☐ Lead Agency or ☐ Responsible Agency)

described project on _____ and has made the following determinations regarding the above
(date)
described project.

1. The project [☐ will ☐ will not] have a significant effect on the environment.
2. ☐ An Environmental Impact Report was prepared for this project pursuant to the provisions of CEQA.
   ☐ A Negative Declaration was prepared for this project pursuant to the provisions of CEQA.
3. Mitigation measures [☐ were ☐ were not] made a condition of the approval of the project.
4. A mitigation reporting or monitoring plan [☐ was ☐ was not] adopted for this project.
5. A statement of Overriding Considerations [☐ was ☐ was not] adopted for this project.
6. Findings [☐ were ☐ were not] made pursuant to the provisions of CEQA.

This is to certify that the final EIR with comments and responses and record of project approval, or the negative Declaration, is available to the General Public at:

Office of Environmental Planning and Sustainability, 4199 Campus Drive, Suite 380, Irvine, CA 92697-2325

Signature (Public Agency): _____ Title: Director

Date: _____ Date Received for filing at OPR: _____

Authority cited: Sections 21083, Public Resources Code.
Reference Section 21000-21174, Public Resources Code.

Revised 2011

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APPENDIX E

Response to Comments

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CENTRAL ENERGY PLANT PROJECT
30-DAY PUBLIC REVIEW
DRAFT IS/MND MAILING LIST

NOC Overnight Delivery

State Clearinghouse
Office of Planning & Research
1400 Tenth Street, Room 222
Sacramento, CA 95814

NOI via Certified Mail

City of Orange
Community Development Department
Orange Civic Center
300 East Chapman Avenue
Orange, CA 92866-1591

City of Orange
Public Works Department
300 East Chapman Avenue
P.O. Box 449
Orange, CA 92866

Orange County Transportation Authority
550 South Main Street
Orange, CA 92868

California Department of Fish & Wildlife
4949 Viewridge Avenue
San Diego, CA 92133

U.S. Fish & Wildlife Service
Division of Ecological Services
2177 Salk Avenue, Suite 250
Carlsbad, CA 92008

Santa Ana Regional Water Quality Control Board
3737 Main Street, Suite 500
Riverside, CA 92501-3348

U.S. Army Corps of Engineers
Los Angeles District
911 Wilshire Boulevard
Los Angeles, CA 90017

CA Department of Toxic Substances Control
5796 Corporate Avenue
Cypress, California 90630

South Coast Air Quality Management District
21865 East Copley Drive
Diamond Bar, CA 91765-4182

Southern California Association of Governments
818 West 7th Street, 12th Floor
Los Angeles, CA 90017

California Department of Transportation
District 12
3337 Michelson Drive, Suite 380
Irvine, CA 92612-1699

Lamoreaux Justice Center
Orange County Superior Court
341 The City Drive South
Orange, CA 92868

Orange County Juvenile Hall
331 The City Drive South
Orange, CA 92868

California Office of Statewide Health Planning and Development
Facilities Development Division
400 R Street, Suite 200
Sacramento, CA 95811-6213

Central Energy Plant Expansion

Draft Initial Study
Public Review/Response to Comments

Public Review

The Draft Initial Study/Mitigated Negative Declaration (IS/MND), along with a Notice of Completion (NOC) and Notice of Intent to Adopt a Mitigated Negative Declaration (NOI), were circulated for public review and comment from December 23, 2015 through January 22, 2016. Copies of the document were submitted to the State Clearinghouse; local agencies; UCI faculty, staff, and other members of the campus community; and additional interested groups and persons. On December 23, 2015, a notice regarding the availability of the Draft IS/MND was published in the Orange County Register. Copies of the distribution list and notices are provided in this appendix.

Comments and Responses

Written comments were submitted by the agencies listed below. The letters and the responses to comments are presented on the pages following the Draft IS/MND distribution list.

Commenting Agency	Date
South Coast Air Quality Management District	January 14, 2016
County of Orange Public Works	January 29, 2016

South Coast
Air Quality Management District
21865 Copley Drive, Diamond Bar, CA 91765-4178
(909) 396-2000 • www.aqmd.gov

SENT VIA E-MAIL AND USPS: January 14, 2016
hashimol@uci.edu

Ms. Lindsey Hashimoto, Associate Planner
Office of Environmental Planning
University of California, Irvine
380 University Tower
Irvine, CA 92697

Draft Mitigated Negative Declaration (DMND)
for the Proposed Central Energy Plant Expansion

The South Coast Air Quality Management District (SCAQMD) staff appreciates the opportunity to comment on the above-mentioned document both as a commenting agency and a responsible agency. The following comments are meant as guidance for the Lead Agency and should be incorporated into the Final Mitigated Negative Declaration (Final MND).

Project Description

In the project description, the Lead Agency proposes demolition of an approximately 6,000 square foot structure and construction of four components to increase the chiller capacity at the University of California, Irvine Medical Center. An approximately 8,800 gross square foot (GSF), 4,000 ton chiller plant will be installed (west of the existing Building 31) along with an approximately 6,500 GSF power generator yard that will include a 2,000-kilowatt (kW) generator and an associated belly fuel tank. Additional generators are planned in this power generator yard to meet future needs. In addition to this chiller plant and generator yard, an existing chiller plant (Building 57) will be expanded to feed chilled water and normal and emergency electrical power to Buildings 1A and 3. The expansion will also include a 1,000-ton chiller with plans to add another chiller in the future. Besides these added chillers, an additional 1,500 kW generator will be installed to serve the existing Buildings 1A, 3 and 31 as well as for future needs. The proposed construction is expected to last for 120 days beginning in June 2016.

Permit Requirements/Health Risk Assessment

In the Final MND, the Lead Agency should include the SCAQMD as a responsible agency whose approval is required for permit purposes. In the air quality analysis, the Lead Agency estimated construction and operational air quality emissions for regional and localized impacts. For operations, emissions were also estimated for activities including the proposed emergency generators and cooling towers. In addition to estimating operational emissions for CEQA purposes, permits may be required for certain basic and/or control equipment by the SCAQMD. Whether a permit is required is based upon in part, on the energy rating of a chiller, a boiler, a heater, a generator, etc. For example, if any of the proposed generators are diesel-fueled and are

rated greater than 50 brake horsepower (bhp), a permit would be required in accordance with SCAQMD rules including Rule 1470 – Requirements for Stationary Diesel-Fueled Internal Combustion and Other Compression Initial Engines and Rule 1110.2 – Emissions From Gaseous and Liquid-Fueled Engines. Other SCAQMD rules and/or regulations would apply to other permitted equipment.

In addition, a health risk assessment may also be required based on certain criteria. Based on the project description, the proposed chiller units may require a health risk assessment to estimate the potential risk to sensitive receptors and workers from the particulate emissions emanating from the groundwater. If required, the Final MND should include the estimated risk from the proposed chiller units. Should the Lead Agency have permit questions concerning the generators, chillers (including questions about health risk assessment requirements), or whether any other ancillary equipment needs a permit, these questions can be directed to Engineering and Compliance Staff at (909) 396-2208.

Please provide the SCAQMD with written responses to all comments contained herein prior to the adoption of the Final MND. SCAQMD staff is available to work with the Lead Agency to address these issues and any other air quality questions that may arise. If you have any questions concerning this letter, please contact Gordon Mize, Air Quality Specialist, at (909) 396-3302.

Sincerely,

Jillian Wong

Jillian Wong, Ph.D.
Program Supervisor
Planning, Rule Development & Area Sources

JW:JY:RO:GM

ORC151229-08
Control Number

Response to the South Coast Air Quality Management District

Comments 1: The South Coast Air Quality Management District (SCAQMD) was added as a responsible agency on page 1-1 of the Final Initial Study/Mitigated Negative Declaration (IS/MND). Compliance with SCAQMD permitting is required under the contract design specifications for the chosen design-build team. Therefore, the University of California, Irvine Medical Center (UCIMC) will comply with permitting required under SCAQMD rules when the equipment and operations are finalized prior to construction.

Comment 2: Refer to Comment 2 above. UCIMC staff is in consultation with SCAQMD and will comply with all permitting requirements.

OC PublicWorks
Integrity, Accountability, Service, Trust
Shane L. Silsby, Director

January 29, 2016

NCL-16-002

Ms. Lindsey Hashimoto, Associate Planner
Office of Environmental and Sustainability
University of California Irvine
380 University Tower
Irvine, California 92697

Subject: Notice of Intent to Adopt a Mitigated Negative Declaration for the Central Energy Plant Expansion Project

Dear Ms. Hashimoto:

The County of Orange has reviewed the Notice of Intent to Adopt a Mitigated Negative Declaration for the Central Energy Plant Expansion Project and offers the following comments:

1. The MND inconsistently describes the location of the Orange County Juvenile Hall in relation to projects, painting an inaccurate picture of the environmental setting. In some places, it is referenced as being "east" of the "nearest" project site (page 4.6-3), in others, it is "southeast" of one project site (4.9-3), or "south" of the project site (page 4.2-8). It is unclear from the various descriptions which "project site," the Non-OSHPD site, the Juvenile Hall is "east," "southeast," or "south" of. This should be clarified and consistently described throughout the document.

2. Further, there is no map that identifies the nature of the surrounding land uses by name.

3. The Air Quality Assessment (attached to MND) on page 9 states that Juvenile Hall property line is 30 feet south from the OSHPD site, and that a Juvenile Hall building is 180 feet from the OSHPD site. The Air Quality Assessment also states that the Non-OSHPD site is 100 feet from the Juvenile Hall property line and building. Throughout the MND, the Juvenile Hall is consistently described as being approximately 200 feet from the OSHPD site (See page 4.9-2). The location and distance of the Juvenile Hall should be consistently described.

4. Although the University of California may not have to comply with local noise ordinances, this does not exempt the University of California from having to demonstrate, on the basis of substantial evidence, that there is no significant impact related to noise. The MND does not contain a noise study documenting existing ambient noise levels due to existing equipment, or any evidence substantiating the estimates of noise levels that will exist after the project is

completed. Without a study indicating the existing and projected future noise levels, the MND does not meaningfully evaluate the noise impacts to the sensitive receptors, Juvenile Hall and the hospital and other sensitive land uses. Moreover, mitigation measure NO-1 improperly defers mitigation by not stating a standard against which significance will be measured and deferring noise study until prior to completion of "construction documents" (there is no indication of what those are or if the public will ever be able to view the analysis and comment).

5. Therefore, the MND as proposed is insufficient as an informational document and the conclusions related to noise are not supported by substantial evidence.

6. The discussion of hydrology and water quality (commencing Page 4.7-2) omits mention of the Phase II Small MS4 General permit 2013-0001-DWQ that was adopted by the State Water Resources Control Board on February 5, 2013. The "Section E.12- Post Construction Stormwater Management" requirements of this permit apply to this project since UCI is a designated "Non-Traditional MS4" (See Attachment B of this Permit). The document's discussion of hydrologic and water quality impacts needs to be revised to include a discussion of the conformance of this project with this Permit.

7. The following statement is incorrect, as stated on Section 2.3 (p. 2-5): *"Immediately south of Dawn Way is the non-affiliated Superior Court of Orange County and associated parking structure and the Orange County Juvenile Hall."* Immediately south of Dawn Way is real property owned by the County of Orange, including a five-story office building known as the Manchester Office Building at 301 The City Drive South, Orange, which houses approximately 300 County staff from the Probation Department, Health Care Agency and Social Services Agency, as well as those employed by a large café on the ground floor. Staff from the Social Service Agency utilize the parking area north of the building (next to the project site) to escort children to and from the building that are either being reunited with, or removed from their families; these children may be considered another "sensitive receptor." The fenced section of the parking area provides secured parking for Juvenile Hall vehicles; it is not utilized by the Superior Court.

8. Exhibit 6: Views from non-OSPHD Chiller Plan Site (p. 4.1-7)
   - **View 1: Description is incorrect**; the view is of the County of Orange Manchester Office Building.
   - **View 2: Description is Incorrect;** the view is of the County of Orange parking structure.

9. 4.2 Air Quality (page 4.2-2)

   The following finding may not be adequately supported:

   a. Air Quality Management Plan Consistency: No Impact

   Criterion 1 – Increase in the Frequency of Severity of Violations?
   "Emissions generated during construction and operation would not exceed SCAQMD's localized significance threshold (LST) criteria, and therefore, it is unlikely that development of the project

would increase the frequency of severity of existing air quality violations in the immediate vicinity of the project."

10. EIR 2000021111 for the UCI Medical Center LRDP dated 10/18/02 includes the Technical Memorandum dated August 27, 2002 by URS entitled, **"Screening Health Risk Assessment with Refined Modeling for the Medical Center at University of California, Irvine (Final)"** (HRA). The Conclusions section of the HRA makes clear that the finding that potential health risks due to the routine operation of the UCI Medical Center would be below the SCAQMD significant levels for public notification were predicated based upon assumptions developed using data available at the time of the memorandum (2002). It further goes on to say that the analysis, *"assumed that the proposed new 1750 kW generators had a diesel PM emission factor (EF) of 0.084 grams per brake horsepower-hour (g/bhp-hr). Specifications obtained from the manufacturer confirm that diesel PM EF of 0.084 g/bhp-hr can be achieved under 75% load."* As such, the HRA was not based upon analysis of maximum emissions, and it was for a 1750 kW generator; the proposed project, at Ultimate implementation of the LRDP, will include the addition of one 1,500 kW generator and four 2,000 kW generators. The cut sheet included in the MND, with Exhaust Emission Date for a 2000 kW generator, provides that PM emissions at ¼ standby is 0.16 g/bhp-hr, and at ½ standby is 0.14 g/bhp-hr, substantially higher that the 0.084 utilized in the HRA.

11. The ***Conclusions*** section of the HRA goes on to say, *"Prior to the commencement of the installation of the generators, a more detailed HRA will be conducted in support of the SCQMD permitting process when the specific source characteristics for all new proposed equipment will be available to confirm or refine the results presented in this memorandum."* However, in the MND, section ***3.3.2 Emergency Generator emissions***, it states that since the project will be constructed under future design-build contracts, the specific make and model of emergency generators for the project are not known, but that since they will be purchased and installed after January 2015, they will be required to comply with Tier 4 emissions standards. The MND further states that Table 9 presents the maximum emissions during any mode of generator operations (Please clarify if this is for a Tier 4, 2,000 kW generator), and that the maximum emissions occur during Full Standby or Full Prime modes; however, as discussed above, the PM emissions shown in the cut sheet are much higher in the ¼ and ½ standby modes, and it does not appear that these maximum emissions were included in the MND analysis, as required. Further, consistent with the EIR, the emissions information for the specific generators to be purchased and installed should be evaluated in a new HRA to determine whether or not SCAQMD regional and localized significance thresholds are exceeded, including the applicability of the Rule 1303 exemption to performing detailed air quality dispersion modeling.

12. The HRA states on page 7, *"The screening HRA assessed health risks at the nearest residential and commercial receptors. For the UCI Medical Center, the nearest residential receptors are more than 500 meters away."* This statement is not true; the residential operations of Juvenile Hall, a sensitive receptor, are significantly closer to the project sites, a fact that should be accurately identified and the impacts of which should be evaluated accordingly. The HRA goes on to state, *"Emergency generators are the major contributor for the cancer risks at both commercial and residential receptors." and "The maximum acute hazard index (HIAMAX) was*

estimated to be 0.8, also below the significant level of 1.0. Diesel emergency generators contribute 64% to the total acute hazard index, while lab emissions contribute 22% and boilers contribute 14%." Given the information provided above, a new HRA is warranted.

13. The required testing of emergency generators every 40 days should, at the Non-OSPHD site, be scheduled to take place on weekends or after 6:00 p.m. to minimize noise and air quality impacts to County staff working in the Manchester Office Building located next door; this should be added as a Mitigation Measure.

14. Analysis for Non-OSHPD cooling towers is predicated on the towers only being operated 12 hours per day. In the event the towers were to be operated 24/7, the emissions from the Ultimate build-out of the Non-OSHPD towers would be anticipated to be 3.8 lbs./day of PM_{10} and 2.4 lbs./day of $PM_{2.5}$ at a site where there were previously no cooling tower emissions. Further, the cumulative impact for the Ultimate build-out of cooling towers at both project sites would change from -1.3 to +0.60 for PM_{10} and from -0.7 (p. 31 of report states -0.8) to +0.50 for $PM_{2.5}$. To ensure the cooling towers at the Non-OSHPD plant only operate 12 hours per day, the 12-hour limitation on daily operations should be added as a Mitigation Measure.

15. Please ensure to include the following County Agency to your project mailing list:

    Orange County Probation Department
    Director of Juvenile Hall
    P.O. Box 10260
    Santa Ana, CA 92711

    Orange County Probation Department
    AFD/Facility Planning Manager
    P.O. Box 10260
    Santa Ana, CA 92711

If you have any questions or need clarification please do not hesitate to contact Chris Uzo-Diribe at (714) 667-8845.

Sincerely,

Laree Alonso, Manager, Planning Division
OC Public Works Service Area/OC Development Services
300 North Flower Street
Santa Ana, California 92702-4048
Laree.alonso@ocpw.ocgov.com

cc: Mehdi Sobhani, Manager, OC Public Works/Flood Programs
Linda Barry, Manager, OC Probation/Facility Planning

Response to the County of Orange

Comment 1: Text in the Final Initial Study/Mitigated Negative Declaration (IS/MND) has been clarified on pages 4.2-8, 4.6-3, and 4.9-3 to consistently describe the California Office of Statewide Health Planning and Development (OSHPD) and non-OSHPD chiller plant project sites and their relation to the Orange County Juvenile Hall.

Comment 2: A surrounding land use map was added to the Final IS/MND on page 1-5 as Exhibit 3. It includes the University of California, Irvine Medical Center, County of Orange uses south of the project sites, and the surrounding roadways.

Comment 3: See response to Comment 1. Text in the Final IS/MND has been clarified on pages 4.6-3 and 4.9-2 to consistently describe the distance between the OSHPD and non-OSHPD chiller plant project sites in relation to the Orange County Juvenile Hall.

Comment 4: The OSHPD and non-OSHPD components of the project will be constructed under separate design-build contracts and the specific makes and models of equipment to be used are not known and will be selected by the design-build contractor. Mechanical equipment noise levels vary greatly depending on the specific manufacturer and model. Further, equipment manufacturers typically offer different models with various levels of sound reduction or one or more levels of optional noise reduction accessories that can reduce noise levels from five to over 20 dB.

Maximum allowable noise levels for the emergency generators and cooling towers are included in the specifications for the project. Each cooling tower is specified to not exceed a noise level of 58 dBA at a distance of 50 feet in any direction from the unit. The four cooling towers at the OSHPD Plant will run continuously 24-hours per day. Two of the four cooling towers at the Non-OSHPD plant will run 12 hours per day and the other two will run continuously.

Each emergency generator is specified not to exceed a noise level of 75 dBA at a distance of 7 meters (23 feet) from the unit. Current emergency generator testing operations were provided by Mr. Greg Elkam the Director of Facility Services for the UCIMC. The OSHPD emergency generators are tested weekly at 2:00 am on Fridays. All of the generators are started and run for approximately 15 minutes. Then all but one generator are shut down and the remaining generator operates for approximately 30 minutes. The same procedure is used to test the non-OSHPD emergency generators except that it is only performed once a month on a Friday at 2:00 am.

Significance Thresholds

The area around the Juvenile Hall Residence Buildings is functionally equivalent to a residential land use in terms of noise impacts. The City of Orange Municipal Code Noise Ordinance (Section 8.24) defines maximum outdoor noise levels that can be generated at any residential use by activities on another property. These limits are hourly Leq of 55 dBA and a maximum noise level of 70 dBA during the daytime (7:00 a.m. to 10:00 p.m.) and an hourly Leq of 50 dBA and maximum noise level of 65 dBA during the nighttime (10:00 p.m. to 7:00 a.m.). If the ambient noise level exceeds the standard then the “adjusted ambient noise level,” the ambient

hourly Leq noise level +3 dB, becomes the standard. This allows the noise source to generate the same noise level as the ambient noise level. When two equal noise sources are combined the resulting noise level is 3 dB greater than the noise level from one of the sources.

The City of Orange Noise Ordinance daytime limits are an appropriate significance threshold for evaluating noise impacts on the Juvenile Hall during daytime hours. The nighttime limits are not an appropriate measure of impact because there are no outdoor activities that occur in the Juvenile Hall yard during the nighttime hours. During the nighttime all activities will be indoors. While compliance with the City of Orange nighttime noise standard would ensure that there are no significant interior noise impacts, it is overly restrictive because of the lack of potential outdoor activity.

Because there are no outdoor nighttime activities at the Juvenile Hall yard, interior noise impacts are more appropriately assessed using the 45 CNEL residential interior noise standard defined in the City of Orange Noise Element of the General Plan. CNEL is a 24-hour energy average noise level with noise occurring during the evening (7:00 p.m. to 10:00 p.m.) being penalized by 5 dB and noise occurring during the nighttime (10:00 p.m. to 7:00 a.m.) penalized by 10 dB to account for increased noise sensitivity during these hours. The proposed project would result in an impact if it increased the interior noise levels perceptively, by more than 3 dB, and resulted in an interior noise level greater than the 45 CNEL standard.

Neither the City of Orange, nor the County of Orange Noise Ordinances establish noise limits applicable to non-residential uses. The City's Noise Element establishes a 50 CNEL interior noise standard for office uses. The County's Land Use/Noise Compatibility manual establishes a standard of 50 dBA Leq averaged over the hours that the office is used. The County's standard most appropriately measures potential impacts to office uses. As with the residential interior threshold, the project would result in an impact if it increased the interior noise levels perceptively, by more than 3 dB, and resulted in an interior noise level greater than the 50 dBA Leq(8) standard.

Ambient Noise Levels

Noise measurements were performed on February 3, 2016 in order to determine the existing ambient noise levels at the locations shown in the attached Figure. Both measurement sites were located along the boundary between the Medical Center and Juvenile Hall with Site 1 located in the area nearest the OSHPD portion of the project and Site 2 located in the area nearest the non-OSHPD portion of the project. The results of the measurements are presented in Table 1. Table 1 presents the energy average (Leq) noise level, the maximum (Lmax) and the minimum (Lmin) noise levels during the measurement periods. The L10, L50 and L90 values are the noise levels exceeded 10%, 50% and 90% of the measurement period respectively. The L50 noise level is the median noise level. During half of the measurement period the noise level was higher than the L50 value and during the other half the noise level was lower. The L90 is considered the background noise level.

Table 1
Noise Measurement Results

Site	Start	End	Leq	Lmax	L10	L50	L90	Lmin
1	11:56 a.m.	12:18 p.m.	61.0	64.8	61.9	60.9	59.9	58.7
2	12:17 p.m.	12:52 p.m.	60.9	76.9	63.5	55.5	53.2	52.2

The primary source of noise at Site 1 was freeway traffic. Noise from the recently installed fuel cell was also audible during the measurement. While the characteristics of the fuel cell noise made it clearly audible over the traffic noise, the noise level generated by the fuel cell was perceptively lower than the freeway traffic noise. The data shows that the noise levels were nearly constant during the measurement. The difference between the maximum and minimum noise level was only 6 dB.

The primary source of noise at Site 2 was equipment located in Building 31 (the barn door on the south side of the building was open during the measurement). Traffic noise was also a considerable source of noise at Site 2. This included vehicles passing adjacent to the site as well as distant traffic noise. Noise levels at this site varied considerably with a 25 dB difference between the maximum and minimum noise levels. However, the difference between the L10 noise level and the minimum noise level was 11 dB. Noise levels at the site exceed 65 dBA less than 10% of the time.

Noise Levels from OSHPD Plant

Noise levels generated during testing of the OSHPD emergency generators will not change significantly from existing conditions. There are four existing emergency generators and the proposed project will add a fifth. As discussed below, testing of the OSHPD emergency generators is performed every Friday night at 2:00 am. All of the generators will operate for approximately 15 minutes and then a single generator will operate for approximately 30 minutes. The addition of the fifth generator will increase the noise generated by less than 1 dB. This level difference is not perceptible.

The nearest Juvenile Hall Residence is located 470 feet from the OSHPD generators and approximately 520 feet from the acoustic center of the generators. In addition, there are buildings located between the generators and the Residence that act as noise barriers. At this distance, and accounting for the noise barrier reduction provided by the buildings, the emergency OSHPD emergency generators are estimated to generate a noise level of 45 dBA or less when all five units are operating. The noise level is approximately 38 dBA with only one unit operating. The hourly Leq during the full weekly generator test, running five generators for 15 minutes and one generator for 30 minutes, would be less than 40 dBA Leq(H). This is considerably less than the City of Orange 50 dBA Leq(H) nighttime standard.

Given the specification discussed above, the four cooling towers to be ultimately installed in the OSHPD project would generate a nearly constant noise level of approximately 61 dBA at the Juvenile Hall property line located approximately 74 feet from the acoustic center of the cooling towers. The cooling tower noise level is estimated to be approximately 51 dBA at the nearest Juvenile Hall residential building located approximately 230 feet from the acoustic center of the

cooling towers. Indoor noise levels will be at least 20 dB lower than outdoor levels resulting in an interior level of 31 dBA. This level of noise occurring 24-hours per day results in an interior noise level of approximately 37 CNEL.

The projected outdoor noise level at the property line with the cooling towers specified for this project is 61 dBA. As shown in Table 1 above, the daytime ambient noise level at the fence line between the Medical Center and Juvenile Hall is 61 dBA Leq. This is greater than the City's 55 dBA Leq daytime Noise Ordinance standard. Per the Ordinance, the standard is increased to 3 dB above the measured ambient noise level when the measured ambient noise level exceeds the standard. When two equivalent noise levels are combined, the resulting noise level is 3 dB greater. Therefore, the ambient adjusted noise limit allows for the potentially offending source to generate a noise level up to the ambient noise level. The ambient noise level is 61 dBA Leq and the projected fence line noise level from the cooling towers is the same. Therefore, noise levels from cooling towers will not exceed the City of Orange Noise Ordinance daytime standard and will not result in a significant noise impact.

As long as the Juvenile Hall residential interior noise levels from the cooling tower does not exceed 42 CNEL it will not exceed the significance criteria discussed above. In this case, if the existing noise level is less than 42 CNEL then the total noise level will be less than the 45 CNEL interior noise standard. If the existing noise level is greater than 42 CNEL then the noise level increase will be less than 3 dB and imperceptible. As discussed above, the cooling towers are anticipated to result in a CNEL noise level of 37, CNEL and therefore, will not result in a significant noise impact.

Noise Levels from Non-OSHPD Plant

The Manchester Office building located directly south of the Non-OSHPD plant is located approximately 130 feet from the nearest point of the non-OSHPD plant and the acoustic center of the plant is approximately 173 feet from the building. At this distance, the specified cooling towers would generate a noise level of approximately 53 dBA at the exterior of the building during the daytime when all four units are running and approximately 50 dBA during the nighttime when two units are running.

Typical wood-frame residential construction provides at least 20 dB of outdoor-to-indoor noise reduction. The Manchester office building is constructed using more substantial materials and only features small fixed windows. Large operable windows in residences are the primary source of noise intrusion. Therefore, the Manchester Office Building would be expected to achieve 25 to 30 dB of outdoor-to-indoor noise reduction. As a worst-case estimate, 20 dB of reduction will be assumed for this analysis.

The cooling towers in the non-OSHPD Plant will generate a noise level of approximately 53 dBA at the exterior face of the Manchester Office Building when all four units are operating during the daytime. This results in a maximum interior noise level of 33 dBA Leq(8). This is 17 dB below the County's 50 dBA Leq(8) commercial interior noise standard. The interior CNEL noise level from the cooling towers will be less than 37 CNEL, which is 12 dB below the City of Orange's 50 CNEL commercial interior noise standard. Therefore, the cooling towers will not result in a significant noise impact at the Manchester Office Building.

As discussed above, the Non-OSHPD generators will be tested once a month on Friday night at 2:00 am. During the testing, the noise levels at the Manchester Office Building will be, at most, approximately 63.5 dBA when all four units are operating and 57.5 dBA when only one unit is operating. Interior noise levels would be expected to be less than 43.5 dBA with all four units operating and less than 37.5 dBA when only one unit is operating. This equates to an interior noise level of 39 dBA Leq(H). This is 11 dBA less than the 50 dBA Leq(8) standard. Further, the office building would not be expected to be occupied at 2:00 am on a Friday during the generator testing period. Therefore, the operation of the non-OSHPD generators would not result in a significant noise impact to the Manchester Office Building.

The acoustic center of the Non-OSHPD generators is located approximately 508 feet from the nearest Juvenile Hall Residence Building. In addition, there are several buildings located between the generators and the Residence that will act as noise barriers reducing the noise level at the Residence. All four generators operating would result in a noise level of less than 39 dBA and one generator operating would result in a noise level of less than 33 dBA. This equates to an hourly noise level of 35 dBA Leq(H) at the exterior to the Residence and an interior noise level of 15 dBA Leq(H). This level of noise does not represent a significant noise impact. Therefore operation of the Non-OSHPD generators would not result in a significant noise impact to the Juvenile Hall Residences.

Plant Noise Mitigation

As discussed above, the noise level performance requirements in the project specifications for the cooling towers (not to exceed 58 dBA at 50 feet) and the emergency generators (not to exceed 75 dBA at 23 feet) will result in noise levels generated by the OSHPD and Non-OSHPD plants to be less than significant. No mitigation is required.

Comment 5: Please see response to Comment 4.

Comment 6: The University of California, Irvine is designated as a non-traditional permittee by the State Water Resources Control Board. However, the University of California, Irvine Medical Center, although affiliated with the campus, falls under the hospitals designation. The State Water Resources Control Board only designates “large hospitals” as non-traditional permittees and defines that as a resident and staff population over 5,000 people or more but may designate smaller facilities on a case-by-case basis. The UCIMC has a resident and staff population of approximately 4,000 and has not been designated as a non-traditional permittee. However, the UCIMC, in compliance with the State Water Quality Control Board, will submit a project-specific Stormwater Pollution Prevention Plan as discussed on page 4.7-2 of the IS/MND.

Comment 7: Language has been changed on page 2.5 of the IS/MND to include the County of Orange Manchester Office Building and County of Orange Parking Structure.

In regards to sensitive receptors, refer to responses to Comments 4, 10, 11, and 12.

Comment 8: Text for Views 1 and 2, on page 4.1-7, has been corrected to the Manchester Office Building and County of Orange Parking Structure.

Comment 9: Language has been changed on page 4.2-2 of the IS/MND to clarify.

Comment 10: The 2002 Health Risk Assessment (HRA) assumed that the generators would be tested at between 67% and 75% load (the text of the report states that the emission factor used is valid for a 75% load but Table 4 in the appendix indicates a 67% load). At this load, the generators were assumed to generate 0.35 lbs/hour of particulate emissions (0.084 g/bhp-hr times 1,885 bhp). Further, the HRA assumed a cumulative 167.5 hours per year of generator operation for testing.

Current emergency generator testing operations were provided by Mr. Greg Elkam the Director of Facility Services for the UCIMC. The existing OSHPD generators are tested once a week on Friday nights at 2:00 am. All four of the existing generators are brought on line and run until they achieve 30% of their nameplate load, which takes approximately 15 minutes. At this time all but one of the generators are shut down and the remaining generator operates for approximately 30 minutes at 30% load. When the fifth generator proposed by the project is installed this procedure will be continued with all five generators operating for approximately 15 minutes and then one generator operating for 30 minutes. This results in a total of 91.25 hours of cumulative generator testing each year for the five OSHPD generators.

The non-OSHPD generators will be tested using the same methodology as the OSHPD generators (four generators operating for approximately 15 minutes up to 30% load followed by one generator operating for approximately 30 minutes at 30% load) except that they will only be tested once a month. This results in 18 hours of cumulative generator testing each year for the non-OSHPD generator testing.

The 2002 HRA assumed 167.5 hours of generator operation each year. However, only 109.25 hours per year of generator operation are anticipated with implementation of this project (i.e. at full buildout with five OSHPD generators and with four non-OSHPD generators). Further, the particulate emission rate for the new generators will be less than the emission rate assumed in the HRA of 0.35 lbs/hour.

The data sheet for the new generator shows that, at ¼ load, the generators emit 0.26 lbs/hour (0.16 g/bhp-hr times 730.5 bhp), and at ½ load, the generators emit 0.45 lbs/hour (0.14 g/bhp-hr times 1,461 bhp). Linearly interpolating these values results in an estimated emission rate of 0.30 lbs/hr at 30% load. Since the generators will be operating at 30% or less of their power rating, the new generators will generate less emissions per hour than was assumed for the HRA.

The number of hours that the generators will be tested is approximately 35% less than was assumed in the 2002 HRA and the particulate emission rates (lbs/hr) for the new generators are approximately 14% less than assumed in the 2002 HRA. Therefore, the particulate emissions from testing of the existing and future OSHPD and non-OSHPD generators will be less than the 2002 HRA. Based on this, adverse health impacts due to diesel emergency generator testing are anticipated to be less than estimated in the 2002 HRA.

Comment 11: The emission rates presented in Table 9 are based on the Tier 4, 2,000 horsepower generator cut sheet included in the appendix. The maximum operating emission rates shown in Table 9 are the maximum of the g/hp-hr Exhaust Emissions Data multiplied by

the BHP at 1800 RPM shown in the cut sheet, converted from grams to pounds, for each of the pollutants. The statement that the maximum emissions occur during Full Standby or Full Prime modes is not correct. The maximum VOC and SOx emissions occur at full standby, the maximum NOx emissions occur at full prime and the maximum CO and PM emissions occur at 1/2 Standby. Therefore, maximum emissions were used for the criteria pollutant impact assessment.

As discussed in the response to Comment 10, the currently anticipated annual generator testing particulate emissions are less than what was assumed in the 2002 HRA. Therefore, the 2002 HRA provides a conservative estimate of the increased cancer risk due and adverse non-cancer health risks with implementation of the project.

The OSHPD and non-OSHPD generators will not be tested on the same day. Therefore, there will be a maximum of 105 minutes of cumulative generator operation in any one day. Using the higher emission factor from the 2002 HRA of 0.35 lbs/hr results maximum particulate emissions of 0.61 lbs/day. This is less than the 1 lbs/day localized significance threshold. Therefore, testing of the emergency generators will not result in a significant localized impact.

As discussed in the analysis, the proposed project's regional impacts are assessed based on the net change in pollutant emission with the project. The reduction in particulate emissions from the replacement cooling towers (1.3 lbs/day of PM_{10} and 0.8 lbs/day of $PM_{2.5}$) is greater than the total daily generator emissions. Therefore, the project results in a net reduction of particulate emissions and will not result in a significant regional impact.

Comment 12: For the Health Risk Assessment, the Juvenile Hall is not equivalent to a residential receptor and the impacts to the Juvenile Hall occupants would be the same or less than commercial receptors. While not clearly indicated in the HRA, we assume that the worst-case commercial receptor shown is located adjacent to the site, equivalent to the Juvenile Hall. The HRA analyzed increased cancer risk and non-cancer health impacts. Cancer risk for a residence is calculated assuming a 70-year residence at the same location while the commercial receptor cancer risk was calculated assuming a 46-year exposure. These are representative of the maximum number of years that a person would live or work in any one location and are exposed to the pollutants. The amount of time spent by anyone at Juvenile Hall will be less than the 46-year exposure assumed for commercial users. Therefore, the cancer risk for Juvenile Hall residents would be less than for commercial workers. Non-cancer health risks are only dependent on location rather than exposure type. Therefore, the non-cancer hazard indices for occupants of the Juvenile Hall will be the same or less than for the commercial receptor presented in the HRA.

Comment 13: As discussed in Response 4, the noise levels generated by the non-OSHPD generators will be mitigated so that they will not create excessive noise levels at the Manchester Building and therefore, not result in a significant noise impact even if they are operated during normal business hours. Further, per the Air Quality Analysis presented in the IS/MND and the response to Comment 11 above, the air pollutant emissions will be less than the SCAQMD Local Significance Threshold and therefore will not result in a localized air quality impact.

Comment 14: As discussed in the analysis, the less than significant determination is based on the 12 hour per day operation for the non-OSHPD cooling towers. This restriction has been added as mitigation measure AQ-2 to ensure the assumptions in the analysis are not exceeded.

Comment 15: The contacts have been added for the project mailing list and for future UCIMC projects.

APPENDIX F

Mitigation Monitoring and Reporting Program

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CENTRAL ENERGY PLANT EXPANSION

MITIGATION MONITORING AND REPORTING PROGRAM - 2016

	Mitigation Measure	Responsible Party	Mitigation Timing	Monitoring and Reporting Procedure	Compliance Notes
Aesthetics					
3.1-3	Prior to the completion of final construction documents, the UCIMC shall ensure that projects use low-reflective materials on buildings and parking structures that do not promote glare to the greatest extent feasible.	UCIMC/EPS	During design	UCIMC to review during design EPS to confirm and monitor	**Prior to construction, submit a finalized lighting plan to EPS.**
Air Quality					
AQ-1	Testing of the emergency generators installed by this project shall be limited to no more than 1.6 hours per day.	UCIMC/EPS	During design and operation	UCIMC to develop and implement plan EPS to confirm	**During the design phase, submit an operational plan to EPS.**
AQ-2	Operation of the non-OSHPD cooling towers shall be limited to 12 hours per day.	UCIMC/EPS	During design and operation	UCIMC to develop and implement plan EPS to confirm	**During the design phase, submit an operational plan to EPS.**
Cultural Resources					
CR-1	Should archaeological resources be found during ground-disturbing activities related to construction, all such activities must be directed away from the immediate area of the discovery and further disturbance to it must be prevented by the on-site contractor in consultation with UCI and a qualified project archaeologist approved by UCI. The project archaeologist shall first determine whether the uncovered resource is a "unique archaeological resource" pursuant to Section 21083.2(g) of the California Public Resources Code or a "historical resource" pursuant to Section 15064.5(a) of the CEQA Guidelines. If the resource is determined to be a "unique archaeological resource" or a "historic resource," the archaeologist in consultation with UCI shall recommend disposition of the site and formulate a mitigation plan that satisfies the requirements of Section 21083.2 of the PRC and Section 15064.5 of the CEQA Guidelines. If the archaeologist determines that the resource is not a "unique archaeological resource" or "historical resource," s/he shall record the site and submit the recordation form to the California Historical Resource Information System (CHRIS) at the South Central Coastal Information Center (SCCIC). The archaeologist shall prepare a report of the results of any study prepared as part of a testing or mitigation plan, following accepted professional practice. The report shall follow guidelines of the California Office of Historic Preservation. Copies of the report shall be submitted to UCI and to the CHRIS at the SCCIC.	UCIMC/EPS	During grading and construction if resources are discovered	On-site construction supervisor to notify UCIMC and EPS who will stop/direct work	**If no resources are found, submit memo from contractor.** **If resources found, submit archaeological report to EPS.**
CR-2	If fossil resources are discovered by the Contractor or others during project grading, ground-disturbing activities in the vicinity of the discovery shall be halted or diverted until a qualified paleontologist, approved	UCIMC/EPS	During grading and construction	On-site construction supervisor to notify	**If no resources are found, submit memo from contractor.**

	Mitigation Measure	Responsible Party	Mitigation Timing	Monitoring and Reporting Procedure	Compliance Notes
	by UCI, inspects the find and evaluates it for significance. Work may proceed in other areas of the site, subject to the direction of the paleontologist, in consultation with UCI. If determined to be significant, the paleontologist shall have the authority to quickly and efficiently salvage and remove the fossil from its locality, as appropriate, before ground-disturbing activities resume in the area. These actions, as well as final disposition of the resources, shall be subject to the approval of UCI.		if resources are discovered	UCIMC and EPS who will stop/direct work	**If resources found, submit paleontological report to EPS.**
Hazards and Hazardous Materials					
3.5-2(a)	Prior to demolition activities at each location, the UCI Medical Center shall develop a decommissioning plan for facilities known or suspected to contain hazardous materials in building features including, but not limited to, exterior surfaces such as rooftops and stacks, and interior features such as floors, walls, ceilings, countertops, and storage areas, and plumbing and ventilation fixtures. Potential contaminants to be evaluated shall include, but not be limited to, the following: friable asbestos, lead-based paint, mercury or other chemical substances, Polychlorinated Biphenyls (PCBs), radioactive materials, and biohazardous materials. The decommissioning plan shall identify, at a minimum, the following information: •The location, type, and estimated amount of exterior and interior features known or suspected to contain contaminants. Measures to evaluate the potential for contaminants to be present could include, but would not be limited to, a review of departmental history, UCI Medical Center records pertaining to use, hazardous materials purchases, consultation with knowledgeable individuals, and sample collection where practical; •Specific tasks that would be performed to determine the type, location, and amount of contaminants that could be present; •A mechanism for ensuring removal of contaminated items in compliance with all applicable hazardous materials management laws and regulations. Such measures could include identification for individuals or companies permitted or licensed to handle contaminants, procedures, contract specifications, periodic monitoring during demolition, and documentation of activities; •For each affected location, health and safety precautions that meet the intent of California Occupational Safety and Health Administration (Cal/OSHA) requirements shall be developed and identified in the decommissioning plan; and •The decommissioning plan shall identify specific steps that will be taken to account for and relocate all stored chemical and radioactive wastes and other hazardous wastes and other hazardous substances used in routine operations. This mitigation would occur during the design phase.	UCIMC/EPS	Prior to demolition	UCIMC to develop and implement plan EPS to confirm and monitor	**Prior to demolition, submit decommissioning plan to EPS.**
3.5-2(c)	In the event unidentified, obvious, or suspected hazardous materials or contamination are discovered during decommissioning or demolition, such activities shall cease immediately until evaluated by a qualified health and safety professional. Work shall not continue until appropriate actions recommended by the health and safety professional have been implemented to demonstrate that there would be no unacceptable health risk to exposed individuals.	UCIMC/EPS	During demolition	On-site construction supervisor to notify UCIMC and EPS who will stop/direct work	**If no hazardous materials found, submit memo from contractor.** **If hazardous materials found, submit report to EPS.**
3.5-2(d)	All buildings shall be tested by a registered environmental assessor for the presence of lead-based paint prior	UCIMC/EPS	During design	UCIMC to develop	**Prior to demolition, submit report to**

	Mitigation Measure	Responsible Party	Mitigation Timing	Monitoring and Reporting Procedure	Compliance Notes
	to demolition. If lead-based paint is detected, the material shall be removed and transported to an approved waste disposal facility in accordance with the County of Orange Health Care Agency.		and prior to demolition	and implement plan EPS to confirm	**EPS.**
Noise					
NO-1	Construction documents shall be reviewed prior to completion by a qualified acoustical expert to determine if the City of Orange Noise Standards shall be achieved or can be met with sound barriers or other mitigation. Outdoor areas where noise barriers cannot provide enough reduction to achieve the standard should be relocated, if feasible. Areas that shall require sound barriers should have detailed noise studies prepared by a qualified acoustical expert to show the location and height of the noise barrier required to meet the standard.	UCIMC/EPS	During design	UCIMC to perform acoustical analysis	**During design, submit report to EPS.**
3.8-1(a)	All construction equipment shall be equipped with improved noise muffling and have the manufacturer's recommended noise abatement measures, such as mufflers, engine covers, and engine vibration isolators in good working order.	UCIMC/EPS	During construction	UCIMC to develop and implement plan EPS to confirm and monitor	**Prior to demolition, submit construction and equipment plan to EPS.**
3.8-1(b)	To the maximum extent feasible, hydraulic equipment (instead of pneumatic impact tools) and electric power tools (instead of diesel powered equipment) shall be used for all exterior construction work.	UCIMC/EPS	During construction	UCIMC to develop and implement plan EPS to confirm and monitor	**Prior to demolition, submit construction and equipment plan to EPS.**
3.8-1(c)	Maintaining equipment in an idling mode shall be minimized. All equipment shall be turned off if not in use.	UCIMC/EPS	During construction	UCIMC to develop and implement plan EPS to confirm and monitor	**Prior to demolition, submit construction and equipment plan to EPS.**
3.8-1(d)	A noise barrier 8 to 10 feet in height shall be provided at the project site perimeter, where construction would be adjacent to onsite or offsite sensitive receptors, that will break the line-of-sight between construction equipment and noise receptors, where feasible.	UCIMC/EPS	During construction	UCIMC to develop and implement plan EPS to confirm and monitor	**Prior to demolition, submit construction and equipment plan to EPS.**
EPS: Environmental Planning & Sustainability **UCIMC: UCIMC Planning Administration**					