4.6 GREENHOUSE GAS EMISSIONS

4.6.1 INTRODUCTION

This section of the Revised Draft EIR discusses the existing global, national, and statewide conditions related to greenhouse gases (GHG) and global climate change and evaluates the potential impacts on global climate from the implementation of the proposed UC Santa Cruz Student Housing West project ("SWH project" or "proposed project"). In addition, the section provides a discussion of the applicable federal, state, regional, and local agencies that regulate, monitor, and control GHG emissions.

The section also presents potential GHG impacts from the anticipated construction and operation of the separate, but related, Porter and Rachel Carson Colleges dining facilities expansion project, which would serve residents of the SHW project and the existing colleges (see **Section 4.6.5** below).

Data used to prepare this section were taken from various sources, including the Monterey Bay Unified Air Pollution Control District's *Guidelines for Implementing the California Environmental Quality Act*, published in 2016, and technical analyses conducted for the project by Illingworth & Rodkin (I&R). The technical memorandum documenting the I&R analysis is presented in **Appendix 4.2** of this EIR.

The project is located within the air basin that is under the jurisdiction of the Monterey Bay Air Resources District (MBARD), formerly known as the Monterey Bay Unified Air Pollution Control District (MBUAPCD). To avoid confusion, the prior name of the District is not used in this section; the phrase "Air District" or the acronym "MBARD" is used throughout the section to refer to the Air District. Although the District's CEQA guidance related to GHG emissions was prepared when the Air District was called MBUAPCD, the guidelines are referred to as the MBARD 2016 guidelines.

This section is revised from the section in the Draft EIR due to project description changes, which include changes in the amount of building space to be constructed and construction schedule, although the project would not involve a substantial change in the number of beds to be built at each site. In addition, comments received on the Draft EIR related to GHG impacts were reviewed and the key issues raised in the comments are summarized below:

- The Draft EIR does not account for GHG emissions that would result from trips that future residents in the new housing will be required to make from the campus to shopping locations, schools, and for other activities. The student residents will bring more cars to the campus and result in increased GHG emissions. The Draft EIR should include the impact of increased personal vehicle use by all UC and non-UC employees associated with the construction and operation of the proposed project.

- The Draft EIR uses a bright-line threshold and an efficiency threshold to evaluate the significance of the project's GHG emissions. Due to the seriousness of the impact of GHG emissions on global climate, the EIR should only use the bright-line threshold to evaluate the impact.

- Using either the per capita emissions or the total emissions per year, the project's cumulative impact cannot be considered de minimus. It would be cumulatively considerable.

These comments are addressed in the revised analysis presented in this section.

4.6.2 ENVIRONMENTAL SETTING

4.6.1 Background

Global climate change refers to any significant change in climate measurements, such as temperature, precipitation, or wind, lasting for an extended period (i.e., decades or longer) (US EPA 2013). Climate change may result from:

- natural factors, such as changes in the sun's intensity or slow changes in the Earth's orbit around the sun;

- natural processes within the climate system (e.g., changes in ocean circulation, reduction in sunlight from the addition of GHG and other gases to the atmosphere from volcanic eruptions); and

- human activities that change the atmosphere's composition (e.g., through burning fossil fuels) and the land surface (e.g., deforestation, reforestation, urbanization, desertification).

The primary effect of global climate change has been a rise in the average global tropospheric temperature of 0.2 degree Celsius (°C) per decade, determined from meteorological measurements worldwide between 1990 and 2005. Climate change modeling using 2000 emission rates shows that further warming is likely to occur, which would induce further changes in the global climate system during the current century (IPCC 2007). Changes to the global climate system and ecosystems, and to California, could include:

- declining sea ice and mountain snowpack levels, thereby increasing sea levels and sea surface evaporation rates with a corresponding increase in tropospheric water vapor due to the atmosphere's ability to hold more water vapor at higher temperatures (IPCC 2007);

- rising average global sea levels primarily due to thermal expansion and the melting of glaciers, ice caps, and the Greenland and Antarctic ice sheets. Along most of the California coast, the average values for future sea level rise are projected to be approximately 6 inches by 2030, 12 inches by 2050, and 36 inches by 2100 (NRC 2012);

- changing weather patterns, including changes to precipitation, ocean salinity, and wind patterns, and more energetic aspects of extreme weather, including droughts, heavy precipitation, heat waves, extreme cold, and the intensity of tropical cyclones (IPCC 2007);

- declining Sierra snowpack levels, which account for approximately half of the surface water storage in California, by 70 percent to as much as 90 percent over the next 100 years (Cal EPA 2006);

- increasing the number of days conducive to ozone formation by 25 to 85 percent (depending on the future temperature scenario) in high ozone areas located in the Southern California area and the San Joaquin Valley by the end of the 21st century (Cal EPA 2006);

- increasing the potential for erosion of California's coastlines and sea water intrusion into the Sacramento and San Joaquin Delta and associated levee systems due to the rise in sea level (Cal EPA 2006);

- increasing pest infestation, making California more susceptible to forest fires (Cal EPA 2006);

- increasing the demand for electricity by 1 to 3 percent by 2020 due to rising temperatures resulting in hundreds of millions of dollars in extra expenditures (Cal EPA 2006); and

- summer warming projections in the first 30 years of the 21st century ranging from about 0.5 to 2 °C (0.9 to 3.6 °F) and by the last 30 years of the 21st century, from about 1.5 to 5.8 °C (2.7 to 10.5 °F) (Cal EPA 2006).

The natural process through which heat is retained in the troposphere[1] is called the "greenhouse effect." Various gases in the Earth's atmosphere, classified as atmospheric greenhouse gases (GHGs), play a critical role in determining the Earth's surface temperature. Solar radiation enters Earth's atmosphere as short wave radiation. It travels through the atmosphere without warming it and is absorbed by the Earth's surface. When the Earth re-emits this radiation back toward space, the radiation changes to long wave radiation. GHGs are transparent to incoming short wave solar radiation but absorb outgoing long wave radiation. As a result, radiation that otherwise would escape back into space is now retained, warming the atmosphere. This phenomenon is known as the greenhouse effect.

4.6.2.2 Greenhouse Gases

State law defines GHGs to include the following six compounds:

- **Carbon Dioxide** (CO_2) is released to the atmosphere when solid waste, fossil fuels (oil, natural gas, and coal), and wood and wood products are burned. CO_2 emissions from motor vehicles occur during operation of vehicles and operation of air conditioning systems. CO_2 comprises over 80 percent of GHG emissions in California (Cal EPA 2014).

1 The troposphere is the bottom layer of the atmosphere, which varies in height from the Earth's surface from 6 to 7 miles).

- **Methane** (CH_4) is emitted during the production and transport of coal, natural gas, and oil. Methane emissions also result from the decomposition of organic waste in solid waste landfills, raising livestock, natural gas and petroleum systems, stationary and mobile combustion, and wastewater treatment. Methane makes up 8.3 percent of all GHGs, and mobile sources and general fuel combustion represent 0.69 percent of overall methane emissions (Cal EPA 2014).

- **Nitrous Oxide** (N_2O) is emitted during agricultural and industrial activities, as well as during combustion of solid waste and fossil fuels. Mobile sources represent about 12 percent of N_2O emissions (US EIA 2011). N_2O emissions from motor vehicles generally occur directly from operation of vehicles.

- **Hydrofluorocarbons** (HFCs) are one of several high global warning potential (GWP) gases that are not naturally occurring and are generated from industrial processes. HFC (refrigerant) emissions from vehicle air conditioning systems occur due to leakage, losses during recharging, or release from scrapping vehicles at end of their useful life.

- **Perfluorocarbons** (PFCs) are another high GWP gas that are not naturally occurring and are generated in a variety of industrial processes. Emissions of PFCs from motor vehicles are generally negligible.

- **Sulfur Hexafluoride** (SF_6) is another high GWP gas that is not naturally occurring and is generated in a variety of industrial processes. Emissions of SF_6 from motor vehicles are generally negligible.

While water vapor and carbon dioxide (CO_2) are the most abundant GHGs, other trace GHGs have a greater ability to absorb and re-radiate long-wave radiation. To gauge the potency of GHGs, scientists have established a Global Warming Potential (GWP) for each GHG based on its ability to absorb and re-emit long-wave radiation over a specific period. The GWP of a gas is determined using CO_2 as the reference gas, which has a GWP of 1 over 100 years (IPCC 2007).[2] For example, a gas with a GWP of 10 is 10 times more potent than CO_2 over 100 years. The use of GWP allows GHG emissions to be reported using CO_2 as a baseline. The sum of each GHG multiplied by its associated GWP is referred to as "carbon dioxide equivalents" (CO_2e). This essentially means that 1 metric ton of a GHG with a GWP of 10 has the same climate change impacts as 10 metric tons of CO_2. As illustrated in **Table 4.6-1**, **Global Warming Potential For Greenhouse Gases,** the other GHGs are less abundant but have higher GWP than CO_2. To account for this higher potential, emissions of other GHGs are frequently expressed in the equivalent mass of CO_2, denoted as CO_2e. Expressing GHG emissions in carbon dioxide equivalents takes the contribution of all GHG emissions to the greenhouse effect and converts them to a single unit equivalent to the effect that would occur if only CO_2 were being emitted. High GWP gases such as HFCs, PFCs, and SF_6 are the most heat-absorbent.

2 All Global Warming Potentials are given as 100-year values.

Table 4.6-1
Global Warming Potential for Greenhouse Gases

Greenhouse Gas	Global Warming Potential Factor (100-Year)
Carbon Dioxide (CO_2)	1
Methane (CH_4)	25
Nitrous Oxide (N_2O)	298
Perfluorocarbons (PFCs)	7,390-12,200
Hydrofluorocarbons (HFCs)	124-14,800
Sulfur Hexafluoride (SF_6)	22,800

Source: Southern California Association of Governments, Draft Program EIR for 2016 RTP/SCS. November 24, 2015.
Note: Global warming potential measures how much heat a GHG traps in the atmosphere, in this case, over a 100-year period.

4.6.2.3 GHG Emissions Classification

To achieve consistency in reporting across different geographies, the GHG Protocol established by the World Research Institute, developed a GHG emissions classification system that classifies GHG emissions into three categories based on the nature and source of the emissions. This classification system is listed in the University of California Sustainable Practices Policy and is used by the University to gather data on its annual GHG emissions for reporting to the Climate Registry.

- Scope 1 GHG emissions include direct emissions that are emitted on the project site/facility and are associated with on-site combustion of natural gas, fuel use in vehicle fleets, and fugitive emissions of gases used for refrigeration and scientific research. Fugitive gases include hydrofluorocarbon gases, perfluorocarbon gases, and sulfur hexafluoride (SF6).

- Scope 2 GHG emissions include indirect emissions associated with the consumption of purchased energy from off-site sources. Scope 2 electricity emissions reflect emissions from all energy used at the electricity-generating power plant, but exclude transmission and distribution losses, which are reported under Scope 3.

- Scope 3 GHG emissions include indirect emissions not covered in Scope 2, including GHG emissions from employee commuting, business air and ground travel, electricity transmission and distribution losses, off-site wastewater treatment, and off-site municipal solid waste disposal.

These definitions of Scope 1, 2 and 3 emissions are used at UC Santa Cruz to gather and report GHG emissions data annually.

Note that CEQA requires an evaluation of direct and indirect emissions. With the exception of business air and ground travel, all of the Scope 1, 2, and 3 emission sources listed above must be addressed in a

CEQA document. In addition, CEQA requires that the estimate of a project's emissions include emissions from the supply, treatment and distribution of water used by the project.

4.6.3 REGULATORY CONSIDERATIONS

4.6.3.1 International Laws and Regulations

Kyoto Protocol

In 1988, the United Nations established the Intergovernmental Panel on Climate Change to evaluate the impacts of global warming and to develop strategies that nations could implement to curtail global climate change. In 1992, the United States (the "U.S.") joined other countries around the world in signing the United Nations' Framework Convention on Climate Change (UNFCCC) agreement with the goal of controlling greenhouse gas emissions. As a result, the Climate Change Action Plan was developed to address the reduction of GHG emissions in the U.S. The plan currently consists of more than 50 voluntary programs for member nations to adopt. The Kyoto Protocol (the "Protocol") is a treaty made under the UNFCCC and was the first international agreement to regulate GHG emissions. Notably, while the U.S. is a signatory to the Kyoto protocol, Congress has not ratified the Protocol and the U.S. is not bound by the Protocol's commitments. The major feature of the Protocol is that it sets binding targets for 37 industrialized countries and the European community for reducing GHG emissions. The major distinction between the Protocol and the UNFCCC is that while the UNFCCC encouraged industrialized countries to stabilize GHG emissions, the Protocol commits them to do so. Recognizing that developed countries are principally responsible for the current high levels of GHG emissions in the atmosphere as a result of more than 150 years of industrial activity, the Protocol places a heavier burden on developed nations under the principle of "common but differentiated responsibilities."

On December 12, 2015, a Conference of the Parties to the UNFCCC and the 11th session of the Kyoto Protocol negotiated an agreement in Paris that would keep the rise of temperature below 2 degrees Celsius. While 186 countries published their action plans detailing how they plan to reduce their GHG emissions, these reductions would still result in up to 3 degrees Celsius of global warming. The Paris agreement asks all countries to review their plans every five years from 2020, acknowledges that $100 billion is needed each year to enable countries to adapt to climate change. The agreement was signed into law on April 22, 2016. However, in May 2017, President Donald Trump announced that the U.S. would withdraw from the agreement.

The Western Regional Climate Action Initiative (WCI)

The Western Regional Climate Action Initiative (WCI) is a partnership among seven states, including California, and four Canadian provinces to implement a regional, economy-wide cap-and-trade system to reduce global warming pollution. The WCI will cap GHG emissions from the region's electricity, industrial, and transportation sectors with the goal to reduce the heat trapping emissions that cause global warming to 15 percent below 2005 levels by 2020. When the WCI adopted this goal in 2007, it estimated that this would require 2007 levels to be reduced worldwide between 50 percent and 85 percent by 2050. California is working closely with the other states and provinces to design a regional GHG reduction program that includes a cap-and-trade approach. The California Air Resources Board's (CARB) planned cap and-trade program, discussed below, is also intended to link California and the other member states and provinces.

4.6.3.2 Federal Laws and Regulations

The USEPA has historically not regulated GHG emissions because it determined the Clean Air Act did not authorize it to regulate emissions that addressed climate change. In 2007, the U.S Supreme Court found that GHG emissions could be considered within the Clean Air Act's definition of a pollutant (*Massachusetts v. EPA et al*, 2007). In December 2009, USEPA issued an endangerment finding for GHG emissions under the Clean Air Act, setting the stage for future regulation. In September 2009, the National Highway Traffic Safety Administration (NHTSA) and USEPA announced a joint rule that would tie fuel economy to GHG emission reduction requirements. By 2016, this could equate to an overall light-duty vehicle fleet average fuel economy of 35.5 miles per gallon.

In June 2013, President Obama announced a Climate Action Plan that calls for a number of initiatives, including funding $8 billion in advanced fossil energy efficiency projects, calls for federal agencies to develop new emission standards for power plants, invests in renewable energy sources, calling for adaptation programs, and leading international efforts to address climate change. There have been numerous executive actions, proposed and finalized agency regulations, investment strategies, budget requests, and international bilateral agreements. This includes a final rule for the Clean Power Plan in August 2015, which will cut carbon emissions from existing power plants 32 percent below 2005 levels by 2030.

Vehicle Standards

Other regulations have been adopted to address vehicle standards including the USEPA and the NHTSA joint rulemaking for vehicle standards.

- On March 30, 2009, the NHTSA issued a final rule for model year 2011 (NHSTA 2009).
- On May 7, 2010, the USEPA and the NHTSA issued a final rule regulating fuel efficiency and GHG emissions pollution from motor vehicles for cars and light-duty trucks for model years 2012–2016 (US EPA 2010).
- On August 9, 2011, USEPA and NHTSA issued a Supplemental Notice of Intent announcing plans to propose stringent, coordinated federal GHG emissions and fuel economy standards for model year 2017-2025 light-duty vehicles (US EPA and NHTSA 2011).
- NHSTA intends to set standards for model years 2022-2025 in a future rulemaking (NHSTA 2012).
- In addition to the regulations applicable to cars and light-duty trucks, on August 9, 2011, the USEPA and the NHTSA announced fuel economy and GHG emissions standards for medium- and heavy-duty trucks that applies to vehicles from model year 2014–2018 (US EPA 2011).
- Energy Independence and Security Act (the "EISA")
- Among other key measures, the EISA would do the following, which would aid in the reduction of national GHG emissions, both mobile and non-mobile:
  - Increase the supply of alternative fuel sources by setting a mandatory Renewable Fuel Standard (RFS) requiring fuel producers to use at least 36 billion gallons of biofuel in 2022.
  - Prescribe or revise standards affecting regional efficiency for heating and cooling products, procedures for new or amended standards, energy conservation, energy efficiency labeling for consumer electronic products, residential boiler efficiency, electric motor efficiency, and home appliances.

While superseded by NHTSA and USEPA actions described above, EISA also set miles per gallon targets for cars and light trucks and directed the NHTSA to establish a fuel economy program for medium- and heavy-duty trucks and create a separate fuel economy standard for work trucks.

Additional provisions of the EISA address energy savings in government and public institutions, promoting research for alternative energy, additional research in carbon capture, international energy programs, and the creation of "green jobs."

4.6.3.3 State Laws and Regulations

Assembly Bill 1493

California has adopted a series of laws and programs to reduce emissions of GHGs into the atmosphere. Assembly Bill (AB) 1493 by then-Assembly member Fran Pavley was enacted in September 2003 and

requires regulations to achieve "the maximum feasible reduction of greenhouse gases" emitted by vehicles used for personal transportation.

Executive Order S-3-05

On June 1, 2005, Governor Schwarzenegger issued Executive Order S-3-05, which set the following GHG emission reduction targets: by 2010, reduce GHG emissions to 2000 levels; by 2020, reduce GHG emissions to 1990 levels; and by 2050, reduce GHG emissions to 80 percent below 1990 levels. The California Environmental Protection Agency (Cal EPA) formed a Climate Action Team ("CAT") that recommended strategies that can be implemented by state agencies to meet GHG emissions targets. The Team reported several recommendations and strategies for reducing GHG emissions and reaching the targets established in the Executive Order (CAT 2006). Furthermore, the report provided to Governor Schwarzenegger in 2006 indicated that smart land use and increased transit availability should be a priority in the State of California (CAT 2006). According to the California Climate Action Team, smart land use is an umbrella term for strategies that integrate transportation and land-use decisions. Such strategies generally encourage jobs/housing proximity, promote transit-oriented development (TOD), and encourage high-density residential/commercial development along transit corridors. These strategies develop more efficient land-use patterns within each jurisdiction or region to match population increases, workforce, and socioeconomic needs for the full spectrum of the population.

Executive Order B-30-15

On April 29, 2015, Governor Brown issued an executive order setting a Statewide GHG reduction target of 40 percent below 1990 levels by 2030. This action aligns the State's GHG targets with those set in October 2014 by the European Union and is intended to help the State meets its target of reducing GHG emissions 80 percent below 1990 levels by 2050. The measure calls on State agencies to implement measures accordingly and directs the CARB to update the Climate Change Scoping Plan.

Assembly Bill 32

In September 2006, AB 32 was signed into law by Governor Arnold Schwarzenegger, focusing on achieving GHG emissions equivalent to statewide levels in 1990 by 2020. It mandates that the CARB establish a quantified emissions cap, institute a schedule to meet the cap, implement regulations to reduce statewide GHG emissions from stationary sources, and develop tracking, reporting, and enforcement mechanisms to ensure that reductions are achieved.

CARB developed an AB 32 Scoping Plan that contains strategies to achieve the 2020 emissions cap. This Scoping Plan, which was developed by CARB in coordination with the CAT, was first published in

October 2008 (the "2008 Scoping Plan"). The 2008 Scoping Plan proposed a comprehensive set of actions designed to reduce overall GHG emissions in California, improve the environment, reduce the state's dependence on oil, diversify the state's energy sources, save energy, create new jobs, and enhance public health. It accommodated the State's projected population growth. Moreover, it expressly encouraged called for coordinated planning of growth, including the location of dense residential projects near transportation infrastructure, including public transit.

On May 22, 2014, CARB approved its first update to the AB 32 Scoping Plan, recalculating 1990 GHG emissions using IPCC Fourth Assessment Report (AR4) released in 2007. It states that based on the AR4 global warming potentials, the 427 $MMTCO_2e$ 1990 emissions level would be slightly higher than identified in the original Scoping Plan, at 431 $MMTCO_2e$. Based on the revised estimates of expected 2020 emissions identified in the 2011 supplement to the FED and updated 1990 emissions levels identified in the draft first update to the Scoping Plan, achieving the 1990 emission level would require a reduction of 76 $MMTCO_2e$ or a reduction by approximately 15.3 percent (down from 28.4 percent) to achieve in 2020 emissions levels in the BAU condition. CARB's First Update "lays the foundation for establishing a broad framework for continued emission reductions beyond 2020, on the path to 80 percent below 1990 levels by 2050," and many of the emission reduction strategies recommended by CARB would serve to reduce the project's post-2020 emissions level to the extent applicable by law by focusing on reductions from several sectors (CARB 2014). CARB will be doing a second update to the Scoping Plan to reflect the 2030 targets set by Executive Order B-30-15 and codified by SB 32.

Nearly all reductions are to come from sources that are controlled at the statewide level by State agencies, including the CARB, Public Utilities Commission, High Speed Rail Authority, and California Energy Commission. The few actions that are directly or indirectly associated with local government control are in the Transportation sector. Of these actions, only one (GHG reductions through coordinated planning) specifically identifies local governments as the responsible agency.

Cap-and-Trade Program

CARB adopted a California Cap-and-Trade Program pursuant to its authority under AB 32. The Cap-and-Trade Program is designed to reduce GHG emissions from major sources (deemed "covered entities") by setting a firm cap on statewide GHG emissions and employing market mechanisms to achieve AB 32's emission-reduction mandate of returning to 1990 levels of emissions by 2020. The statewide cap for GHG emissions from the capped sectors (e.g., electricity generation, petroleum refining, and cement production) commenced in 2013 and declines over time, achieving GHG emission reductions throughout the program's duration.

As of January 1, 2015, the Cap-and-Trade Program covered approximately 85 percent of California's GHG emissions. The Cap-and-Trade Program covers the GHG emissions associated with electricity consumed in California, whether generated in-state or imported. Accordingly, GHG emissions associated with CEQA projects' electricity usage are covered by the Cap-and-Trade Program.

On July 25, 2017, the Governor signed AB 398 into law, extending the Cap-and-Trade Program to 2030. AB 398 calls for half of emissions offsets to be generated in California and prohibits CARB and air districts from regulating CO_2 from sources under the Cap-and-Trade program.

Senate Bill 1368

Senate Bill (SB) 1368 requires the California Public Utilities Commission and the California Energy Commission to establish GHG emissions performance standards for the generation of electricity. These standards will also apply to power that is generated outside of California and imported into the state.

SB 97 & CEQA Guidelines

In August 2007, the California State Legislature adopted Senate Bill 97 (SB 97), requiring the Governor's Office of Planning and Research (OPR) to prepare and transmit new CEQA guidelines for the mitigation of GHG emissions or the effects of GHG emissions. In response to SB 97, the California Natural Resources Agency (CNRA) adopted amendments to the State CEQA Guidelines that require evaluation of GHG emissions or the effects of GHG emissions. The amendments, in Section 15064.4, provide that:

> (a) The determination of the significance of greenhouse gas emissions calls for a careful judgment by the lead agency consistent with the provisions in Section 15064. A lead agency should make a good-faith effort, based to the extent possible on scientific and factual data, to describe, calculate, or estimate the amount of greenhouse gas emissions resulting from a project.
>
> (b) A lead agency should consider the following factors, among others, when assessing the significance of impacts from greenhouse gas emissions on the environment:
>
> (1) The extent to which the project may increase or reduce greenhouse gas emissions as compared to the existing environmental setting;
>
> (2) Whether the project emissions exceed a threshold of significance that the lead agency determines applies to the project;
>
> (3) The extent to which the project complies with regulations or requirements adopted to implement a statewide, regional, or local plan for the reduction or mitigation of greenhouse gas emissions. Such requirements must be adopted by the relevant public agency through a public review process and must reduce or mitigate the project's incremental contribution of greenhouse gas emissions.

The amendments also add Section 15126.4(c), Mitigation Measures Related to Greenhouse Gas Emissions. Generally, this State CEQA Guidelines section requires lead agencies to consider feasible means, supported by substantial evidence and subject to monitoring or reporting, of mitigating the significant effects of GHG emissions. Potential measures to mitigate the significant effects of GHG emissions are identified, including those outlined in Appendix F, Energy Conservation, of the State CEQA Guidelines.

State Bill 375

On September 30, 2008, SB 375 was instituted to help achieve AB 32 goals through regulation of cars and light trucks. SB 375 aligns three policy areas of importance to local government: (1) regional long-range transportation plans and investments; (2) regional allocation of the obligation for cities and counties to zone for housing; and (3) a process to achieve GHG emissions reductions targets for the transportation sector. It establishes a process for CARB to develop GHG emissions reductions targets for each region (as opposed to individual local governments or households). SB 375 also requires Metropolitan Planning Organizations ("MPOs") to prepare a Sustainable Communities Strategy (SCS) within the Regional Transportation Plan (RTP) that guides growth while taking into account the transportation, housing, environmental, and economic needs of the region. SB 375 uses CEQA streamlining as an incentive to encourage residential projects, which help achieve AB 32 goals to reduce GHG emissions.

In October 2017, CARB released its final report recommending updates to the SB 375 GHG emission reduction targets across the State (CARB 2017). This addresses several statutory, technological, and policy factors that have changed since the original 2010 targets. The original SB 375 2020 targets for the AMBAG region were a zero percent reduction, while the proposed 2035 target could increase from a 5 percent to a 6 percent reduction.

Executive Order B-30-15

In April 2015, Governor Brown signed Executive Order B-30-15 that provides the state a mid-term target. The executive order establishes a target for the state to reduce its GHG emissions such that the state's 2030 emissions are 40 percent of the 1990 emissions. According to the state, California is on track to meet or exceed the current target of reducing GHG emissions to 1990 levels by 2020, as established in AB 32. The new emission reduction target of 40 percent below 1990 levels by 2030 will make it possible to reach the ultimate goal of reducing emissions 80 percent under 1990 levels by 2050, established by Executive Order S-3-05.

Senate Bill 350

On October 7, 2015, Senate Bill 350: Clean Energy and Pollution Reduction Act (SB 350) was signed into law, establishing new clean energy, clean air and greenhouse gas reduction goals for 2030 and beyond. Building off of AB 32, SB 350 established California's 2030 greenhouse gas reduction target of 40 percent below 1990 levels. To achieve this goal, SB 350 set ambitious 2030 targets for energy efficiency and renewable electricity, among other actions aimed at reducing greenhouse gas emissions. SB 350 increases California's renewable electricity procurement goal from 33 percent by 2020 to 50 percent by 2030. This will increase the use of Renewables Portfolio Standard (RPS) eligible resources, including solar, wind, biomass, geothermal, and others. In addition, SB 350 requires the state to double statewide energy efficiency savings in electricity and natural gas end uses by 2030.

Senate Bill 32

Senate Bill 32 (SB 32) was signed into law on August 31, 2016. This bill requires CARB to adopt rules and regulations to ensure that statewide GHG emissions are reduced to 40 percent below the 1990 level by 2030.

Assembly Bill 197

On September 8, 2016, Assembly Bill 197 (AB 197) was signed into law. This bill requires CARB to make available the emissions of greenhouse gases, criteria pollutants, and toxic air contaminants for each facility that reports to the state board and air districts. In addition, this bill requires that CARB make available the emissions of greenhouse gases, criteria pollutants, and toxic air contaminants throughout the state, broken down to a local and sub-county level for stationary sources and to at least a county level for mobile sources, as specified.

Title 24 Energy Efficiency Standards

California's Energy Efficiency Standards for Residential and Nonresidential Buildings, located at Title 24, Part 6 of the California Code of Regulations and commonly referred to as "Title 24," were established in 1978 in response to a legislative mandate to reduce California's energy consumption. The standards are updated periodically to allow consideration and possible incorporation of new energy efficiency technologies and methods.

California Green Building Standards

The California Green Building Standards Code, which is Part 11 of the California Code of Regulations (the "CCR"), is commonly referred to as the *CALGreen* Code. *CALGreen* was added to Title 24 to represent base standards for reducing water use, recycling construction waste, and reducing polluting materials in new buildings. In contrast, Title 24 focuses on promoting more energy-efficient buildings and considers the building envelope, heating and cooling, water heating, and lighting restrictions. The current 2016 *CALGreen* Code became effective January 1, 2017.

4.6.3.4 Regional

MBARD Guidelines for Implementing the California Environmental Quality Act

MBARD revised its 1996 *Guidelines for Implementing CEQA* in February of 2016. The revision included significance criteria for stationary source greenhouse gas emissions to be used when the Air District is the Lead Agency. MBARD has not set forth guidance for CEQA projects under other lead agencies. According to the 2016 guidelines, "A proposed stationary source project will not have a significant GHG impact, if operation of the project will:

- Emit less than the significance level of 10,000 metric tons per year (MT/yr) CO2e, or
- In accordance with the State CEQA Guidelines Section 15064.4(b)(3), the project complies with regulations or requirements adopted to implement a statewide, regional, or local plan for the reduction or mitigation of GHG emissions [such as, sources subject to the Cap-and-Trade requirements pursuant to Title 17, Article 5 (California Cap on Greenhouse Gas Emissions and Market-based Compliance Mechanisms)]."

The 2016 guidelines define stationary source projects to include "equipment, processes and operations that require an Air District permit to operate." The guidelines also state that "Project GHG emissions include direct and indirect sources emissions. Direct emissions occur as a result of onsite equipment, and also offsite sources directly related to the project such as emissions from worker commute trips and haul truck trips. Indirect emissions occur as a result of a project's actions but are produced from sources not owned or controlled by the project such as offsite emissions from electricity generation, water conveyance, and waste disposal."

AMBAG 2035 Metropolitan Transportation Plan/Sustainable Communities Strategy

In June, 2014, AMBAG adopted its 2035 Metropolitan Transportation Plan Sustainable Communities Strategy (the "RTP/SCS"), calling for a continuation of integrated planning for land use and transportation that will help achieve the State's goal of reducing per capita GHG emissions by eight percent by 2020 compared to 2005 levels, by 18 percent by 2035, and 21 percent by 2040. The Plan calls for public transportation improvements and land use planning that would cut emissions from passenger vehicles to nearly six percent below 2005 levels.

The RTP/SCS also includes a number of mitigation measures designed to reduce the potential of development to conflict with AB 32 or any other plan designed to reduce GHG. These mitigation measures are particularly important where streamlining mechanisms under SB 375 are utilized. Examples of GHG emissions reduction mitigation measures include the following:

- **MM-GHG-1**: The project sponsor shall ensure that applicable GHG-reducing diesel particulate and NO_x emissions measures for off-road construction vehicles are implemented during construction. The measures shall be noted on all construction plans and the project sponsor shall perform periodic site inspections. Applicable GHG reducing measures include the following.
  - Use of diesel construction equipment meeting CARB's Tier 2 certified engines or cleaner off-road heavy-duty diesel engines, and comply with the State Off-Road Regulation;
  - Use of on-road heavy-duty trucks that meet the CARB's 2007 or cleaner certification standard for on-road heavy-duty diesel engines, and comply with the State On-Road Regulation;
  - All on and off-road diesel equipment shall not idle for more than 5 minutes. Signs shall be posted in the designated queuing areas and or job sites to remind drivers and operators of the 5 minute idling limit;
  - Use of electric powered equipment in place of diesel powered equipment when feasible;
  - Substitute gasoline-powered in place of diesel-powered equipment, where feasible;
  - Use of alternatively fueled construction equipment, such as compressed natural gas (CNG), liquefied natural gas (LNG), propane or biodiesel, in place of diesel powered equipment for 15 percent of the fleet;
  - Use of materials sourced from local suppliers; and
  - Recycling of at least 50 percent of construction waste materials.

Climate Action Compact (CAC)

In 2007 UC Santa Cruz (Campus) became a founding signatory to the CAC, a Monterey Bay regional compact to collectively address GHG emissions. The charter statement of the CAC is: "to develop effective collaborative solutions for the reduction of greenhouse gas emissions from our communities, municipal services, transportation infrastructure, business and energy providers necessitates active collaboration among groups and aggressive steps taken towards a low carbon future." This compact will reduce the Monterey Bay Region's contribution to climate change and benefit members by:

1. providing a neutral forum for city and county government agencies and special districts to learn from each other and from others about climate protection programs;

2. establishing a dialog among members that will lead to innovative solutions to current hurdles and reduce the need of individual members to research all areas of climate mitigation and adaptation;

3. supporting members who take actions to address GHG emissions and support the success of those actions throughout the region; and

4. helping address funding and other resource limitation as necessary for all members to achieve their reduction goals.

The CAC is important to the Campus for fostering community relations, meeting sustainability and climate change commitments, and participating in collaborative approaches to addressing regional and global challenges.

4.6.3.5 Local

University of California Sustainable Practices Policy

The University of California Sustainable Practices Policy ("Policy"), most recently updated in August 2018, is a system-wide commitment to minimize the University's impact on the environment and reduce its dependence on non-renewable energy sources. The Policy states that "The University of California ("University") is committed to responsible stewardship of resources and to demonstrating leadership in sustainable business practices. The University's locations should be living laboratories for sustainability, contributing to the research and educational mission of the University, consistent with available funding and safe operational practices."

The Policy establishes goals in nine areas of sustainable practices: green building, clean energy, transportation, climate protection, sustainable operations, waste reduction and recycling,

environmentally preferable purchasing, sustainable foodservice, sustainable water systems. Portions of the Policy applicable to the proposed project are listed below:

Green Building Design

- All new building projects shall be designed, constructed, and commissioned to outperform the CBC energy-efficiency standards by at least 20 percent or meet the whole-building energy performance targets listed in the Sustainable Practices Policy, Table 1 of Section V.A.3. The University will strive to design, construct, and commission buildings that outperform CBC energy efficiency standards by 30 percent or more, or meet the stretch whole-building energy performance targets listed in Table 1 of Section V.A.3, whenever possible within the constraints of program needs and standard budget parameters.

- No new building or major renovation that is approved after June 30, 2019 shall use onsite fossil fuel combustion (e.g. natural gas) for space and water heating (except those projects connected to an existing campus central thermal infrastructure). Projects unable to meet this requirement shall provide a justification as described in Section V.A.4.

Clean Energy

In support of the climate neutrality goals outlined in Section C of this policy, the University of California is committed to reducing its greenhouse gas emissions by reducing energy use and switching to clean energy supplies.

- **Energy Efficiency:** Each campus and medical center will implement energy efficiency actions in buildings and infrastructure systems to reduce their energy use intensity by at least 2 percent year over year.

- **On-campus Renewable Electricity:** Campuses will install additional on-site renewable electricity supplies and energy storage systems whenever cost-effective and/or supportive of campus carbon goals.

- **Off-campus Clean Electricity:** By 2025, each campus and health location will obtain 100% clean electricity. By 2018, the University's Wholesale Power Program will provide 100% clean electricity to participating locations

- **On-campus Combustion:** By 2025, at least 40 percent of the natural gas used for on-site combustion will be biogas.

Climate Protection

Each campus and the UC Office of the President will develop strategies for meeting the following UC goals:

- Climate neutrality from Scope 1 and 2 sources by 20253

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3 For definitions of Scopes 1, 2 and 3 emissions, see **Section 4.6.2.3** above.

- Climate neutrality from specific Scope 3 sources (as defined by the American College and University Presidents' Climate Commitment (ACUPCC) by 2050 or sooner

And at minimum, meet these following intermediate goals in pursuit of climate neutrality:

- Reducing GHG emissions to 1990 levels by 2020, pursuant to the California Global Warming Solutions Act of 2006.

Sustainable Transportation

The University recognizes that single-occupant vehicle (SOV) commuting is a primary contributor to commute GHG emissions and localized transportation impacts and sets the following goals:

- By 2025, each location shall strive to reduce its percentage of employees and students commuting by SOV by 10 percent relative to its 2015 SOV commute rates;

- By 2050, each location shall strive to have no more 40 percent of its employees and no more than 30 percent of all employees and students commuting to the location by SOV.

Recycling and Waste Management

The University's goal for diverting municipal solid waste from landfills is as follows:

- Reduce waste generation per capita to FY2015/16 levels by 2020;

- Reduce waste generation by 25% per capita from FY2015/16 levels by 2025;

- Reduce waste generation by 50% per capita from FY2015/16 levels by 2030; and

- The University will achieve zero waste by 2020 at all locations other than health locations.

American College and University Presidents Climate Commitment

The University of California has also signed the American College and University Presidents Climate Commitment (ACUPCC). Each signatory commits to completing an inventory of GHG emissions within one year, and to developing, within two years, an institutional plan to achieve climate neutrality as soon as possible. The commitment also includes specific interim actions, including requiring that new campus construction will be built to at least the US Green Building Council's LEED Silver standard or equivalent; purchasing Energy Star appliances; offsetting greenhouse gas emissions generated by institutional air travel; encouraging and providing access to public transportation; purchasing or producing at least 15 percent of the institution's electricity consumption from renewable sources; supporting climate and sustainability shareholder proposals at companies where the institution's endowment is invested; and adopting measures to reduce waste.

UC Santa Cruz Climate and Energy Strategy

The UC Santa Cruz Climate and Energy Strategy (CES) was prepared in 2016. The CES report resulted from an 18-month process led by campus staff in partnership with a team of consultants to develop a detailed plan for achieving UC Santa Cruz's two climate and energy goals:

- Achieve carbon neutrality by 2025 for Scopes 1 and 2 emissions, and
- Mitigate the impacts of the Cap and Trade regulation.

Through a series of desktop and onsite energy audits of fifty of the campus' most energy-intensive buildings and an evaluation of the campus' potential for development of solar photovoltaic and solar thermal projects, several hundred energy efficiency measures and nearly a dozen renewable energy projects were developed, providing detailed cost information on metrics such as energy and utility savings, labor and materials costs.

All energy measures were input into a custom-built techno-economic scenario analysis tool (CES Tool) developed specifically to support the CES**.** The CES Tool generates comprehensive metrics such as emissions savings, net present value, savings-to-investment ratio, cash flow and cost/metric ton of carbon dioxide equivalent (MTCO2e) through 2055 for various combinations of project implementation, capital buildout and procurement strategies. The CES Team developed 50+ scenarios that considered several variables including:

- Energy efficiency and renewable project implementation;
- Energy efficiency in new construction (using the Ten Year Capital Financial Plan as a baseline);
- Procurement of greenhouse gas mitigation and reduction instruments;
- Financing; and
- Timeframe for implementation.

The CES Team then analyzed the results and used the findings to inform the development of preferred strategies, recommendations, and next steps for implementation. Energy savings, GHG emissions savings, and financial returns ***were*** estimated for hundreds of projects, which are grouped into Tier 1 (high priority) and Tier 2 (longer term planning) projects based on their energy savings and financial payback. The CES project list is intended to be regularly updated to evaluate the feasibility of additional energy-saving measures, and is intended to be dynamic and updated as market conditions change and best practices evolve.

The findings of the analysis show that carbon neutrality at UC Santa Cruz could be achieved with a positive net-present-value due to the projected savings from onsite renewable energy and energy efficiency projects being greater than the additional costs of purchasing biogas, offsets and compliance instruments to achieve carbon neutrality, as defined by the initiative, and addressing regulatory requirements**.**

Similar to the CAPs for the all UC campuses, the CES provided recommendations, with a series of possible paths to meeting the UC Sustainable Practices Policy requirements, but does not create performance requirements that every project must comply with. However, most relevant to campus building projects is the recommendation that the Campus adopt a policy of net zero emissions for new buildings (Scope 1 and 2, so includes purchased electricity and on-site combustion). This would be accomplished by developing all electric buildings with (in order of preference):

- On-site renewable power generation
- All purchased electricity from renewable sources
- RECs for purchased electricity from non-renewable sources
- Offsets for on-site combustion sources

The CES has not been adopted; nor has it been used to develop an updated Climate Action Plan for the campus. However, many of the strategies identified in the CES have been incorporated into the Campus Sustainability Plan.

UC Santa Cruz Transportation Demand Management

The Campus employs an aggressive Transportation Demand Management (TDM) program that includes an extensive shuttle system, among other alternative transportation opportunities. Based on a Spring 2016 modal mix survey of the campus, about 66 percent of all passenger trips to the campus are made by means other than driving alone (UCSC 2017). Key components of UC Santa Cruz's existing TDM program include the following which are described in further detail in **Section 4.11, Traffic and Transportation**:

- Parking Demand Management
- Transit program
- Bicycle Shuttle Program
- Commuter Vanpool Program

- Emergency Ride Home Program

4.6.4 IMPACTS AND MITIGATION MEASURES

4.6.4.1 Significance Criteria

The impacts related to GHG emissions resulting from the implementation of the proposed project would be considered significant if they would exceed the following significance criteria, in accordance with Appendix G of the State CEQA Guidelines:

- Generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment; or
- Conflict with an applicable plan, policy or regulation adopted for the purpose of reducing the emissions of greenhouse gases.

The State CEQA Guidelines include Section 15064.4, which states that, when making a determination with respect to the significance of a project's GHG emissions, a lead agency shall have discretion to determine whether to: (1) Use a model or methodology to quantify greenhouse gas emissions resulting from a project, and which model or methodology to use; and/or (2) Rely on a qualitative analysis or performance-based standards. Section 15064.4 also states that a lead agency should consider the following factors when assessing the significance of the impact of GHG emissions on the environment: (1) The extent to which the project may increase or reduce greenhouse gas emissions as compared to the existing environmental setting; (2) Whether the project emissions exceed a threshold of significance that the lead agency determines applies to the project; and (3) The extent to which the project complies with regulations or requirements adopted to implement a statewide, regional, or local plan for the reduction or mitigation of GHG emissions.

Thresholds for Evaluation of Impacts under the First Criterion

The proposed project would result in GHG emissions both during construction and operations. A project's operational GHG emissions can result from two types of sources: (1) stationary sources such as generators, and (2) non-stationary sources which include area sources such as fireplaces, boilers and other combustion sources; mobile sources such as vehicles used by residents and employees associated with a project; the consumption of electricity and water; and the generation of wastewater and solid waste. Thresholds used in this EIR to evaluate the impact from these categories of sources are described below.

Threshold for Operational Emissions from Stationary Sources

As noted earlier in this section, MBARD has set forth an operational GHG emissions significance threshold for stationary sources in its 2016 *Guidelines for Implementing the California Environmental Quality Act*. As noted in the guidelines, a proposed stationary source project will not have a significant GHG impact, if operation of the project will emit less than 10,000 metric tons per year (MT/year) CO2e.

Threshold for Operational Emissions from Non-Stationary Sources

MBARD has not set forth significance thresholds for the evaluation of the GHG impact of projects that do not require a permit to operate from the Air District. Thus, per the practice of the Campus and the recommendation of MBARD (UCSC 2016), the following two of the three thresholds[4] that are set forth by the neighboring San Luis Obispo County Air Pollution Control District (SLOAPCD) are used in this EIR to evaluate the significance of the operational GHG emissions associated with the proposed project:

- A bright-line threshold of 1,150 MTCO2e/year, or
- An efficiency threshold of 4.9 MTCO2e/service person/year (where service persons are residents plus employees).

The SLOAPCD efficiency threshold is designed to reduce GHG emissions such that the AB 32 goal that 2020 emissions equal 1990 emissions is met. In 2015 and 2016, SB 350 and SB 32 were signed into law, which provided a mid-term target that the state's 2030 emissions be 40 percent below 1990 levels. Based on the current schedule, while the first phase of the project would be completed by 2019, the majority of the proposed housing would be constructed and occupied in 2022. Because the project's emissions would essentially occur in the years after 2022, in order to evaluate the project's impact, the Campus conservatively developed a new efficiency threshold that is consistent with the direction provided by SB 350 and SB 32. Using the existing efficiency threshold of 4.9 MTCO2e/person/year and the relationship between the GHG reduction targets set forth in AB 32 and SB 32/350, an efficiency metric for year 2025 was calculated at 3.9 MTCO2e/service person/year. In addition to the SLOAPCD efficiency threshold, this threshold was also used to evaluate the significance of the impact associated with the project's operational emissions.

4 The SLOAPCD guidelines set forth three thresholds. Two are reported above and used in this EIR; the third threshold is non quantitative and requires demonstration of compliance with a GHG reduction plan. The SLOAPCD guidelines state "Lead agencies may use any of the three options above to determine the significance of a project's GHG emission impact to a level of certainty."

Threshold for Emissions from Construction Activities

There are no thresholds put forth by the MBARD or SLOAPCD for evaluating the significance of a project's construction-phase GHG emissions (MBUAPCD 2016, SLOAPCD 2012). However, the South Coast Air Quality Management District (SCAQMD) has adopted an approach for assessing construction emissions that includes amortizing construction emissions over the life span of the project, defined as 30 years, then adding those emissions to the operational emissions (SCAQMD 2008). As stated below, that approach is used in this EIR and the impact of the project's total emissions (construction and operations) is evaluated using the efficiency threshold described above.

Thresholds for Evaluation of Impact under the Second Criterion

A project's impact relative to the second Appendix G criterion may be evaluated by demonstrating compliance with plans, policies, or regulations adopted by local governments to curb GHG emissions. As noted above in **Section 4.6.3.4**, MBARD's 2016 guidelines include the following threshold for evaluating a stationary source project's impact: "In accordance with the State CEQA Guidelines Section 15064.4(b)(3), the project complies with regulations or requirements adopted to implement a statewide, regional, or local plan for the reduction or mitigation of GHG emissions [such as, sources subject to the Cap-and-Trade requirements pursuant to Title 17, Article 5 (California Cap on Greenhouse Gas Emissions and Market-based Compliance Mechanisms)]." The threshold is set forth by the Air District specifically for evaluating a stationary source project's emissions relative to the second criterion under CEQA and does not apply to a non-stationary source project such as the SHW project.

Per the practice of the Campus, the project's compliance with campus plans and policies for controlling GHG emissions is evaluated below.

4.2.4.2 CEQA Checklist Items Adequately Addressed in the 2005 LRDP EIR or not Applicable to the Project

As the 2005 LRDP EIR predates AB 32 which initiated the practice of evaluating a project's GHG emissions impacts, GHG impacts are not evaluated in the 2005 LRDP EIR. Both the CEQA checklist items listed above as significance criteria are addressed in the following analysis.

4.6.4.3 Methodology

As noted above, CEQA guidelines require that the impact from a project's GHG emissions, emitted directly or indirectly, be evaluated. Direct emissions are those that are emitted on a project site whereas indirect emissions are those that are emitted off-site, such as those associated with vehicular traffic,

electricity generation, etc. The Office of Planning and Research has noted that lead agencies "should make a good-faith effort, based on available information, to calculate, model, or estimate… GHG emissions from a project, including the emissions associated with vehicular traffic, energy consumption, water usage and construction activities" (OPR 2017). Therefore, direct and indirect emissions were calculated for the project. Both construction phase and operational emissions were calculated.

GHG emissions were quantified using the California Emissions Estimator Model (CalEEMod). CalEEMod is a statewide land use emissions computer model designed to provide a uniform platform for government agencies, land use planners, and environmental professionals to quantify potential criteria pollutant and GHG emissions associated with both construction and operations from a variety of land use projects. The model is considered by the MBARD to be an accurate and comprehensive tool for quantifying air quality and GHG impacts from land use projects throughout California (CalEEMod 2018). As set forth in greater detail in **Section 4.2, Air Quality**, the project land use types and size, construction schedule, assumptions of construction equipment usage and truck trips, were input to CalEEMod.

4.2.4.4 LRDP EIR Mitigation Measures included in the Proposed Project

There are no LRDP EIR mitigation measures specifically focused on reducing GHG impacts from growth and development on the campus. However, as noted in **Section 4.2, Air Quality**, the 2005 LRDP EIR sets forth LRDP Mitigation AIR-6 to minimize construction emissions, and LRDP Mitigations AIR-2, and -7 to minimize operational emissions from all types of sources, including mobile, stationary, and area sources (see **Table 4.2-6** in **Section 4.2**). The proposed project would implement all of these mitigation measures, which would not only reduce the project's criteria pollutant and TAC emissions but would also reduce the project's GHG emissions.

4.6.4.5 Project Impacts and Mitigation Measures

SHW Impact GHG-1: Project construction and operation would generate greenhouse gas emissions, either directly or indirectly, that would not have a significant impact on the environment. (*Less than Significant*)

Construction GHG Emissions

Emissions associated with construction at the Hagar site would occur between spring 2019 and summer 2020. Emissions associated with construction at the Heller would occur from summer 2020 into fall 2023. Project construction activities include demolition, site preparation, grading, building construction, pavement and asphalt installation, landscaping and hardscaping, and architectural coatings. Based on the

result of CalEEMod modeling, approximately 3,138 $MTCO_2e$ of GHG emissions would be emitted during the approximately 4-year project construction period.

Neither the University nor any of the air districts, including MBARD, has set forth quantitative thresholds for the evaluation of construction-phase GHG emissions. However, the South Coast Air Quality Management District has adopted an approach for assessing construction emissions that includes amortizing construction emissions over the life span of the project, defined as 30 years, then adding those emissions to the operational emissions (SCAQMD 2008). Using this approach, the project's construction emissions were amortized over the 30-year life of the proposed project and added to the non-stationary source operational emissions below for purposes of impact evaluation.

Non-Stationary Source Operational GHG Emissions

Non-stationary sources of operational emissions associated with the proposed SHW project include (1) mobile sources, (2) area sources (use of consumer products, etc. by the residents of the project), (3) water conveyance and treatment, (4) solid waste hauling and disposal; and (5) electricity consumption. GHG emissions would also be associated with the operation of the MBR plants to treat wastewater on site. However, because wastewater would be treated on site and would not be discharged into the sanitary sewer system for treatment at the City's wastewater treatment plant, the emissions associated with the operation of the MBR plants would be lower than those that would result from off-site conveyance and treatment. Furthermore, the use of recycled water on site (and related reduction in use of potable water) would also reduce GHG emissions associated with the treatment and pumping of potable water.

Table 4.6-2, Annual Project GHG Emissions (Metric Tons), presents the results of the CalEEMod model analysis in terms of annual MTCO2e. As shown in **Table 4.6-2** below, operation of the project would generate approximately 3,088 MTCO2e/year at the Heller and Hagar sites combined. The net daily service population associated with the proposed project would be approximately 2,937 persons (see **Table 3.0-3** in **Chapter 3.0, Project Description**). The per capita emissions would be 1.09 MTCO2e/per capita/year, which would be well below the threshold of 3.9 MTCO2e/capita/year used in this EIR to evaluate the project's GHG impact.

Table 4.6-2
Annual Project GHG Emissions (Metric Tons)

Scenario	Year	Project Emissions (MTCO2e/year)
Operational Emissions	2023	3,088

Scenario	Year	Project Emissions (MTCO2e/year)
Amortized Construction Emissions		105
	Total	3,193
	Per Capita Emissions	1.09 MT/capita/year
	Current SLOAPCD Efficiency Threshold	4.9 MT/capita/year
	Estimated 2025 Efficiency Threshold:	3.9 MT/capita/year
	Exceed Threshold?	No

Source: Illingworth & Rodkin, 2018.

Comments received on the Draft EIR assert that the EIR uses a bright-line threshold and an efficiency threshold to evaluate the significance of the project's GHG emissions, and because of the seriousness of the impact of GHG emissions on global climate, the EIR should only use the bright-line threshold to evaluate the impact. The SLOAPCD guidelines recommend the use of either threshold, and therefore, the EIR appropriately uses the efficiency threshold. As the analysis above shows, the estimated per capita emissions for the project are substantially below the threshold.

Commenters also assert that either the per capita emissions or the total emissions per year, the project's cumulative impact cannot be considered de minimus, and should be considered cumulatively considerable. The MBARD 2016 CEQA guidelines reiterate that "Per Section 15064.7 of the CEQA Guidelines, a threshold is an identifiable quantitative, qualitative or performance level of particular environmental effect, non-compliance with which means the effect will normally be determined to be significant and compliance with normally means the effect will be determined to be less than significant." A proposed project will not have a significant air quality effect on the environment, if the project emissions are below the thresholds set forth in the MBARD or other applicable guidelines. Furthermore, the MBARD 2016 CEQA guidelines state that "Global climate change is a cumulative impact; a project contributes to this impact through its incremental contribution of greenhouse gas (GHG) emissions combined with the cumulative increase of all other sources of GHGs. The Air District's GHG threshold is defined in terms of carbon dioxide equivalent (CO2e), a metric that accounts for the emissions from various GHGs based on their global warming potential. If annual emissions of GHGs exceed these threshold levels, the proposed project would result in a cumulatively considerable contribution of GHG emissions and must implement mitigation measures." Finally, practically all air districts throughout the state, including MBARD, SLOAPCD, and the BAAQMD, support the use of a quantitative threshold, such as the threshold used in this EIR, to evaluate the contribution a project would make to global climate change. Based on the threshold and methodology recommended by the local Air District, the project's

impact would be less than significant, and the project's contribution to the global cumulative impact would not be cumulatively considerable.

Stationary Source Operational Emissions

In addition to the emissions from non-stationary sources noted above, the project would result in GHG emissions from the routine testing and maintenance of seven emergency generators located in each building of the Heller site that would be included in the project. Pursuant to LRDP Mitigation AIR-5A, the Campus limits the testing of all generators on the campus to 15 minutes of testing every 6 weeks. Based on this frequency of testing, generator emissions were computed to be 2 MTCO2e/year. If the testing emissions from the generators are compared to the MBARD's significance threshold of 10,000 MT/year for stationary sources, the emissions would be substantially below the threshold and therefore less than significant.

In summary, both the construction-phase and operational GHG emissions that would result from project implementation would not exceed applicable significance thresholds, and the impact would be less than significant.

Mitigation Measures: No mitigation is required.

SHW Impact GHG-2: The proposed project would not conflict with state law, UC Policy on Sustainable Practices, or the UC Santa Cruz Climate Action Plan. (*Less than Significant*)

EO S-3-05, AB 32, SB 350, and SB 32

AB 32 established the goal for the reduction of California's GHG emissions to 1990 levels by 2020. Prior to that, Executive Order S-3-05 established the goal of reducing California's emissions 80 percent under 1990 levels by 2050. In 2015 and 2016, SB 350 and SB 32 were signed into law, establishing the state's mid-term target for 2030 emissions to be 40 percent below the 1990 emissions.

Following the passage of AB 32, some of regional air districts in the state, such as the SLOAPCD and the Bay Area Air Quality Management District, based their planning and regulations on the requirements of AB 32, which included a reduction of GHG emissions to 1990 levels by 2020. As noted earlier in this section, MBARD has not put forth planning guidance for lead agencies within the NCCAB to use to evaluate a project's GHG impact based on consistency with AB 32. However, MBARD has recommended

the use of thresholds and guidance provided by the neighboring SLOAPCD. The SLOAPCD set forth the GHG significance thresholds specifically to meet AB 32 requirements within its jurisdiction, and so plans and projects that meet those thresholds can be assumed to meet the requirements of AB 32. The per capita GHG emissions from the proposed project of 1.09 MTCO2e/per capita/year would be below the SLOAPCD efficiency threshold of 4.9 MTCO2e/per capita/year that applies to projects through 2020. Therefore the proposed project would not conflict with AB 32.

As the SLOAPCD efficiency threshold described above was designed to assist that air district attain the 2020 target pursuant to AB 32, and was not designed to assist achieve the new mid-term target for 2030 emissions set forth by SB 350 and SB 32, as discussed above under **SHW Impact GHG-1,** UC Santa Cruz conservatively developed a 2025 efficiency threshold that is aligned with the mid-term target. As the analysis above shows, the project's per capita emissions would also be well below the 2025 threshold of 3.9 MTCO2e/per capita/year, and the project would not be in conflict with the future GHG reduction goals per SB 350 and SB 32.

UC Sustainable Practices Policy

The UC Sustainable Practices Policy requires each campus to develop strategies for meeting the University's goals in nine areas of sustainable practices. These goals apply to UC Santa Cruz as a whole, and UC Policy does not require each new project to meet the goals. Nonetheless, the proposed project would not conflict with goals set forth in the Policy.

The University requires all UC projects to achieve a minimum of a Silver rating under United States Green Building Council's (USGBC) Leadership in Energy and Environmental Design (LEED) Building Design and Construction (BD+C) v4.0 Green Building Rating System (the "LEED Rating System"). The project is targeting to achieve a LEED Platinum certification but will achieve a minimum of Gold certification. The proposed project would include the following sustainable features for each site that would provide greater energy, water and wastewater efficiencies than factored into the calculation of the reported GHG emissions:

Heller Site

- All buildings would be designed and constructed to be energy efficient. The exterior envelope would be optimized to improve thermal isolation. The exterior walls and roofs would have enhanced insulating qualities. High-performance glass would be used to promote daylighting and passive solar heat gain in the winter without excessive use of glazing. Horizontal sun shades at south-facing elevations, and vertical sun shades at unshaded west-facing elevations would be installed to reduce solar heat gains during the summer and allow passive solar heating during winter months.

- The general lighting in the buildings would be accomplished through a combination of daylighting and general artificial lighting. In areas of special function, specialty lighting would be utilized. Light fixtures and lighting system would be selected based on performance and aesthetics.

- The student housing units would be provided with heating-only mechanical systems. Ventilation would be provided by unit exhaust with makeup air through trickle vents in the exterior wall. The units would also be provided with operable windows to provide natural ventilating and passive cooling whenever conditions are appropriate. Cooling would be provided only for certain spaces such as main electrical rooms.

- All space and water heating systems would operate on electricity. To minimize greenhouse gas emissions, no natural gas would be utilized on the project site except as fuel in emergency generators.

- Roof-top photovoltaics would be included in Buildings 1 through 5 to provide electricity to the project.

- Wastewater would be treated in an on-site membrane bioreactor (MBR) plant to generate recycled water to be used for toilet flushing and irrigation, thereby minimizing the project's demand for potable water and eliminating wastewater conveyance and treatment at the City's wastewater treatment plant.

- High efficiency electrical and water fixtures and appliances would be included in the proposed housing.

- The project would include adequate facilities to encourage recycling and composting, and minimization of solid waste that would need landfill disposal.

- A minimal amount of vehicle parking would be provided to discourage use of personal vehicles by the residents.

- Bicycle parking would be provided throughout the project site to encourage bicycle use.

Hagar Site

- The street network will be designed to encourage multi-model circulation.

- Climate-appropriate plant materials that require less irrigation will be used.

- Wastewater would be treated in an on-site MBR plant to generate recycled water to be used for toilet flushing and irrigation, thereby minimizing the project's demand for potable water and eliminating wastewater conveyance and treatment at the City's wastewater treatment plant.

- The project will also seek to utilize renewable sources of energy including solar PVs, sewer heat recovery, and water recycling.

- Low-flow water fixtures, energy star appliances, high-efficiency irrigation systems, high-performance exterior building envelopes, insulated glazing, LED lighting, and natural ventilation will also be utilized.

The buildings would meet the energy performance targets required by the UC Sustainable Practices Policy and include many features to minimize energy use and minimize Scope 1, 2, and 3 emissions. Furthermore, the proposed project would not result in substantial emissions from the use of automobiles. This is because students living in the proposed on-campus housing would walk, ride a bike or take a UC Santa Cruz shuttle to travel between the project site, classes, and other campus facilities. In addition, the project would reduce daily trips compared to existing conditions as well as the no project scenario because students who would otherwise live off campus and make trips to the campus would instead live on campus. Additionally, wastewater treated at the proposed MBR plants would be pumped into a recycled water main and distribution system ("purple" pipes) and conveyed throughout the Heller and Hagar site development to provide water for toilet flushing and landscape irrigation. Use of this recycled water system would minimize potable water usage. The project would also include adequate facilities to encourage recycling and composting, and minimization of solid waste that would need landfill disposal.

UC Santa Cruz Climate and Energy Strategy

The UC Santa Cruz CES is the Campus' equivalent of a Climate Action Plan (CAP). Similar to the CAPs for the all UC campuses, the CES provided recommendations, with a series of possible paths to meeting the UC Sustainable Practices Policy requirements, but does not create performance requirements that every project must comply with. However, most relevant to campus building projects, such as SHW project, is the recommendation that the Campus adopt a policy of net zero emissions for new buildings (Scope 1 and 2, so includes purchased electricity and on-site combustion). As noted above, this would be accomplished by developing all electric buildings with either on-site renewable power generation; or all purchased electricity from renewable sources; or RECs for purchased electricity from non-renewable sources; or offsets for on-site combustion sources.

The proposed project will meet a minimum of LEED Gold certification and is actually targeting to achieve LEED Platinum certification. Therefore, the buildings are being designed to be highly energy efficient. In addition, at both sites, the proposed housing includes on-site renewable power generation using photovoltaic panels. Therefore, the project would not conflict with the UC Santa Cruz CES.

In summary, the proposed project would not conflict with the applicable laws, plans and policies adopted for the purpose of reducing the emissions of GHG emissions. The impact would be less than significant.

Mitigation Measures: No mitigation is required.

4.6.5 PORTER AND RACHEL CARSON DINING FACILITIES EXPANSION PROJECT IMPACTS AND MITIGATION MEASURES

Environmental Setting

The area for the dining facilities expansion is currently undeveloped land and there are no existing sources of GHG emissions on the expansion area.

Impacts and Mitigation Measures

DF Impact GHG-1: The proposed dining facilities project would not generate greenhouse gas emissions, either directly or indirectly, that would have a significant impact on the environment, nor would the proposed trail conflict with any applicable plans or policies for reducing greenhouse gas emissions. (*Less than Significant*)

GHG Emissions

As discussed in **Section 3.0, Project Description**, the proposed improvement at the Porter College Dining Hall is an expansion of the seating area to the south of the existing dining area, over an approximately 0.12-acre area. The proposed improvements at Rachel Carson Dining Hall include a new kitchen, servery, and additional seating. The additional seating may be provided in a second floor dining area above the existing dining area or by extending the existing dining area to the south. The dining facilities expansion project would involve minimal grading and excavation .All cut and fill material would be balanced on-site and no additional haul trips would be required. Given the scale and nature of the construction activities, and the small number of construction equipment and vehicles that would be used, construction would result in minimal GHG emissions, which would not be substantial enough to result in a significant GHG impact.

The dining facilities expansion project would expand dining areas and a kitchen, adding less than 10,000 square feet of building space. It would not increase the campus population and therefore would not increase vehicle trips. The project's emissions would not, by themselves or in combination with the GHG emissions of the SHW project, exceed the threshold for non-stationary source emissions set forth above. The impact from GHG emissions from project operations would be less than significant.

Conflict with Plans and Regulations

Construction and operation of the dining facilities would not generate substantial GHG emissions and thus, the proposed dining facilities project would not conflict with AB 32 or other state laws and regulations, as well as the UC Sustainable Practices Policy related to GHG emissions. The impact would be less than significant.

Mitigation Measures: No mitigation is required.

4.6.6 CUMULATIVE IMPACTS AND MITIGATION MEASURES

SHW Impact C-GHG-1: The proposed project would not result in a significant cumulative GHG impact. (*Less than Significant*)

As the impact from a project's GHG emissions is essentially a cumulative impact, and the methodologies and thresholds applied in the analysis presented above are designed to assess the cumulative significance of the project's GHG emissions, the analysis presented above provides an adequate analysis of the proposed project's cumulative impact related to GHG emissions. Based on the analysis above, the proposed project would result in a less than significant cumulative impact.

Mitigation Measures: No mitigation is required.

4.6.7 REFERENCES

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