Draft Technical Report

for the

California Northstate University Medical Center Campus

Greenhouse Gas Emissions Analysis under Assembly Bill 900

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LIST OF ABBREVIATIONS

CalEEMod	California Emissions Estimator Model
CalRecycle	California Department of Resources Recovery and Recycling
CAPCOA	California Air Pollution Control Officers Association
CARB	California Air Resources Board
CEQA	California Environmental Quality Act
CH_4	methane
CNU	California Northstate University
CO_2	carbon dioxide
CO_2e	carbon dioxide equivalent
EDLP	Environmental Leadership Development Project
EV	electric vehicle
GHG	greenhouse gas
IPCC	Intergovernmental Panel on Climate Change
kWh	kilowatt-hour
LEED	U.S. Green Building Council's Leadership in Energy and Environmental Design
LTO	landing and take-off
$MTCO_2e$	metric tons of carbon dioxide equivalent
MWh	megawatt-hour
N_2O	nitrous oxide
OPR	Governor's Office of Planning and Research
PG&E	Pacific Gas and Electric Company
PRC	Public Resources Code
RPS	Renewables Portfolio Standard
SMAQMD	Sacramento Metropolitan Air Quality Management District
SMUD	Sacramento Municipal Utility District
VMT	vehicle miles traveled

1 INTRODUCTION

Ascent Environmental (Ascent) is conducting a comprehensive greenhouse gas (GHG) emissions assessment for the California Northstate University (CNU) Medical Center Campus Project (Project) to demonstrate that the Project meets the GHG requirements of the Jobs and Economic Improvement Through Environmental Leadership Act (the Act) (Public Resources Code [PRC] Section 21178 et seq.). The Governor's Office of Planning and Research (OPR) has provided approved guidelines for submitting applications for streamlined environmental review pursuant to the Act. With respect to GHG emissions, a Project must demonstrate to the California Air Resources Board (CARB) that it would not result in any net additional GHGs including GHG emissions from employee transportation in accordance with PRC Section 21183(c). The GHG emissions associated with construction of the Project are also to be considered in the analysis.

This submittal describes the methodology used to estimate the GHG emissions from baseline and Project conditions and describes the methodology used to quantify GHG emission reductions from Project design features and mitigation measures.

1.1 ASSEMBLY BILL 900

In September 2011, Governor Brown signed the Act, which required the Governor to establish procedures for applying for streamlined environmental review under the California Environmental Quality Act (CEQA) for projects that meet certain requirements. OPR has provided approved guidelines for submitting applications for streamlined environmental review pursuant to the Act. With respect to GHG emissions, a Project must demonstrate that it would not result in any net additional GHGs, including GHG emissions from employee transportation in accordance with PRC Section 21183(c). For purposes of PRC Section 21183(c), the following process applies, as quoted from OPR:

a. The applicant shall submit electronically to AB900@arb.ca.gov a proposed methodology for quantifying the Project's net additional greenhouse gas emissions. The Air Resources Board will review and comment on the methodology, at its discretion, within 30 days of submission.

b. At the same time, the applicant shall submit to AB900@arb.ca.gov, documentation that the Project does not result in any net additional greenhouse gas emissions. The documentation must at least quantify:

i. Both direct and indirect greenhouse gas emissions associated with the Project's construction and operation, including emissions from the Project's projected energy use and transportation related emissions: and

ii. The net emissions of the Project after accounting for any mitigation measures that will be monitored and enforced consistent with PRC Section 21183(d).

c. Within 60 days of receiving the documentation in section b above, the Board will determine whether the conditions specified in PRC Section 21183(c) has been met or, if more time is needed, notify the applicant of the expected completion date.

d. The Board will determine and report to the Governor in writing that a Project does not result in any net additional emissions of GHGs if the Project demonstrates through a combination of Project design features, compliance with (or exceeding minimum requirements of) existing regulations, and mitigation that it would result in zero additional GHG emissions.

2 PROJECT DESCRIPTION

2.1 PROJECT LOCATION AND SETTING

The Project site consists of approximately 24 acres along the western boundary of the City of Elk Grove (City) in Sacramento County. The Project site consists of 12 parcels (assessor parcel numbers 132-2480-001, -002, -003, -004, -005, -007, -008, -010, -011, 132-2160-001, -002, 132-0460-076) and is bordered by Elk Grove Boulevard to the north, Interstate 5 to the west, West Taron Drive to the east, and the Laguna Stone Lake subdivision to the south. The Project location is shown in Figure 1). The area is fully developed except one approximately 0.5-acre undeveloped parcel on the southwest corner of Riparian Court and West Taron Drive.

2.2 EXISTING CONDITIONS

The Project site is currently occupied by a total of nine structures that encompass a total of 282,246 square feet of building space. This includes the 109,800-square-foot, 2-story School of Medicine building at 9700 West Taron Drive, a 76,000-square-foot office building at 9650 West Taron Drive currently occupied by All Data, and seven additional buildings comprising 2501 through 2619 West Taron Drive currently occupied by a number of different uses, including eating establishments, a brewery, an animal hospital, the CNU Psychology College, and other commercial and retail uses. A gas station, fast-food restaurants, and a church are adjacent to the site. Roadway access to the Project site is provided from West Taron Drive and Riparian Drive.

2.3 PROPOSED PROJECT

Development of the proposed CNU Medical Center Campus would be guided by its District Development Plan, which would provide for overall site plan approval and establish development elements including, but not limited to, parking, landscaping, pedestrian improvements, and other features that are common across the site. Development would be completed over three phases.

The Project would include the demolition of existing buildings and the construction of the various uses over three phases. Under Phase 1, the Project would include construction of a 596,790-square-foot hospital with 250 beds. The proposed hospital would include an 8-story 150-patient-bed tower atop a 4-story 100-patient-bed main hospital building with one basement level providing underground parking for up to 230 vehicles using a semi-automatic stacked parking system. A 22,850-square-foot central plant is also proposed under Phase 1 of development. This facility would be two stories, including a basement parking level with 80 spaces, and would house support equipment for the hospital and a 15,000-square-foot exterior mechanical yard. A total of 1,426 parking spaces would be provided under Phase 1 of development. This would consist of 1,116 surface parking spaces and 310 structure parking spaces to be provided in the lower levels of the hospital and central plant buildings. This phase would require the demolition of the buildings and parking lots occupying 2501, 2505, 2513, and 2525 West Taron Court, and part of 9650 West Taron Drive.

Phase 2 of the proposed Project would include a second 150-patient-bed tower atop the main hospital, an out-patient clinic, a medical office building, and the first of two public parking structures (Parking Structure 1). The additional 8-story patient-bed tower would be 103,210 square feet and would add 150 beds for a total of 400 beds at the hospital. The 168,500-square-foot out-patient clinic would include four stories above ground and a basement floor parking level with 170 parking spaces. This building would contain outpatient medical services and ambulatory care. The 100,000-square-foot medical office building would include five stories above ground and contain out-patient medical clinics and hospital administration. Parking Structure 1 would be 257,000 square feet and include four stories above ground and one basement level. The ground floor would include 51,400 square feet of retail, medical offices, and other supporting uses. The remaining three floors and basement level would provide parking for 1,500 vehicles. A semi-automatic stacked parking system would be used on the three above-ground parking levels and the basement level would be standard parking. This phase would require demolition of the buildings and parking lots occupying 2521 West Taron Court and part of 9650 West Taron Drive.

# ON MAP	ADDRESS	APN #
1	9700 West Taron Dr.	132-0460-076
2	9650 West Taron Dr.	132-2160-001
3	n/a	132-2160-002
4	2615 West Taron Dr.	132-2480-011
5	2619 West Taron Dr.	132-2480-010
6	n/a	132-2480-007
7	2521 West Taron Ct.	132-2480-008
8	n/a	132-2480-005
9	2501 West Taron Ct.	132-2480-004
10	2505 West Taron Ct.	132-2480-001
11	2509/2513 West Taron Ct.	132-2480-002
12	2525 West Taron Ct	132-2480-003

Project Boundary
Parcel Boundary
Existing Building
Phase 1 Demolition
Phase 2 Demolition
Phase 3 Demolition

0 100 250 FEET

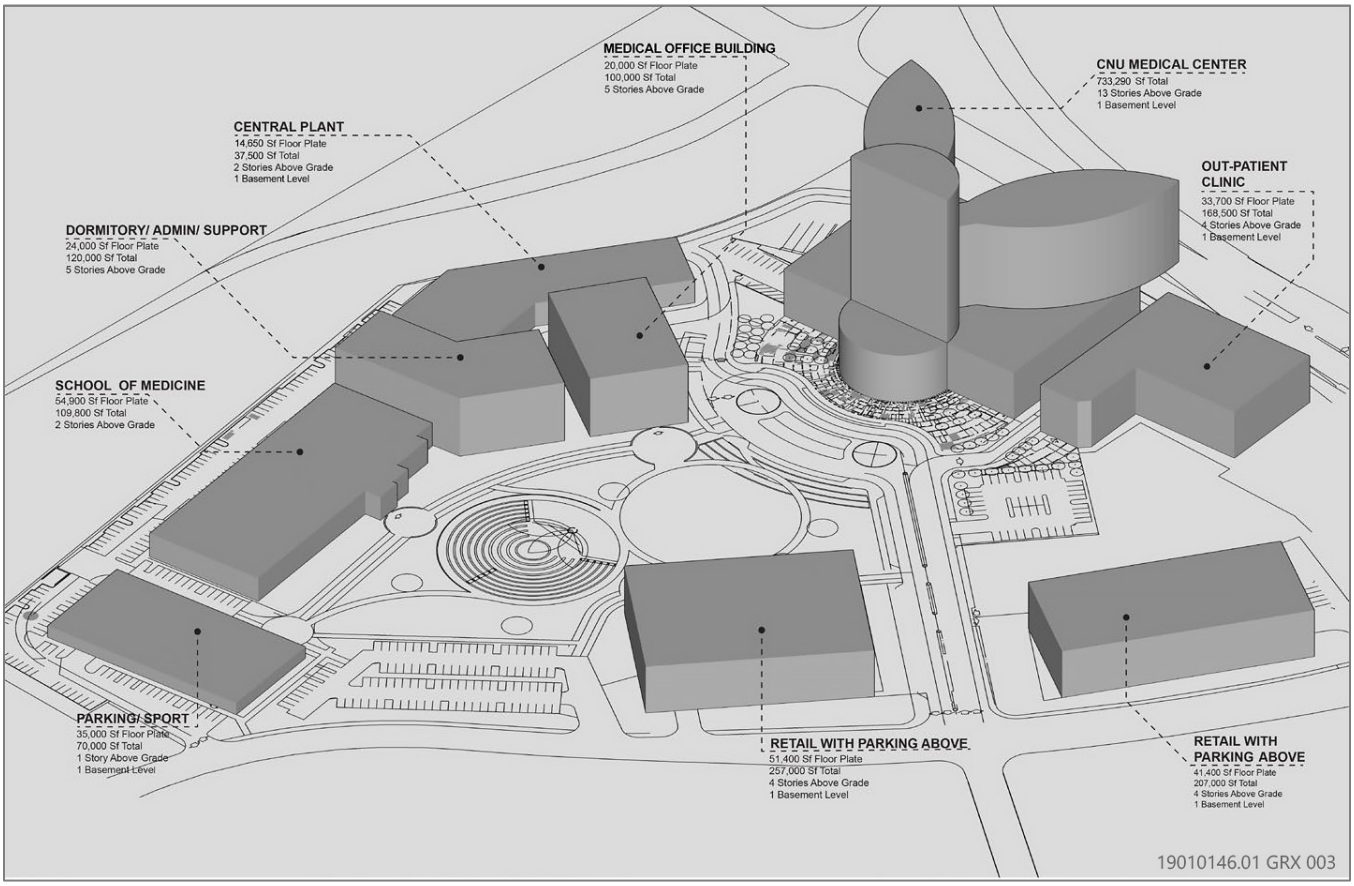
Base Map: Cal-Atlas
19010146.01 GRX 002

Source: Image provided by Fong & Chan Architects in 2019

Figure 1 California North State University Demolition Phases

Lastly, Phase 3 of construction would incorporate a second parking structure (Parking Structure 2), a dormitory, and a parking structure for medical student use with sports facilities on the roof. Parking Structure 2 would be 207,000 square feet and include four stories above ground and one basement level. The ground floor would include approximately 41,400 square feet of retail, medical offices, and other supporting uses. The remaining three floors and basement level would provide parking for 1,000 vehicles. A semi-automatic stacked parking system would be used on the three above-ground stories and the basement level would be standard parking. The proposed 120,000 square-foot, 5-story dormitory is also proposed under Phase 3, to be located in the southern portion of the Project site, adjacent to the school facilities (the 109,800 square-foot 2-story school building would remain onsite). A 70,000 square-foot structure intended to provide parking and recreational facilities for medical students would also be constructed under this phase. This student parking structure would include one story above-ground and a basement level that would accommodate 200 standard parking spaces. The roof would be occupied by basketball, tennis, and volleyball courts. This phase would require demolition of the buildings and parking lots occupying 2615 and 2619 West Taron Court, and 9700 West Taron Drive.

The Project would also include streetscape modifications to Riparian Court (also known as West Taron Court), modifications to existing parking areas, driveway improvements to West Taron Drive, and construction of new landscaped public gathering areas. The site plan for the proposed Project is shown in Figure 2.



Source: Image provided by Fong & Chan Architects in 2019

Figure 2 CNU Center Final Buildout Massing

The proposed Project is being designed to achieve U.S. Green Building Council's Leadership in Energy and Environmental Design (LEED) Gold version 4 certification for Healthcare. For details about how the Project will achieve this certification, refer to Attachment A.

Land uses for the proposed Project and existing conditions are shown in Table 1 below.

Table 1 Land Uses Associated with Existing Site and Proposed Project

Land Use	Existing Site Size	Proposed Project Size	Unit
General Office Building	76,000	24,000	Square feet
Retail	58,946	92,800	Square feet
Hospital	0	733,290	Square feet
Central Plant	0	22,850	Square feet
Out-Patient Clinic	0	168,500	Square feet
Medical Office Building	0	100,000	Square feet
Dormitory	0	96,000	Square feet
Enclosed Parking with Elevator	0	680	Spaces
Unenclosed Parking with Elevator	0	2,500	Spaces
Mechanical Yard	0	15,500	Square feet

Source: Data compiled by Ascent Environmental in 2019

3 GREENHOUSE GAS EMISSIONS

3.1 CONSTRUCTION EMISSIONS

The Project would demolish and remove five of the nine existing structures from the Project site. The existing uses will be vacated prior to construction and all uses would cease to operate. Construction of the Project would result in one-time GHG emissions during the period of construction activity. Construction of the Project would be completed over three phases lasting approximately 10 years total, with emissions estimated for each year of construction. After the three phases of construction are completed, the Project would become fully operational in 2030. Therefore, Project-generated construction emissions would occur contemporaneously with segmented Project operational emissions, as detailed in the construction schedules for each phase below.

Phase 1 of construction would commence with the demolition of the buildings located at 2501, 2505, 2509/2513, and 2525 West Taron Court. Construction of Phase 1 is expected to begin in May 2020 and end in November 2022. Structural components of Phase 1 will include a hospital building of 596,790 square feet in size, 13 stories tall, with a basement level of 230 parking spaces; a campus central plant of 22,850 square feet with 80 parking spaces at the basement level; and a mechanical yard of 15,500 square feet in size.

Phase 2 demolition and construction would succeed Phase 1 and is expected to begin in December 2023 and end in October 2025. The existing buildings to be demolished include buildings at 2521 and 9650 West Taron Court. Building construction would include the patient bed tower of 103,210 square feet in size; the out-patient clinic of 134,800 square feet in size and four stories tall with 170 parking spaces at the basement level; the medical office building of 100,000 square feet in size and five stories tall; and Parking Structure 1 of 257,000 square feet in size and 1,500 parking spaces.

Phase 3 demolition and construction would follow Phase 2 and is anticipated to begin December 2026 and end in October 2029. The remaining buildings to be demolished on the Project site include buildings at 2615 and 2619 West Taron Court. Phase 3 building construction would include Parking Structure 2 with 1,000 parking spaces; a 150-unit dormitory building; a parking and sports structure approximately 70,000 square feet in size and 200 parking spaces; and a 24,000-square-foot expansion of the existing School of Medicine building for administrative services.

To be consistent with other Environmental Leadership Development Projects (ELDP), Project-generated construction emissions were estimated on an annual, calendar year, basis to estimate GHG emissions generated during the construction phases. To meet Project application standards, the Project's emissions are required to be offset fully to meet the requirements of net zero increase in GHG emissions. Based on the construction schedule provided by the applicant, construction of Phase 2 would occur during operation of Phase 1, and construction of Phase 3 would occur during operation of Phases 1 and 2.

Table 2 shows the Project's anticipated construction schedule by phase and subphases. For details about construction subphases, refer to Attachment B.

Table 2 Project Construction Schedule

Phase	Start Date	End Date
1	5/1/2020	11/30/2022
2A	12/1/2023	12/31/2024
2B	4/1/2024	3/31/2025
2C	12/1/2023	5/30/2025
2D	5/1/2025	10/31/2025
3A	12/1/2026	11/30/2027
3B	11/1/2027	12/29/2028
3C	1/1/2029	10/31/2029

Source: Fong & Chan Architects 2019

Construction emissions were estimated using the California Emissions Estimator Model (CalEEMod) Version 2016.3.2, a computer software developed by the California Air Pollution Control Officers Association (CAPCOA). Quantifying Project-generated GHG emissions with CalEEMod is recommended by the local Sacramento Metropolitan Air Quality Management District (SMAQMD). CalEEMod construction emissions modeling is based on data from CARB's OFFROAD2011 off-road equipment emissions tool and EMFAC2014 on-road vehicle emissions tool. CalEEMod was manually programmed with Project-specific data provided by the applicant such as construction activities and phasing, number of haul truck trips, amount of excavated material, and number of construction workers by phase. Where construction information was not available from the Applicant, CalEEMod default values were used. For details on construction modeling inputs, refer to Attachment B.

Each of the three construction phases would include demolition, site preparation, excavation, building construction, paving, and architectural coating. During demolition, building waste would be hauled off-site. Site preparation and excavation phases would involve the import and export of soil. Phases 2 and 3 were separated into several subphases based on the order in which buildings are anticipated to be constructed. For details on construction phasing, refer to Attachment B.

Table 3 Project Land Uses by Construction Phase

Land Use	Phase 1	Phase 2	Phase 3	Unit
General Office Building	0	0	24,000	Square feet
Retail	0	51,400	41,400	Square feet
Hospital	596,790	103,210	0	Square feet
Central Plant	22,850	0	0	Square feet
Out-Patient Clinic	168,500	0	0	Square feet
Medical Office Building	0	100,000	0	Square feet
Dormitory	0	0	96,000	Square feet
Enclosed Parking with Elevator	310	170	200	Spaces
Unenclosed Parking with Elevator	0	1,500	1,000	Spaces
Mechanical Yard	15,500	0	0	Square feet

Source: Data compiled by Ascent Environmental in 2019

3.1.1 Emissions from Diesel-Fueled Construction Equipment

Emissions associated with diesel-fueled construction equipment were estimated using CalEEMod Version 2016.3.2, in accordance with SMAQMD recommendations. Emissions were calculated based on the number and type of equipment, the length of each construction phase, and the hours per day each piece of equipment would be used. The amount and types of diesel-fueled equipment was based on the land uses input into the model as shown in Table 3 above. CalEEMod's default equipment list was used based on these land uses, which is derived from a construction survey conducted by South Coast Air Quality Management District. All construction equipment used in the modeling was assumed to have CalEEMod default diesel engines without any mitigation.

Emissions associated with the use of diesel-fueled equipment include only running exhaust emissions because starting and evaporative emissions are considered to be de minimis (CAPCOA 2016:A-7). The running exhaust emissions are based on CARB's OFFROAD2011 methodology, as follows:

$$Emissions\ (MTCO_2e) = \sum_i (EF_i\ x\ Pop_i\ x\ AvgHp_i\ x\ Load_i\ x\ Activity_i\ x\ GWP_i)$$

Where:

EF = emission factor in grams per brake horsepower-hour (g/bhp-hr) as processed from OFFROAD2011

Pop = population, or the number of pieces of equipment

AvgHp = maximum rated average horsepower

Load = load factor

Activity = hours of operation

i = equipment type

GWP_i = global warming potential of each GHG pollutant

GHG emissions associated with diesel-fueled equipment were estimated by construction phase and year based on the phasing schedule provided by the Project applicant. Refer to Attachment B for additional details on construction phasing. Estimated emissions are shown in Table 4 below.

3.1.2 Emissions from On-Road Construction Trips

On-road construction trips include those of construction workers for commuting and haul trucks exporting and delivering materials to the Project site. GHG emissions were quantified based on the number of trips, distance of trips, and EMFAC2014 emission factors that are included in CalEEMod. The number of trips is based on the anticipated number of construction workers for each phase of construction and the number of haul truck trips for each phase of construction based on the amount of demolished and excavated material to be transported off-site, as well as building materials imported to the site. For details on the maximum number of construction workers and haul trips by phase, refer to Attachment B. Default trip lengths for haul trucks and worker commutes from CalEEMod were used to quantify construction-generated vehicle miles traveled (VMT). Worker commute vehicles were assumed to be a default mix provided by CalEEMod of 50 percent light-duty autos, 25 percent light-duty truck type 1, and 25 percent light-duty truck type 2. Haul trucks were assumed to be all heavy heavy-duty trucks. Exhaust running and running loss emissions were estimated in CalEEMod using EMFAC2014 (as contained in CalEEMod) and direct methane emission factors provided by CARB for CalEEMod as follows:

$$Emissions\ (MTCO_2e) = \left(VMT\ x\ EF_{running\ pollutant}\right)\ x\ GWP_i$$

Where:

VMT = vehicle miles traveled

$EF_{running\ pollutant}$ = emission factor for running emissions from EMFAC2014

GWP_i = global warming potential of each GHG pollutant

Evaporative, starting, and idling emissions were also estimated in CalEEMod by multiplying the number of trips by the respective emission factor for each GHG pollutant as provided in EMFAC2014.

3.1.3 Summary of Construction Emissions

The total construction-generated emissions are shown by source and by year in Table 4 below. The total GHG emissions for Project construction from off-road construction equipment and on-road travel over the 10-year buildout period would be 8,273 metric tons of carbon dioxide equivalent ($MTCO_2e$).

Table 4 Construction-Generated GHG Emissions by Source ($MTCO_2e$)

Construction Year	Off-Road Construction Equipment	On-Road Travel[1]	Total GHG Emissions
2020	607	453	1,267[2]
2021	417	1,394	1,810
2022	30	1,215	1,245
2023	71	15	86
2024	709	1,267	1,976
2025	292	495	787
2026	39	8	47
2027	290	210	500
2028	141	180	321
2029	134	98	232
Total	**2,732**	**5,334**	**8,273**

Notes: GHG = greenhouse gas; $MTCO_2e$ = metric tons of carbon dioxide equivalent; GHG = greenhouse gas.

[1] Includes worker commute trips and haul truck trips.

[2] Includes loss of carbon sequestration from removal of 292 trees.

For calculation details, refer to Attachment B.

Source: Data compiled by Ascent Environmental in 2019

3.2 OPERATIONAL EMISSIONS

Operation of the existing uses and Project uses results in annual GHG emissions from mobile sources, building energy use, water demand and wastewater treatment, and solid waste generation. The Project's annual, calendar year, operational emissions were compared to the baseline annual operational GHG emissions to determine the net change in GHG emissions. Emissions were estimated for a 30-year land use Project lifetime.

Operational emissions were estimated using a variety of sources and models. The CalEEMod (Version 2016.3.2) software was used to estimates emissions from water and wastewater, solid waste disposal, and area sources such as landscaping equipment. Operational GHG emissions were estimated using Project-specific information, where available, and default values in CalEEMod based on the Project's location, size, and land use type. Mobile source emissions associated with on-road VMT was estimated using EMFAC2017 emission factors for the default fleet mix in Sacramento County for each applicable year (i.e., existing emissions in 2020 and Project-generated emissions by phase in 2023, 2026, and 2030) and Project-specific VMT provided in Appendix B. Helicopter emissions were calculated using Climate Registry emission factors and project-specific data. Energy-related emissions associated with electricity, natural gas, and diesel fuel were estimated using utility-specific and Climate Registry emission factors.

Operational emissions are shown in terms of carbon dioxide equivalents (CO_2e). The CO_2e metric translates each GHG to an equivalent volume of carbon dioxide (CO_2) by weighing its relative global warming potential (GWP). Per the Intergovernmental Panel on Climate Change's (IPCC's) Fourth Assessment Report, methane (CH_4) and nitrous oxide (N_2O) are approximately 25 and 298 times more potent, respectively, than CO_2 in their abilities to trap heat in the atmosphere (IPCC 2007). The GHG emissions quantified herein use the IPCC's Fourth Assessment Report values to maintain consistency with the statewide GHG emissions inventory prepared by CARB.

3.2.1 Existing Site Emissions

Emissions associated with land uses currently operating at the Project site were quantified by Project phase for buildings which would be demolished in each Phase. Under Phase 1, the buildings at 2501, 2505, 2509/2513, and 2525 West Taron Court would be demolished in 2020. Total GHG emissions associated with existing land uses under Phase 1 would be 2,521 $MTCO_2e$ per year. Under Phase 2, the buildings at 2521 and 9650 West Taron County would be demolished in 2023. Total GHG emissions associated with existing land uses under Phase 1 would be 5,249 $MTCO_2e$ per year. Under Phase 3, the buildings at 2615 and 2619 West Taron Court would be demolished in 2026. ~~for the year 2020 and are shown in Table 5 below.~~ Total GHG emissions associated with existing land uses under Phase 3 ~~in 2020~~ would be ~~9,337~~ 813 $MTCO_2e$ per year. Mobile-source emissions account for the largest portion of the site's emissions, followed by energy use (both electricity and natural gas). Table 5 below shows GHG emissions associated with existing land uses by Project phase.

To quantify emissions from the existing land uses, CalEEMod was used for an operational year of 2020, 2023, and 2026 based on the buildings types and sizes that would be demolished under each Project phase. ~~as shown in Table 1 above.~~ Water demand for existing uses was provided by the Project applicant and existing VMT was provided by the traffic impact analysis conducted for the Project (see Appendix B). A backup diesel-powered generator was assumed to be used 96 hours per year for the All Data building located at 9650 West Taron Drive, based on data provided by the applicant. For all other GHG emissions sources, default values in CalEEMod were used. The lifetime of a building is assumed to be 30 years from the first year of full operation. Full buildout of the Project was assumed to occur in 2030, after completion of Phase 3 of the Project. The corresponding operational lifetime emissions were estimated through the year 2055 ~~2060~~. GHG emissions associated with the existing land uses were assumed to remain constant over each Project phase for an operational lifetime of 30 years. Existing buildings under Phase 1 were assumed to remain constant from 2020 through 2049, existing buildings under Phase 2 were assumed to remain constant from 2023 through 2052, and existing buildings under Phase 3 were assumed to remain constant from 2026 through 2055. ~~the entire construction period and operational lifetime of the project (i.e., 2020 through 2060) to compare existing emissions to lifetime operational emissions for 30 years after the Project is fully built out. No adjustments were made to existing emissions after the year 2020.~~ Details on the modeling inputs for the existing land uses can be found in Attachment C.

AREA SOURCES

Area-source emissions estimated for the existing site only include fossil fuel–powered landscape maintenance equipment. CalEEMod landscape equipment defaults were used based upon the existing land uses at the Project site. Landscape equipment emissions are considered as direct because they are generated on-site due to activities from the existing land uses. Emissions factors used in CalEEMod are generated from CARB's OFFROAD2011 model using average horsepower and load factors according to equipment types. These emissions are shown in Table 5 below and the methodology used in CalEEMod is as follows:

$$Annual\ Emissions\ (MTCO_2e) = \sum (\ Units\ x\ EF_{LE}\ x\ A_{LE}\ x\ GWP_i)$$

Where:

Units = number of land use units (1,000 square feet)

EF_{LE} = GHG emission factor for landscape equipment ($MTCO_2e$/1000 sq. ft./day)

A_{LE} = number of landscaping days per year

GWP_i = global warming potential of each GHG pollutant

ENERGY

Energy-related GHG emissions include the indirect emissions associated with electricity consumption and the direct emissions associated with natural gas consumption, which were quantified using CalEEMod. Electricity is provided to the Project site by the Sacramento Municipal Utility District (SMUD) and natural gas is provided by the Pacific Gas & Electric Company (PG&E). The existing buildings on the Project site were constructed to the 2008 California Energy Code (i.e., California Code of Regulations Title 24, Part 6). Electricity and natural gas demand factors are provided in CalEEMod based on land use types. Historical data was selected on the Energy tab of CalEEMod to represent the project's energy consumption associated with compliance with the 2008 California Energy Code, which is less stringent than later iterations of the code.

The GHG intensity factor associated with electricity provided by SMUD was used for the year 2020. The default value provided in CalEEMod for SMUD was replaced with an adjusted factor based on the utility's compliance with the California Renewables Portfolio Standard (RPS) in 2020. The RPS requires all utilities to procure at least 33 percent of their electricity from renewable sources by 2020. For details on the adjustment of the electricity intensity factor, refer to Attachment C. Electricity-related emissions were calculated in CalEEMod using the following methodology:

$$Annual\ Emissions\ (MTCO_2e) = \sum_i (\ Utility\ x\ Energy\ Intensity\ x\ Size\ x\ CF)$$

Where:

Energy Intensity = electricity energy intensity for a land use (kilowatt-hour [kWh] per square foot)

Utility = electricity intensity factor for SMUD adjusted for 2020 RPS ($MTCO_2e$/megawatt-hour [MWh])

Size = square feet of existing land uses

i = land use type

CF = conversion factor

Natural gas-related GHG emissions were quantified using default emission factors provided in CalEEMod. Energy-related GHG emissions from the existing site are shown in Table 5 below. Natural gas-related emissions were calculated in CalEEMod using the following methodology:

$$Annual\ Emissions\ (MTCO_2e) = \sum_j (\ EF_i\ x\ Energy\ Intensity\ x\ Size\ x\ CF\ x\ GWP_i)$$

Where:

Energy Intensity = natural gas energy intensity for a land use (thousand British thermal units [kBTU] per square foot)

EF = emission factor based on AP-42 or Climate Registry (pounds CO_2e per kBTU)

Size = square feet of existing land uses

i = each GHG pollutant

j = land use type

CF = conversion factor

GWP_i = global warming potential of each GHG pollutant

MOBILE SOURCES

Mobile source-related GHG emissions were estimated based on the existing site's daily trip generation and VMT of on-road vehicles provided in the traffic impact analysis prepared by Fehr & Peers (see Appendix B). The existing site's daily trip generation and daily VMT were estimated based on all existing land uses during a typical weekday. Annual VMT was based on multiplying the daily VMT by a factor 347, which takes into account reduced VMT from weekends

and holidays (CARB N.d.:14). Mobile-source emissions were estimated using EMFAC2017 emissions factors for Sacramento County in 2020. The mobile-source emissions were estimated using the following methodology:

$$Annual\ Emissions\ (MTCO_2e) = VMT\ x\ P_{mix}\ x\ \sum(EF_v\ x\ GWP_i)$$

Where:

VMT = Existing uses-generated annual vehicle miles traveled

P_{mix} = percent mode of total vehicle mix

EF_v = composite emission factor for EMFAC2017 fleet mix in Sacramento in 2020

GWP_i = global warming potential of each GHG

For details of the existing VMT calculation, refer to Attachment C.

Mobile sources associated with the existing land uses are the largest source of GHG emissions, as shown in Table 5 below.

SOLID WASTE

Solid waste-related GHG emissions were estimated in CalEEMod based on waste generation rates for each land use type as reported by the California Department of Resources Recovery and Recycling (CalRecycle). Emission estimates include the indirect methane emissions associated with the decomposition of waste and the carbon dioxide emissions associated with the combustion of methane, as follows:

$$Annual\ Emissions\ (MTCO_2e) = DOC\ x\ DANF\ x\ 0.5$$

Where:

DOC = degradable organic carbon

DANF = degradable anaerobic fraction (0.5)

0.5 = assumes half anaerobic carbon is methane and half is carbon dioxide

GHG emissions associated with solid waste from the existing site are shown in Table 5 below.

WATER AND WASTEWATER

Water consumption associated with the existing land uses was provided by the Project applicant. Water consumption includes both water demand for water fixtures and landscaping, as well as wastewater generation. GHG emissions are associated with the indirect electricity used to pump, treat, and convey water to and from the existing buildings, as well as methane and nitrous oxide emissions associated with wastewater treatment. CalEEMod was used to estimate the GHG emissions associated with water consumption using SMUD's adjusted electricity intensity as discussed above, and the gallons of water per year required by the existing land uses. CalEEMod was also used to estimate the GHG emissions associated with wastewater treatment, assuming all aerobic facilities with anaerobic digesters, which is the CalEEMod default assumption. The methodology for water and wastewater emissions is as follows:

$$Indoor\ Water\ Emissions\ (MTCO_2e) = Water_{Indoor}\ x\ Electricity_{Indoor}\ x\ Utility\ x\ CF$$

$$Outdoor\ Water\ Emissions\ (MTCO_2e) = Water_{Outdoor}\ x\ Electricity_{Outdoor}\ x\ Utility\ x\ CF$$

$$Wastewater\ Emissions\ (MTCO_2e) = Water_{Indoor}\ x\ R_T\ x\ EF_T\ x\ CF$$

$$Annual\ Emissions\ (MTCO_2e) = Indoor\ Water\ Emissions + Outdoor\ Water\ Emissions + Wastewater\ Emissions$$

Where:

$Water_{Indoor}$ = total water used indoors (million gallons)

$Water_{Outdoor}$ = total water used outdoors (million gallons)

$Electricity_{Indoor}$ = electricity required to supply, treat, and distribute water and resulting wastewater (kWh/million gallons)

$Electricity_{Outdoor}$ = electricity required to supply, treat, and distribute water (kWh/million gallons)

R_T = percent of indoor water resulting in wastewater

EF_T = emission factor for wastewater treatment process ($MTCO_2e$/MWh)

CF = conversion factor

Utility = electricity intensity factor for SMUD adjusted for 2020 RPS ($MTCO_2e$/kWh)

Emissions associated with water and wastewater from the existing site are shown in Table 5 below.

STATIONARY SOURCES

The existing All Data building has a back-up diesel generator with a kilowatt rating of 400. It was assumed that the back-up generator is used 96 hours per year based on estimates of Project-related back-up generator use, as provided by the Applicant. Because it was unknown how much fuel is consumed annually by the generator, emissions associated with the generator were calculated using CalEEMod and are shown in Table 5 below. The methodology used in CalEEMod is as follows:

$$Annual\ Emissions\ (MTCO_2e) = EF\ x\ n\ x\ HP\ x\ Load\ x\ Activity$$

Where:

EF = emission factor ($MTCO_2e$/hp-hr)

n = number of generators

HP = maximum rated horsepower

Load = load factor

Activity = hours of operation per year

SUMMARY

GHG emissions associated with the existing land uses at the Project site are shown in Table 5 below for each Project phase ~~the year 2020~~ by emissions source.

Table 5 Existing Site Operational GHG Emissions by ~~Source in 2020~~ Phase in Demolition Years ($MTCO_2e$/year)

Emissions Source	Greenhouse Gas Emissions		
	Phase 1	Phase 2	Phase 3
Area	~~<1~~ <1	<1	<1
Energy	~~589~~ 114	340	34
Mobile	~~8,638~~ 2,381	4,843	771
Solid Waste	~~67~~ 20	39	8
Stationary	~~20~~ 0	20	0
Water & Wastewater	~~24~~ 6	8	0
Total	**~~9,337~~ 2,521**	**5,249**	**813**

Notes: GHG = greenhouse gas; $MTCO_2e$/year = metric tons of carbon dioxide equivalent per year.

Totals may not sum exactly due to rounding

For calculation details, refer to Attachment C.

Source: Modeling conducted by Ascent Environmental in 2019

3.2.2 Proposed Project Emissions

AREA SOURCES

Area-source emissions estimated for the Project type only include landscape maintenance equipment. CalEEMod landscape equipment defaults were used based upon the land uses that will be included in the Project. Landscape equipment emissions are considered as direct because they are generated on-site due to activities from the proposed land uses. Emissions factors used in CalEEMod are generated from CARB's OFFROAD2011 model using average horsepower and load factors according to equipment types. Area-source emissions are shown by phase in Table 6 below and the CalEEMod methodology is as follows:

$$Annual\ Emissions\ (MTCO_2e) = \sum (\ Units\ x\ EF_{LE}\ x\ A_{LE}\ x\ GWP_i)$$

Where:

Units = number of land use units (1,000 square feet or dwelling units)

EF_{LE} = GHG emission factor for landscape equipment ($MTCO_2e$/1000 sq. ft./day)

A_{LE} = number of landscaping days per year

GWP_i = global warming potential of each GHG pollutant

ENERGY

The Project's on-site central plant would supply natural gas to the hospital, as well as provide heating and cooling capabilities to other Project buildings. Energy emissions were quantified by Project phase for both natural gas and electricity. Indirect emissions associated with electricity generation were quantified using consumption estimates provided by the Project applicant and emissions factors for SMUD that were adjusted for RPS compliance for each phase's buildout year (i.e., 2023, 2026, and 2030). There is no RPS target for 2023 so the 2020 target of 33 percent renewable was used. Pursuant to Senate Bill 100 of 2018, the RPS targets for 2026 and 2030 are 50 and 60 percent renewables, respectively, which were applied for Phases 2 and 3. The methodology used to quantify electricity-related emissions is as follows:

$$Annual\ Emissions\ (MTCO_2e) = \sum (\ Utility_{RPS}\ x\ Energy\ Intensity_P\ x\ CF)$$

Where:

Energy $Intensity_P$ = electricity energy intensity for each Project phase (kWh per year)

Utility = electricity intensity factor for SMUD ($MTCO_2e$/MWh)

RPS = adjustment for RPS target years for each Project phase

CF = conversion factor

Emissions associated with the use of on-site natural gas combustion were quantified using consumption estimates provided by the Project applicant and emission factors provided in the Climate Registry's 2017 Default Emission Factors. These emissions factors were not anticipated to change over the project buildout period. The methodology used to quantify natural gas-related emissions is as follows:

$$Annual\ Emissions\ (MTCO_2e) = \sum (\ EFx\ Energy\ Intensity\ x\ CF)$$

Where:

Energy Intensity = natural gas energy intensity for each Project phase (cubic feet per year)

EF = emission factor provided by Climate Registry (kg CO_2e/MMBTU)

CF = conversion factor

All energy-related GHG emissions associated with the Project are shown by phase in Table 6 below.

MOBILE SOURCES

Mobile source emissions were estimated based on the Project's daily trip generation and VMT of on-road vehicles provided in the traffic impact analysis prepared by Fehr & Peers (see Appendix B). The Project's daily trip generation and daily VMT by phase were estimated based on the operation of all proposed land uses under each phase during a typical weekday. Annual VMT by phase was based on multiplying the daily VMT by a factor ~~338~~ 347, which takes into account reduced VMT from weekends and holidays (CARB N.d.:14). Mobile-source emissions were estimated using EMFAC2017 emissions factors for Sacramento County in 2023 for Phase 1, 2026 for Phase 2, and 2030 for Phase 3. For details of the existing VMT calculation, refer to Attachment C. The methodology for quantifying mobile-source emissions by phase is as follows:

$$Annual\ Emissions\ (MTCO_2e) = VMT_{Phase}\ x\ P_{mix}\ x \sum_{Phase} (\ EF_v\ x\ GWP_i)$$

Where:

VMT_{Phase} = Project-generated annual vehicle miles traveled by Project phase

P_{mix} = percent mode of total vehicle mix

EF_v = composite emission factor for fleet mix provided in EMFAC2017 for Sacramento County for each operational year

GWP_i = global warming potential for each GHG pollutant

Mobile emissions for helicopter activity associated with the Project were estimated using emission factors for jet fuel derived from the Climate Registry's 2017 Default Emission Factors and average fuel consumption from helicopter activity. Emissions from helicopter use are based on the number of landing and take-offs (LTO) cycles, number of cruising hours per day, and the helicopter engine model type and fuel used. For details about helicopter use assumptions, refer to Attachment C. The methodology for quantifying helicopter emissions is as follows:

$$LTO\ Emissions\ (MTCO_2e) = Fuel_{LTO}\ x\ Hours\ x\ Days\ x\ EF_{CO2}$$

$$Cruising\ Emissions\ (MTCO_2e) = Fuel_C\ x\ Hours\ x\ Days\ x\ (EF_{CO2} + (EF_{N2O}\ x\ GWP))$$

$$Annual\ Emissions\ (MTCO_2e) = LTO\ Emissions + Cruising\ Emissions$$

Where:

$Fuel_{LTO}$ = gallons of jet fuel used per LTO

$Fuel_C$ = gallons of jet fuel used per hour

Hours = average hours per day of use

Days = average days per year of use

EF_{CO2} = carbon dioxide emission factor provided by Climate Registry (kg CO_2/gallon)

EF_{N2O} = nitrous oxide emission factor provided by Climate Registry* (kg N_2O/gallon)

GWP = global warming potential for N_2O

*Note that CH_4 emission factors are not available for jet fuel

All mobile source-related GHG emissions are shown in Table 6 by Project phase.

SOLID WASTE

Solid waste emissions occur from the decomposition of waste that has been disposed of in landfills. Project-generated solid waste was estimated using CalEEMod defaults, which consider disposal rates based on land use types and their size. Annual disposal rate data is gathered from CalRecycle. The Project would comply with the requirements for commercial recycling and organic waste diversion pursuant to PRC Section 42649 and is anticipated to divert at least 50 percent of its solid waste generation. CalEEMod's mitigation module was used to reduce solid waste disposal by 50 percent. Solid waste emission factors depend on characteristics of landfills and gas capture assumed in the CARB GHG emissions inventory. GHG emissions associated with solid waste are shown in Table 6 below and the methodology for quantifying solid waste emissions is as follows:

$$Annual\ Emissions\ (MTCO_2e) = (DOC\ x\ DANF\ x\ 0.5)\ x\ W_D$$

Where:

DOC = degradable organic carbon

DANF = degradable anaerobic fraction (0.5)

0.5 = assumes half anaerobic carbon is methane and half is carbon dioxide

W_D = waste diversion rate (50 percent)

WATER AND WASTEWATER

Emissions from water usage and wastewater generation were estimated using anticipated consumption provided by the Project applicant for indoor and outdoor water use by Project phase. GHG emissions are associated with the indirect electricity used to pump, treat, and convey water to and from the existing buildings, as well as methane and nitrous oxide emissions associated with wastewater treatment. CalEEMod was used to estimate the GHG emissions associated with water consumption using SMUD's adjusted electricity intensity as discussed above for the operational years of each Project phase (i.e., Phase 1 in 2023, Phase 2 in 2026, and Phase 3 in 2030). CalEEMod was also used to estimate the GHG emissions associated with wastewater treatment, assuming all aerobic facilities with anaerobic digesters, which is the CalEEMod default assumption. Water efficiency features included in the Project were factored in to the anticipated water consumption provided by the Project applicant. These features include reduced turf and increased native and drought-tolerant landscaping, low-flow fixtures, water-efficient dishwashers and clothes washers, and water metering. The methodology used to quantify water and wastewater emissions is as follows:

$$Indoor\ Water\ Emissions\ (MTCO_2e) = Water_{Indoor}\ x\ Electricity_{Indoor}\ x\ Utility_{RPS}\ x\ CF$$

$$Outdoor\ Water\ Emissions\ (MTCO_2e) = Water_{Outdoor}\ x\ Electricity_{Outdoor}\ x\ Utility_{RPS}\ x\ CF$$

$$Wastewater\ Emissions\ (MTCO_2e) = Water_{Indoor}\ x\ R_T\ x\ EF_T\ x\ CF$$

$$Annual\ Emissions\ (MTCO_2e) = Indoor\ Water\ Emissions + Outdoor\ Water\ Emissions + Wastewater\ Emissions$$

Where:

$Water_{Indoor}$ = total water used indoors by Project phase (million gallons)

$Water_{Outdoor}$ = total water used outdoors by Project phase (million gallons)

$Electricity_{Indoor}$ = electricity required to supply, treat, and distribute water and resulting wastewater (kWh/million gallons)

$Electricity_{Outdoor}$ = electricity required to supply, treat, and distribute water (kWh/million gallons)

R_T = percent of indoor water resulting in wastewater

EF_T = emission factor for wastewater treatment process ($MTCO_2e$/MWh)

CF = conversion factor

Utility = electricity intensity factor for SMUD ($MTCO_2e$/kWh)

RPS = adjustment for RPS target years for each Project phase

STATIONARY SOURCE EMISSIONS

Stationary source emissions from the maintenance and operation of on-site emergency generators were also estimated. The Project would install four back-up diesel-powered generators that would be anticipated to run for 96 hours per year, consuming 89,376 gallons of diesel per year, as provided by the Applicant. Fuel consumption was estimated by multiplying the consumption rate (175 gallons per hour) by 96 hours per year by 4 generators by 133 percent (per National Fire Protection Association codes and standards). All generators would be installed under Phase 1 of the Project. Emissions were quantified using diesel emission factors provided by the Climate Registry's 2017 Default Emission Factors. Emissions associated with stationary sources are included in Table 6 below. The methodology used to quantify stationary source-related emissions is as follows:

$$Annual\ Emissions\ (MTCO_2e) = EF\ x\ Fuel$$

Where:

EF = emission factor for diesel provided by Climate Registry (kg CO_2e/gallon)

Fuel = annual gallons of diesel consumed

SUMMARY

GHG emissions associated with the Project's operation by phase are shown in Table 6 below by emissions source.

Table 6 Project-Generated GHG Emissions by Source at Full Buildout ($MTCO_2e$/year)

Emissions Source	Phase 1[1] Emissions	Phase 2[2] Emissions	Phase 3[3] Emissions
Area	<1	<1	3
Energy	8,914	4,863	904
Mobile	13,376	7,107	4,084
Solid Waste	3,256	2,046	68
Stationary	925	0	0
Water & Wastewater	82	45	12
Total	**26,553**	**14,061**	**5,071**

Notes: GHG = greenhouse gas; $MTCO_2e$/year = metric tons of carbon dioxide equivalent per year; SMUD = Sacramento Municipal Utility District.

[1] First year of operation for Phase 1 would be 2023.

[2] First year of operation for Phase 2 would be 2026.

[3] First year of operation for Phase 3 would be 2030.

Totals may not sum exactly due to rounding.

Source: Modeling conducted by Ascent Environmental in 2019

For calculation details, refer to Attachment C.

4 MEASURES FOR OFFSETTING NET INCREASE IN GHG EMISSIONS

SOLAR REDUCTION

The Project would install solar photovoltaics on Project building roofs. Phase 1 would include solar installations on the existing CNU School of Medicine building, covering approximately 47,000 square feet. Phase 2 would include solar installations on the out-patient clinic, medical office building, and Parking Garage 1, covering approximately 89,000 square feet. Phase 3 would include solar installations on the dormitory and Parking Garage 2, covering approximately 56,600 square feet. The National Renewable Energy Laboratory's PVWatts Calculator was used to estimate the

amount of electricity generated by the system based on the roof size, Project location, and a premium module type (see Attachment D). The PVWatts Calculator estimated approximately 1,327,446 kWh per year would be generated by the system under Phase 1; 2,537,432 kWh per year under Phase 2; and 1,578,453 kWh per year under Phase 3. The adjusted SMUD electricity intensity factors for 2020, 2026, and 2030 were used to quantify GHG emissions that would be reduced as a result of each phase's solar systems. The GHG reductions are shown in Table 6 below.

SMUD GREENERGY REDUCTION

After installation of the solar systems described above, the Project would still consume electricity provided by SMUD. The Project would purchase 100 percent renewable energy provided through SMUD's Greenergy program for the remaining electricity demands of the Project, rather than using SMUD's average renewable mix for the operational years of each phase. This would effectively offset all electricity-related GHG emissions associated with the Project. The GHG reductions from the Greenergy program are shown in Table 7 below by phase.

ELECTRIC VEHICLE CHARGING REDUCTION

The Project would install Level 2 electric vehicle (EV) charging stations as part of each phase. Under Phase 1, 37 Level 2 EV chargers would be installed, serving 74 parking spaces. Under Phase 2, 36 additional Level 2 EV chargers would be installed, serving and additional 70 parking spaces. Under Phase 3, 11 additional Level 2 EV chargers would be installed, serving an additional 22 parking spaces. The GHG reductions associated with the use of EV chargers was calculated using average fuel efficiency of gas-powered light duty vehicles in each of the Project phase buildout years, the efficiency of EVs, the charging power of a Level 2 EV charger, and the SMUD electricity intensity factor for each of the Project phase buildout years. Table 7 below shows the GHG reductions associated with the installation of EV chargers by phase.

TRANSPORATION DEMAND MANAGEMENT PLAN REDUCTION

The Project would include a Transportation Demand Management (TDM) Plan consistent with the *City of Elk Grove Climate Action Plan: 2019 Update* and the *City of Elk Grove Transportation Demand Management Plan Guidelines* that aims to reduce VMT by 15 percent. The TDM Plan developed for the Project would include required and optional measures that the Project could implement to achieve a 15 percent reduction in VMT. The measure categories include marketing and promotion, bike facilities, on-site amenities, transit, commuter benefits, and parking facilities. Attachment B of this application identifies up to 28 possible points the Project could achieve through design features. Ten points would be required to meet the 15 percent VMT reduction goal. As specified in the commitment letter, the TDM Plan would be incorporated as a mitigation measure in the environmental impact report prepared for the Project. All mitigation measures will be enforceable through the Project's Mitigation Monitoring and Reporting Program, which represents a binding and enforceable agreement between the Applicant and the lead agency (City of Elk Grove). Table 7 below shows the GHG reduction associated with implementation of the TDM Plan by phase.

VEGETATION CHANGE

The Project would preserve 83 existing trees on the Project site and remove 292 trees. After Project construction, 313 new trees would be planted~~ for a net gain of 21 trees~~. The carbon sequestration associated with the net increase in trees was quantified in CalEEMod and is shown in Table 7 below as part of Phase 3.

SUMMARY

Table 7 below shows the Project's operational emissions by phase with the reduction measures identified above.

Table 7 Project-Generated GHG Emissions by Source at Full Buildout with Reduction Measures ($MTCO_2e$ per year)

Emissions Source	Phase 1[1] Emissions	Phase 2[2] Emissions	Phase 3[3] Emissions
Area	<1	<1	3
Energy	8,914	4,863	904
Mobile	13,376	7,107	4,084
Solid Waste	1,628	1,023	34
Stationary	925	0	0
Water & Wastewater	82	45	12
Solar Reduction	-319	-456	-227
SMUD Greenergy Reduction	-4,950	-2,076	-338
Electric Vehicle Charging Reduction	-335	-353	-113
TDM Plan	-1,974	-1,050	-613
Vegetation Change	0	0	-11
Total	**17,347**	**9,103**	**3,736**

Notes: GHG = greenhouse gas; $MTCO_2e$ = metric tons of carbon dioxide equivalent; SMUD = Sacramento Municipal Utility District; TDM = Transportation Demand Management.

[1] First year of operation for Phase 1 would be 2023.

[2] First year of operation for Phase 2 would be 2026.

[3] First year of operation for Phase 3 would be 2030.

Totals may not sum exactly due to rounding.

For calculation details, refer to Attachment C.

Source: Modeling conducted by Ascent Environmental in 2019

4.1 OVERALL YEAR-BY-YEAR EMISSIONS

Table 8 below shows the year-by-year comparison of GHG emissions from the existing site and the operational and construction emissions associated with the Project. Existing site emissions would exceed the Project's emissions during the first few years of construction (i.e., 2020 through 2022) ~~and final years of the Project's lifetime (i.e., 2056 through 2060~~). Once Phase 1 is operational in 2023, Project-generated emissions would exceed the existing site's emissions. The amount by which the Project exceeds the existing site emissions would increase in 2026 when Phase 2 becomes operational, and again in 2030 when Phase 3 becomes operational. All three phases' lifetime operation would overlap from 2030 through 2052.

Total construction emissions associated with the Project would be 8,273 $MTCO_2e$. Total existing site emissions over the Project's lifetime (i.e., 2020 through ~~2060~~2059) would be ~~373,472~~ 257,504 $MTCO_2e$. The Project's net increase in operational emissions over the existing site would be ~~532,193~~ 648,170 $MTCO_2e$ over the Project's lifetime. Combining the construction emissions and net increase in operational emissions, the Project would be required to purchase carbon offset credits for a total of ~~540,466~~ 656,433 $MTCO_2e$.

The Applicant has agreed to meet the requirement set forth in PRC Section 21183(c) to demonstrate that the Project would result in no net additional GHG emissions through the purchase of voluntary carbon offset credits sufficient to offset all projected additional GHG emissions. A copy of the commitment letter is provided in Appendix H.

Notably, the commitments to enter into contract(s) to offset net additional GHG emissions will be incorporated as a mitigation measure in the environmental impact report prepared for the Project. All mitigation measures will be enforceable through the Project's Mitigation Monitoring and Reporting Program, which represents a binding and enforceable agreement between the Applicant and the lead agency (City of Elk Grove).

Table 8 Year-by-Year Comparison of GHG Emissions ($MTCO_2e$)

Year	Existing Site Emissions	Project Operational Emissions	Project Operational Difference	Construction Emissions
2020	~~9,337~~ 2,521	0	~~-9,337~~ -2,521	1,267
2021	~~9,337~~ 2,521	0	~~-9,337~~ -2,521	1,810
2022	~~9,337~~ 2,521	0	~~-9,337~~ -2,521	1,245
2023	~~9,337~~ 7,771	17,347	~~8,010~~ 9,576	86
2024	~~9,337~~ 7,771	17,347	~~8,010~~ 9,576	1,976
2025	~~9,337~~ 7,771	17,347	~~8,010~~ 9,576	787
2026	~~9,337~~ 8,583	26,449	~~17,112~~ 17,866	47
2027	~~9,337~~ 8,583	26,449	~~17,112~~ 17,866	500
2028	~~9,337~~ 8,583	26,449	~~17,112~~ 17,866	321
2029	~~9,337~~ 8,583	26,449	~~17,112~~ 17,866	232
2030	~~9,337~~ 8,583	30,185	~~20,848~~ 21,602	0
2031	~~9,337~~ 8,583	30,185	~~20,848~~ 21,602	0
2032	~~9,337~~ 8,583	30,185	~~20,848~~ 21,602	0
2033	~~9,337~~ 8,583	30,185	~~20,848~~ 21,602	0
2034	~~9,337~~ 8,583	30,185	~~20,848~~ 21,602	0
2035	~~9,337~~ 8,583	30,185	~~20,848~~ 21,602	0
2036	~~9,337~~ 8,583	30,185	~~20,848~~ 21,602	0
2037	~~9,337~~ 8,583	30,185	~~20,848~~ 21,602	0
2038	~~9,337~~ 8,583	30,185	~~20,848~~ 21,602	0
2039	~~9,337~~ 8,583	30,185	~~20,848~~ 21,602	0
2040	~~9,337~~ 8,583	30,185	~~20,848~~ 21,602	0
2041	~~9,337~~ 8,583	30,185	~~20,848~~ 21,602	0
2042	~~9,337~~ 8,583	30,185	~~20,848~~ 21,062	0
2043	~~9,337~~ 8,583	30,185	~~20,848~~ 21,602	0
2044	~~9,337~~ 8,583	30,185	~~20,848~~ 21,602	0
2045	~~9,337~~ 8,583	30,185	~~20,848~~ 21,602	0
2046	~~9,337~~ 8,583	30,185	~~20,848~~ 21,602	0
2047	~~9,337~~ 8,583	30,185	~~20,848~~ 21,602	0
2048	~~9,337~~ 8,583	30,185	~~20,848~~ 21,602	0
2049	~~9,337~~ 8,583	30,185	~~20,848~~ 21,602	0
2050	~~9,337~~ 6,062	30,196	~~20,859~~ 24,134	0
2051	~~9,337~~ 6,062	30,196	~~20,859~~ 24,134	0
2052	~~9,337~~ 6,062	30,196	~~20,859~~ 24,134	0
2053	~~9,337~~ 813	12,850	~~3,513~~ 12,037	0
2054	~~9,337~~ 813	12,850	~~3,513~~ 12,037	0
2055	~~9,337~~ 813	12,850	~~3,513~~ 12,037	0
2056	~~9,337~~ 0	3,747	~~-5,590~~ 3,747	0
2057	~~9,337~~ 0	3,747	~~-5,590~~ 3,747	0
2058	~~9,337~~ 0	3,747	~~-5,590~~ 3,747	0
2059	~~9,337~~ 0	3,747	~~-5,590~~ 3,747	0
~~2060~~	~~9,337 0~~	~~3,747~~	~~-5,590~~	~~0~~
Total	**~~373,472~~ 257,504**	**905,665**	**~~532,193~~ 648,170**	**8,273**

Notes: GHG = greenhouse gas; $MTCO_2e$ = metric tons of carbon dioxide equivalent.

[1] First year of operation for Phase 1 would be 2023.

[2] First year of operation for Phase 2 would be 2026.

[3] First year of operation for Phase 3 would be 2030.

Totals may not sum exactly due to rounding.

Source: Modeling conducted by Ascent Environmental in 2019

The Project would not result in any net additional GHG emissions after the purchase of carbon offset credits, in accordance with PRC Section 21183(c). Therefore, the Project would meet the GHG emission requirements for streamlined environmental review under CEQA.

5 LIST OF PREPARERS

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