Pleasant Grove Wastewater Treatment Plant Expansion and Energy Recovery Project

Addendum to the CEQA-Plus Initial Study/Mitigated Negative Declaration

June 2018

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CEQA-Plus Initial Study/Mitigated Negative Declaration
for the

PGWWTP Expansion and Energy Recovery Project

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ACRONYMS AND ABBREVIATIONS

CH_4	methane
City	City of Roseville
CNG	compressed natural gas
DGE	diesel gallon equivalents
GHG	greenhouse gas
IS	Initial Study
IS/MND	Initial Study/Mitigated Negative Declaration
mgd	million gallons per day
MND	Mitigated Negative Declaration
N_2O	nitrous oxide
NO_X	nitrogen oxides
PG&E	Pacific Gas & Electric
PGWWTP	Pleasant Grove Wastewater Treatment Plant
PM	particulate matter
rCNG	renewable compressed natural gas
VOC	volatile organic compounds
WAS	waste activated sludge

1 INTRODUCTION

1.1 BACKGROUND AND ACTIONS TRIGGERING THE ADDENDUM

In April 2017, the Roseville City Council adopted the Initial Study/Mitigated Negative Declaration (IS/MND) (State Clearinghouse No. 2016122040) for the Pleasant Grove Wastewater Treatment Plant (PGWWTP) Expansion (Expansion Project) and Energy Recovery Project (herein referred to as the 2017 IS/MND). The 2017 IS/MND analyzed a proposed project that included expansion and increased treatment capacity of the existing PGWWTP so that it can meet its original 12 million gallons per day (mgd) design capacity, and construction of the related but separate Energy Recovery Project that would beneficially utilize the digester gas produced by anaerobic digestion that is included in the Expansion Project.

The City of Roseville (City) is currently proposing minor modifications to the previously approved project. These modifications include: 1) relocation of the proposed Pacific Gas & Electric (PG&E) compressed natural gas (CNG) pipeline, 2) relocation of proposed construction staging areas, 3) changes in the phasing of solid waste trucks that would be available for fueling with CNG, and 4) delays in the anticipated start date of construction. Refer to Section 2, "Description of Proposed Project Changes," of this Addendum for a more detailed description of proposed project modifications. The project objectives identified in Section 2.3, page 2-2, of the 2017 IS/MND remain unchanged.

The purpose of this proposed Addendum is to consider whether these modifications to the project would result in the need for additional analysis under CEQA (Public Resources Code, Section 21166; CEQA Guidelines, Sections 15162, 15164).

As demonstrated in Section 3, "Environmental Consequences of Proposed Project Changes" below, the project modifications do not meet any of the criteria listed in Section 15162 of the CEQA Guidelines requiring supplemental environmental review (as described in Section 1.2, "CEQA Guidelines Regarding an Addendum to an MND," below) and an addendum is, therefore, appropriate. This means the modifications would (1) not result in any new significant environmental effects or a substantial increase in severity of previously evaluated significant effects that result from either a substantial change to the project or changes to the project circumstances, and (2) there is no new information of substantial importance since certification of the 2017 IS/MND that shows the modifications would have new significant effects or more severe previously evaluated effects. Therefore, pursuant to Section 15164 of the CEQA Guidelines, the differences between the approved project described in the 2017 IS/MND and the refined elements of the project as they are currently proposed are considered minor technical changes.

This document concludes that the proposed project modifications would not alter any of the conclusions of the adopted MND. No new significant environmental effects or a substantial increase in the severity of previously identified significant effects would result. The additions also would not affect the feasibility of any mitigation measures. As mentioned above, none of the conditions listed in Section 15162 of the CEQA Guidelines exist for the project modification described herein. Therefore, pursuant to Section 15164 of the CEQA Guidelines, the differences between the approved project described in the adopted MND and the modification of the project as currently proposed and described in this Addendum are minor, and this Addendum provides sufficient environmental documentation.

1.2 CEQA GUIDELINES REGARDING AN ADDENDUM TO AN MND

Section 15162(a) of the CEQA Guidelines provides that when an MND has been certified for a project, no subsequent MND shall be prepared for that project unless the lead agency determines, on the basis of substantial evidence in light of the whole record, that one or more of the following conditions is met:

(1) substantial changes are proposed in the project which will require major revisions of the previous MND due to the involvement of new significant environmental effects or a substantial increase in the severity of previously identified significant effects;

(2) substantial changes occur with respect to the circumstances under which the project is undertaken which will require major revisions of the previous MND due to the involvement of new significant environmental effects or a substantial increase in the severity of previously identified significant effects; or

(3) new information of substantial importance, which was not known and could not have been known with the exercise of reasonable diligence at the time the previous MND was certified as complete, shows any of the following:

(A) the project will have one or more significant effects not discussed in the previous MND; and
(B) significant effects previously examined will be substantially more severe than shown in the previous MND;

In the event one of these conditions would occur, either a supplement or subsequent MND would be required or, if significant impact may occur after mitigation, an EIR would be required. Section 15164 of the CEQA Guidelines states that a lead agency or a responsible agency shall prepare an addendum to a previously certified MND if some changes or additions are necessary, but none of the conditions described above in Section 15162(a), calling for preparation of a subsequent CEQA document, have occurred.

Note that CEQA Section 15162(a)(3) also includes the following conditions with respect to the need to prepare a supplemental CEQA document; however, these conditions only apply to the preparation of an EIR because (a) alternatives are not required in MNDs and (b) feasible mitigation to reduce significant effects is required to be included in MNDs:

(C) mitigation measures or alternatives previously found not to be feasible would in fact be feasible, and would substantially reduce one or more significant effects of the project, but the project proponents decline to adopt the mitigation measures or alternatives; or

(D) mitigation measures or alternatives which are considerably different from those analyzed in the previous MND would substantially reduce one or more significant effects on the environment, but the project proponents decline to adopt the mitigation measures or alternatives.

CEQA allows lead and those responsible agencies issuing additional discretionary approvals for a project to restrict their review of modifications to a previously approved project to the incremental effects associated with the proposed modifications, compared against the anticipated effects of the previously approved project at buildout. In other words, if the project under review constitutes a modification of a previously approved project that was subject to prior final environmental review, the “baseline” for purposes of CEQA is adjusted such that the originally approved project is assumed to exist.

The City is proposing minor modifications to the approved project; these changes are described in Section 2 of this Addendum. As demonstrated in detail below, the project modifications do not meet any of the relevant criteria listed in Section 15162 that would lead to preparation of a supplemental or subsequent MND or EIR. First, the modifications would not result in any new significant environmental effects or a substantial increase in severity of previously evaluated significant effects that result from either a substantial change to the project or changes to the project circumstances. Second, there is no new information of substantial importance since adoption of the 2017 IS/MND that shows the modifications would have new significant effects or more severe previously evaluated effects. The project modifications would reduce the amount of GHG emissions offset by Mitigation Measure 3.7-1; however, this mitigation measure would continue to reduce the project’s impacts to a less-than-significant level. Therefore, pursuant to Section 15164 of the CEQA Guidelines, the differences between the approved project described in the 2017 IS/MND and the refined elements of the project as they are currently proposed are considered minor technical changes. Furthermore, the approved IS/MND and associated mitigation monitoring and reporting program remain valid for mitigating the identified significant impacts that would result from implementation

of the project, including the proposed modifications. For these reasons, an addendum to the adopted MND is the appropriate mechanism to address modifications to the project.

2 DESCRIPTION OF PROPOSED PROJECT CHANGES

The City's proposed changes to the approved IS/MND include: 1) relocation of the proposed PG&E gas pipeline, 2) relocation of proposed construction staging areas, 3) changes in the phasing of solid waste trucks that would be available for fueling with CNG, and 4) delays in the anticipated start date of construction. The following provides a description of each proposed modification to the previously adopted 2017 IS/MND.

2.1 RELOCATION OF PG&E GAS PIPELINE

The 2017 IS/MND assumed a 4-inch CNG pipeline would be constructed from the PG&E main along Westpark Drive to serve the Energy Recovery Project. The pipeline was previously described as being located south of the southern boundary of the existing PGWWTP within the Southern Expansion Area. The proposed pipeline extended east to connect the Energy Recovery Project area to the existing PG&E main along Westpark Drive (Exhibit 2-1). The proposed pipeline location has been revised to extend from the Energy Recovery Project area to the existing PG&E gas main located along the western fenceline of the City's property (Exhibit 2-2) (approximately 40 feet of pipeline). The relocated pipeline would still be 4-inch in diameter; however, the length of pipeline would be less than the pipeline previously analyzed in the 2017 IS/MND.

The relocation of the PG&E pipeline as a modification to the adopted MND would require disturbance of undeveloped land to the west of the project area evaluated in the 2017 IS/MND. Potential effects to the expanded footprint are addressed in Section 3.2*,* "Impact Analysis," below.

2.2 RELOCATION OF CONSTRUCTION STAGING AREAS

The 2017 IS/MND assumed up to four staging areas would be used for construction of the Expansion Project and one staging area for the Energy Recovery Project (Exhibit 2-3). Through refinement of the design, it was determined that not all of the staging areas identified previously are feasible locations for construction staging. The proposed locations of the staging areas have been revised as shown in Exhibit 2-4 including moving the proposed Energy Recovery Project staging area to a disturbed area within the PGWWTP boundary. In addition to the staging areas identified, other previously disturbed areas within the PGWWTP boundary could be made available for construction staging as approved by the City. However, all staging areas would be within the fenceline of the existing PGWWTP and would either be paved or previously disturbed. Any disturbance or treatment facility development occurring within the PGWWTP fenceline was already evaluated and approved consistent within the *Roseville Regional Wastewater Treatment Service Area Master Plan EIR* (City of Roseville 1996).

2.3 SOLID WASTE TRUCKS AVAILABLE FOR FUELING WITH CNG

The 2017 IS/MND assumed a fueling station would be constructed as part of the Energy Recovery Project that would dispense renewable compressed natural gas (rCNG), which is produced from digester gas. Digester gas would be generated from the digesters that would be constructed as part of the Expansion Project. This rCNG would be used as vehicle fuel for the City's solid waste truck fleet, which would be converted from diesel to CNG over time as a separate project. The related 2017 IS/MND air quality and greenhouse gas (GHG) analysis assumed that 2,500 diesel gallon equivalents (DGE) of rCNG would be produced per day at project startup and used as fuel for the converted solid waste collection truck fleet. The analysis further assumed that approximately half of the 55 truck solid waste fleet would be converted to CNG by project startup and therefore available to utilize the CNG generated. The DGE demand is calculated based on the number trucks available for fueling and the fuel consumption for each truck.

Since the adoption of the 2017 IS/MND, the estimated DGE of vehicle fuel demand has been revised from 2,500 DGE per day to 1,000 DGE per day. In addition, the number of solid waste trucks expected to be available for fueling with rCNG has been revised to be 10 trucks at project startup and 34 at project buildout (estimated to be 2040).

2.4 CONSTRUCTION SCHEDULE

The 2017 IS/MND noted that construction of the Expansion Project would last approximately 24 months and was anticipated to begin in fall of 2017, and construction of the Energy Recovery Facilities would last approximately 18 months and would begin in late 2017 or early 2018. The start of project construction for the Expansion Project and Energy Recovery Project has shifted to spring of 2019. There are no changes to the length of construction identified in the 2017 IS/MND.

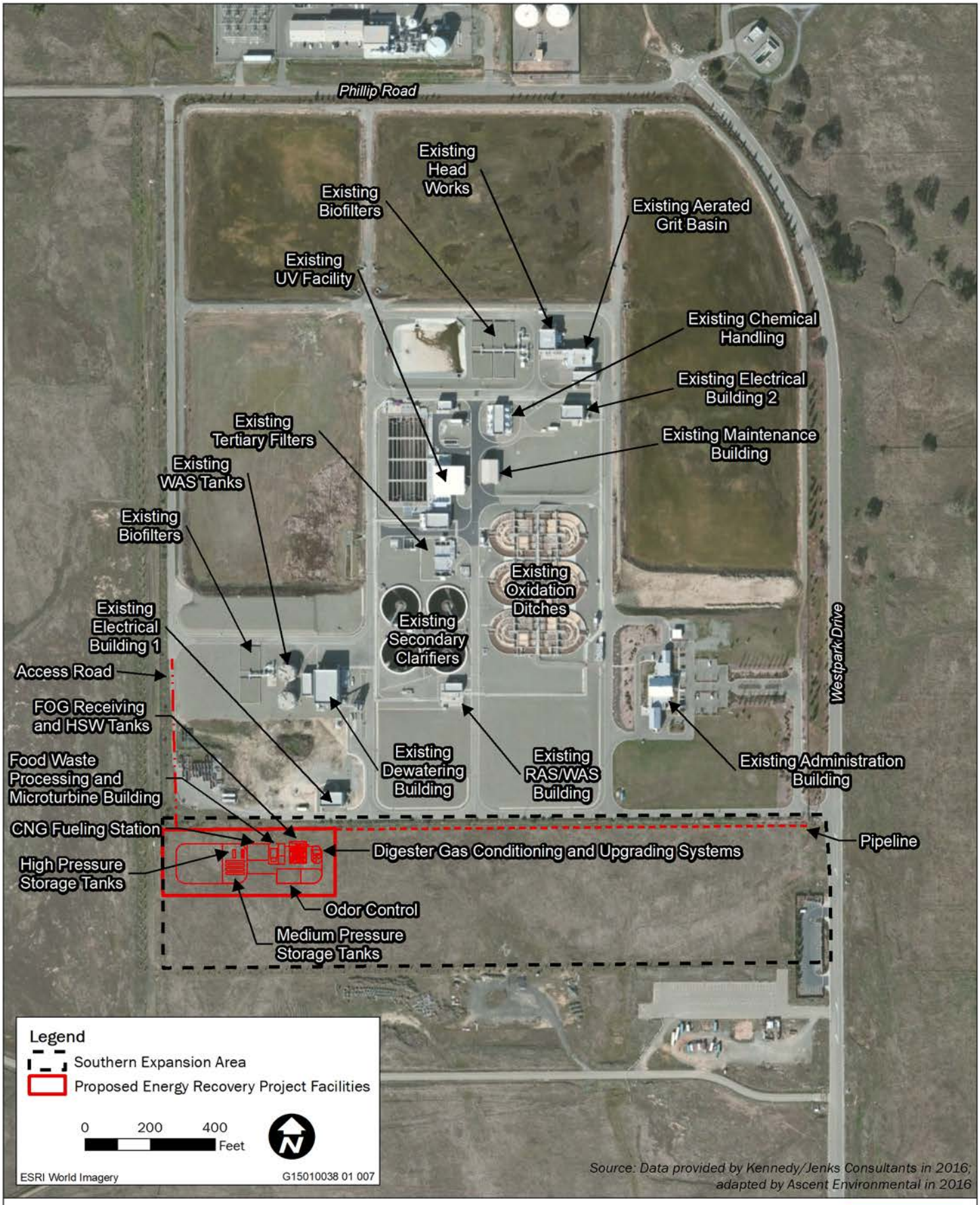

Exhibit 2-1 Energy Recovery Project PG&E Pipeline Location Proposed in 2017 IS/MND

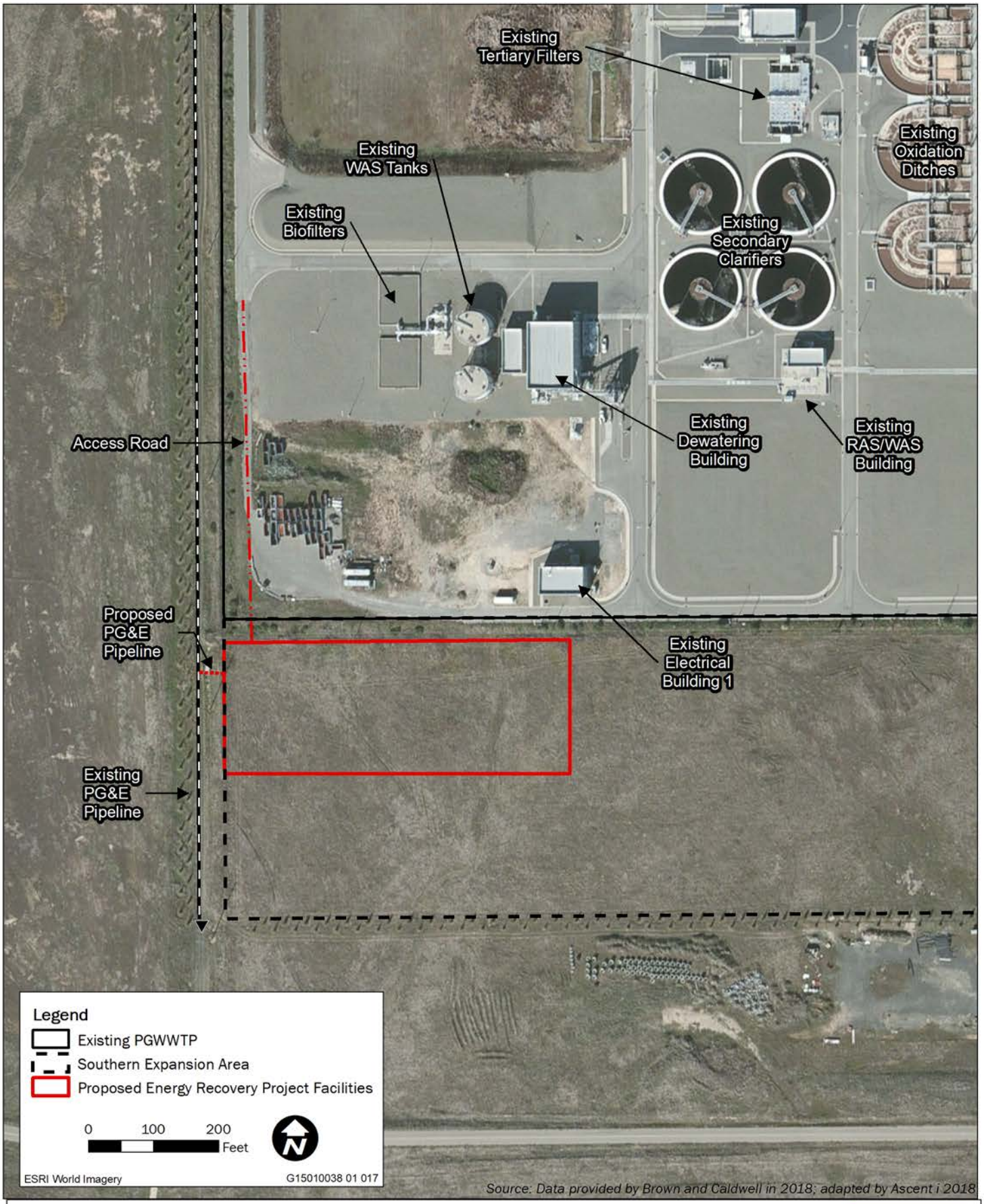

Exhibit 2-2 **Energy Recovery Project Revised PG&E Pipeline Location**

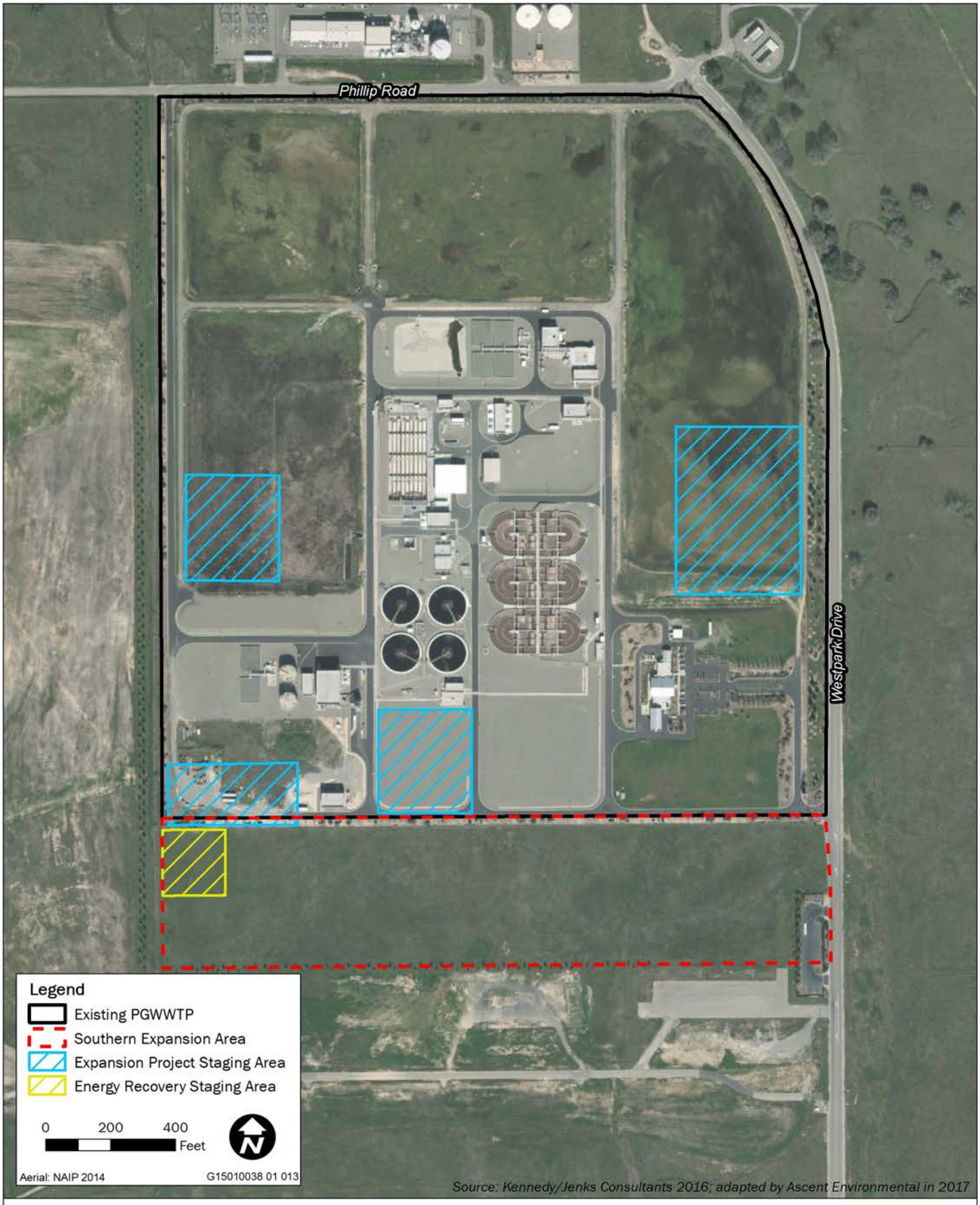

Exhibit 2-3 **Staging Areas Proposed in 2017 IS/MND**

ASCENT ENVIRONMENTAL

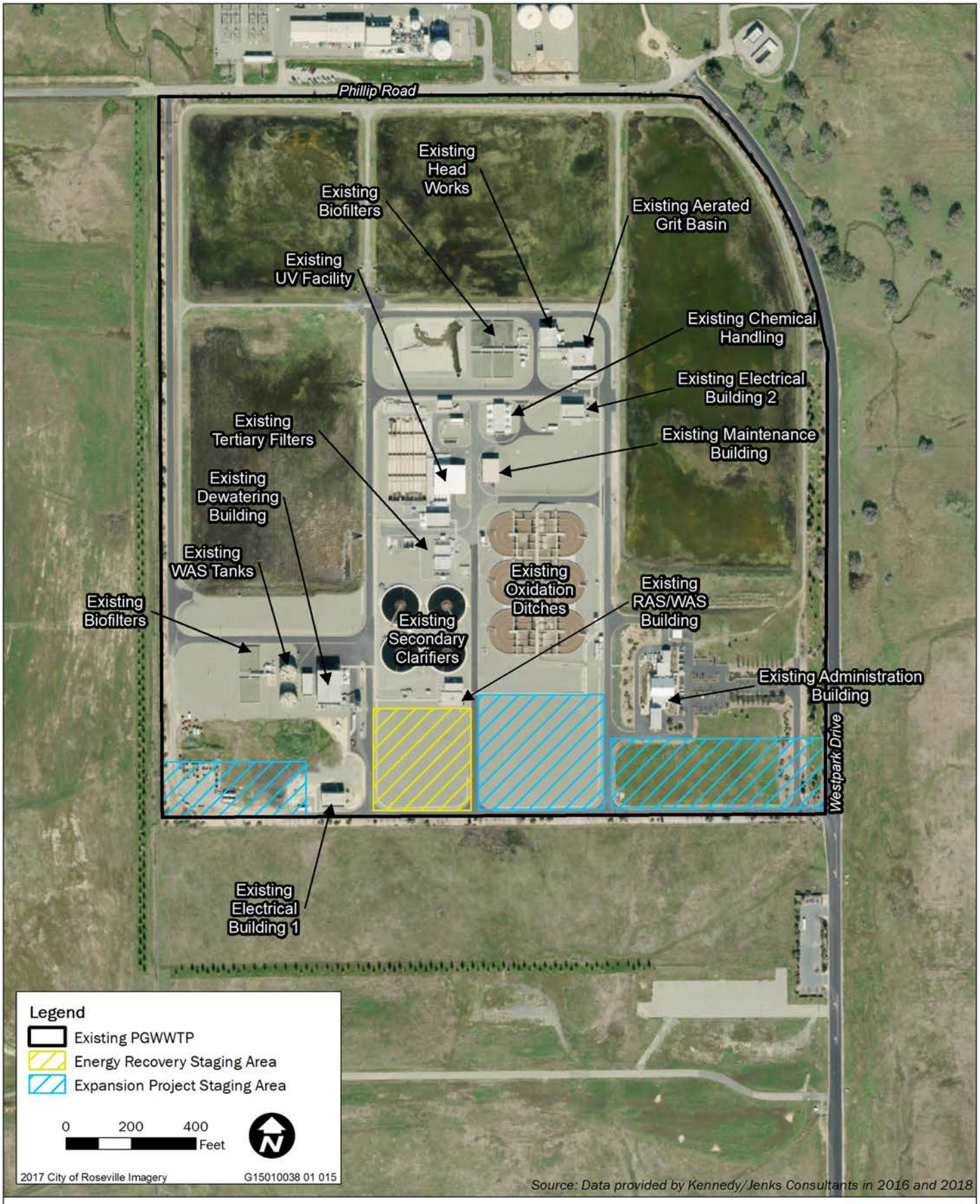

Exhibit 2-4 **Revised Staging Locations**

3 ENVIRONMENTAL CONSEQUENCES OF THE PROPOSED CHANGES

The purpose of the discussion below is to evaluate the environmental issue areas in terms of any "changed condition" (i.e., changed circumstances, project changes, or new information of substantial importance) resulting from the proposed project changes that may result in a different environmental impact significance conclusion from the adopted MND. These resource issue areas are addressed below.

3.1 ISSUES SCOPED OUT OF THE IMPACT EVALUATION

Since the proposed project changes would not result in changes to construction activity or operation of the project, the proposed changes would not affect the analysis of environmental impacts associated with the following issue areas in the 2017 IS/MND, including:

- Aesthetics,
- Agriculture and Forest Resources,
- Geology and Soils,
- Hazards and Hazardous Materials,
- Hydrology and Water Quality,
- Land Use/Planning,
- Mineral Resources,
- Noise,
- Transportation/Traffic,
- Tribal Cultural Resources,
- Utilities and Energy Conservation, and
- Compliance with Federal Regulations (CEQA-Plus compliance).

Also, because the proposed changes would not increase the number of employees beyond the staffing number evaluated in the 2017 IS/MND, the modifications would not affect the analysis of any environmental impacts associated with increased population and subsequent effects associated with housing and services that support those populations in the 2017 IS/MND, including:

- Population and Housing,
- Public Services, and
- Recreation.

Since the proposed changes would not affect the analysis in the 2017 IS/MND for these issue areas, they are not discussed further in this Addendum. This Addendum focuses on those environmental issue areas for which the project changes would result in minor changes in the analysis in the 2017 IS/MND.

3.2 IMPACT ANALYSIS

3.2.1 Air Quality

The 2017 IS/MND identified less than significant impacts related to increases in construction- and operation-related emissions, exposure of sensitive receptors to substantial pollutant concentrations, and odors relative to existing conditions. As indicated in the 2017 IS/MND, construction- and operation-related emissions did not exceed Placer County Air Pollution Control District (PCAPCD) thresholds for air quality. Thus, project impacts for these thresholds were determined to be less than significant.

Construction activities would include grading, trenching, building construction, paving, and architectural coating similar to those described in the 2017 IS/MND. However, the proposed project modifications would result in less ground disturbance because the proposed fueling site would be smaller than previously anticipated. Also, the start of project construction has shifted from fall 2017 to spring of 2019. The modifications would not change the duration of project construction. However, the shift in the project construction schedule to a later year would reduce emissions, compared to emissions estimated in the 2017 IS/MND, because of increasingly stringent criteria air pollutant emissions standards for new diesel construction equipment, resulting in an overall reduction in construction fleet emission rates as older equipment retire (EPA 2016). As such, the proposed modifications would result is slightly less construction-related emissions and the project would not result in new or increased construction-related air quality impacts relative to those evaluated in the 2017 IS/MND.

With respect to operational air quality impacts, the Energy Recovery Project would slightly increase the emissions of criteria pollutants and precursors relative to existing conditions. As discussed in the 2017 IS/MND, the Expansion Project would produce digester gas that would be converted to rCNG and tail gas (which is a byproduct of the rCNG conversion process). The rCNG would be used for fueling solid waste trucks and the tail gas would be used in proposed on-site microturbines to generate electricity for facility operations. The rCNG fuel would offset non-renewable CNG fuel use. As discussed above in Section 2.3, the number of solid waste trucks available for fueling with rCNG has been revised, as well as the anticipated vehicle fuel demand. Relative to the 2017 IS/MND, the proposed project modifications would reduce the number of solid waste trucks anticipated to be fueled at the facility from 55 to 34 trucks per day at project buildout. In addition, the modified project would provide 100-percent rCNG, rather than a blend of rCNG and CNG, as previously anticipated as a result of the reduced fuel demand for the solid waste trucks. The proposed project modifications also reduce the estimate of the daily fuel usage in the solid waste trucks by reducing the anticipated fuel usage from 45 to 27 DGE per truck per day. These changes lower the total amount of rCNG provided to vehicles by about 20 percent from 1,136 to 918 DGE per day.

Because the proposed project modifications would not change the overall amount of digester gas anticipated to be generated by the project, the reduction in rCNG for vehicle fuel would result in an increase in the amount of digester gas sent to the proposed microturbines. All digester gas not used for vehicle fuel would be conditioned and used as fuel for the microturbines. Either tail gas from the upgrading process blended with natural gas or conditioned digester gas would be used as fuel for the microturbines. Digester gas and tail gas have an average methane content of 60 and 28 percent, respectively, while natural gas has an average methane content of 75 percent. Thus, the additional fuel available for the microturbines would also result in additional natural gas demand to blend with the tail gas to meet a minimum of a 50 percent methane content required for combustion in the microturbines (City of Roseville 2016). This would result in an increase in natural gas demand from the microturbines at the 2040 build-out scenario from 624 therms per day, anticipated in the 2017 IS/MND, to maximum of 1,650 therms per day, a 260 percent increase. This assumes the worst-case scenario for natural gas demand where the only available companion fuel to natural gas for the microturbines is tail gas.

The emission factors for nitrogen oxides (NO_X) and volatile organic compounds (VOC) used to quantify emissions from microturbine exhaust were also revised. The 2017 IS/MND used U.S Environmental Protection Agency's (EPA) AP-42 emission factors for uncontrolled gas turbines. For this analysis, NO_X and VOC emission factors were taken from emissions ratings published by Capstone Turbine Corporation, the manufacturer for the 200-kW CR200 microturbines proposed for the Energy Recovery Project, and thus are more precise estimates. NO_X emission factors for CR200 model microturbines are approximately 87 percent less than the NO_X emission factors for an uncontrolled gas turbine in AP-42 (Capstone 2008, EPA 2000). The Capstone CR200 microturbines include NO_X emission control technologies not applied in uncontrolled turbines. Capstone's VOC emission factors are slightly higher than AP-42 emission factors, but better represent the equipment used for the project. This emission factor revision improves the accuracy of the emissions estimates by reflecting the equipment emissions standards and equipment choices under the proposed project. The Capstone Turbine Corporation did not include particulate matter (PM) emission factors. Thus, PM emission factors are still based on AP-42 factors.

The proposed project modifications would not change the proposed wastewater treatment methods or anticipated treatment volume; thus, the modifications would not result in new or substantially worse impacts than identified in the 2017 IS/MND associated with exposure of sensitive receptors to substantial pollutant concentrations or odors.

Based on the changes described, operational emissions from the proposed project modifications were estimated for both the 2020 startup scenario and 2040 build-out scenario. Emissions from operation of the proposed project facilities for 2020 were scaled from 2040 estimates by the difference in the volume of wastewater that would be treated per day (8.07 mgd at startup and 12 mgd at buildout). Table 3-1 summarizes the modeled operational emissions of criteria air pollutants and criteria air pollutant precursors for the proposed project under the 2020 startup scenario. Table 3-1 also compares the emissions results for the 2040 build-out scenario between the 2017 IS/MND and the proposed project with modifications. The 2017 IS/MND did not analyze the 2020 startup scenario, and thus the 2020 startup emissions associated with the 2017 IS/MND assumptions were not included. Refer to Appendix A for detailed modeling input parameters and results.

Table 3-1 Comparison of Modeled Maximum Daily Emissions of Criteria Air Pollutants and Precursors Associated with Energy Recovery Project Operation between Modified Project and 2017 IS/MND[1]

Emissions Source	ROG (lb/day)	NO_X (lb/day)	PM_{10} (lb/day)	$PM_{2.5}$ (lb/day)
2020 Startup				
Mobile Sources[2]	0.5	0.9	2.5	0.2
WWTP Processes[3]	2.3	0.4	-0.2	0.0
Microturbines[4]	1.6	6.4	1.0	0.2
TOTAL	4.4	7.6	3.4	0.4
PCAPCD Thresholds of Significance	55	55	82	NA
Exceeds Thresholds?	No	No	No	NA
2040 Buildout as analyzed in the 2017 IS/MND				
Mobile Sources[2]	2.1	1.4	0.3	0.3
WWTP Processes[5]	11.4	2.1	0.0	0.0
Microturbines[4]	0.2	22.9	0.5	0.1
TOTAL	13.8	26.4	0.8	0.4
PCAPCD Thresholds of Significance	55	55	82	NA
Exceeds Thresholds?	No	No	No	NA
2040 Buildout with Proposed Modifications				
Mobile Sources[2]	1.7	1.2	0.6	0.2
WWTP Processes[5]	11.4	2.1	-0.2	0.0
Microturbines[4]	2.4	9.5	1.3	0.3
TOTAL	15.5	12.8	1.7	0.6
PCAPCD Thresholds of Significance	55	55	82	NA
Exceeds Thresholds?	No	No	No	NA
Difference from 2017 IS/MND at Buildout				
Mobile Sources[2]	-0.4	-0.1	0.3	-0.1
WWTP Processes[5]	0.0	0.0	-0.2	0.0
Microturbines[4]	2.1	-13.5	0.7	0.2
TOTAL	1.7	-13.6	0.8	0.1

Table 3-1 Comparison of Modeled Maximum Daily Emissions of Criteria Air Pollutants and Precursors Associated with Energy Recovery Project Operation between Modified Project and 2017 IS/MND[1]

Notes: Emissions are shown as the difference from existing conditions. Amounts may not sum to totals due to rounding. See Appendix A for more details.

1 Includes operation of proposed Expansion Project.

2 Accounts for changes in employee commute, elimination of WAS hauling, increases in biosolids hauling, increased hauling of high strength waste, increased chemical hauling, and replacing CNG with a rCNG blend in solid waste collection vehicles. Emissions estimated using emission factors from EMFAC2014.

3 The increase in emissions from the expanded WWTP is based on 2014 facility-level emissions report from CARB (CARB 2016) and scaled by the anticipated change in wastewater volume (7.1 to 8.07 mgd).

4 PM emissions estimated using emission factors from EPA's AP-42 guidance documentation for an uncontrolled natural gas turbine (EPA 2000). ROG and NO_X emissions estimated using emission factors from Capstone Turbine Corporation for the C200 model microturbines (Capstone 2008).

5 The increase in emissions from the expanded WWTP is based on 2014 facility-level emissions report from CARB (CARB 2016) and scaled by the anticipated change in wastewater volume (7.1 to 12 mgd).

lb/day = pounds per day
ROG = reactive organic gases
NO^X = oxides of nitrogen
PM^{10} = respirable particulate matter with an aerodynamic diameter of 10 micrometers or less
$PM^{2.5}$ = respirable particulate matter with an aerodynamic diameter of 2.5 micrometers or less
WWTP = wastewater treatment plant
WAS = waste activated sludge
NA = not available
CNG = compressed natural gas
mgd = million gallons per day
CARB = California Air Resources Board

Source: CARB 2016, EPA 2000, PCAPCD 2017, Capstone 2008, modeling conducted by Ascent Environmental in 2018.

As shown in Table 3-1, the proposed project modifications would increase daily criteria air pollutant and precursor emissions from existing conditions at both the 2020 startup and 2040 build-out conditions. With the corrected emission factors ROG and PM emissions are slightly higher than what was anticipated under the 2017 IS/MND. This is due to the corrected VOC emissions factor for microturbines and the increased natural gas usage. However, NO_X emissions would be approximately half of what was analyzed in the 2017 IS/MND. Thus, the emissions of criteria pollutants and precursors would not exceed PCAPCD thresholds at the 2020 startup or the 2040 buildout.

Therefore, the impacts associated PM and VOCs with the proposed project modifications would be higher than those evaluated in the 2017 IS/MND; and impacts associated with NO_X would be lower than those evaluated in the 2017 IS/MND. However, overall, no new impacts to air quality would result from implementation of the proposed project modifications evaluated in this addendum.

3.2.2 Greenhouse Gas Emissions

The 2017 IS/MND found that the Energy Recovery Project would result in a less-than-significant impact associated with generation of GHG emissions. As indicated in the 2017 IS/MND, construction- and operation-related emissions did not exceed PCAPCD thresholds for GHG emissions. Thus, project impacts were determined to be less than significant. Further, the Energy Recovery Project was anticipated to reduce overall operational GHG emissions by offsetting energy demand for CNG fuel in solid waste vehicles and electricity for the PGWWTP and Energy Recovery facilities.

PCAPCD finalized their GHG thresholds in November 2017 which occurred after the completion of the 2017 IS/MND, though the 2017 IS/MND used a draft version of the thresholds. As with the discussion in the 2017 IS/MND, the November 2017 thresholds include an upper bright-line threshold, a lower bright-line threshold, and a consideration of a project's GHG efficiency, which looks at a project's annual GHG emissions on a per-unit basis (e.g., emissions per resident or per square foot), depending on the type of project. In this latest revision, PCAPCD adopted the following GHG thresholds for determining whether a project's GHG emissions would be cumulatively considerable.

- A "de minimis level" mass emission threshold of 1,100 MT CO_2e/year, which, if not exceeded, means the project's GHGs would be less than cumulatively considerable (regardless of the project's GHG efficiency);

- A "bright-line cap" mass emission threshold of 10,000 MT CO_2e/year, which, if exceeded, means the project's GHGs would be cumulatively considerable regardless of the project's GHG efficiency; and

- GHG efficiency-based thresholds for land use development projects, depending on whether the project is rural or urban and residential or non-residential (e.g., 5.5 $MTCO_2e$/year per capita and 27.3 $MTCO_2e$/year/1,000 square feet for residential and non-residential land uses in rural areas, respectively; and 4.5 MT CO_2e/year per capita and 26.5 $MTCO_2e$/year/1,000 square feet for residential and non-residential land uses in urban areas, respectively) (PCAPCD 2017).

This means that a project with emissions that exceed the "de minimis level" threshold would not necessarily result in cumulatively considerable amount of GHG emissions if it can demonstrate that its emissions would be below PCAPCD's GHG efficiency-based thresholds.

Construction of the proposed project modifications would not increase construction-related emissions relative to those evaluated in the 2017 IS/MND, and the proposed modifications would not result in new or increased construction-related GHG emissions beyond those evaluated in the 2017 IS/MND.

With respect to operational air quality impacts, the Energy Recovery Project would slightly increase the emissions of criteria pollutants and precursors relative to existing conditions. As discussed in the 2017 IS/MND, the Expansion Project would produce digester gas that would be converted to rCNG for solid waste trucks and tail gas, which is a byproduct of the rCNG conversion process, would be used in proposed on-site microturbines to generate electricity for facility operations. The rCNG fuel would offset non-renewable CNG fuel use. As discussed above in Section 2.3, the number of solid waste trucks available for fueling with rCNG has been revised, as well as the anticipated vehicle fuel demand.

Because the proposed project modifications would not change the overall amount of digester gas anticipated to be generated by the project, the reduction in rCNG for vehicle fuel would result in an increase in the amount of digester gas sent to the proposed microturbines. As discussed above, the tail gas and any additional digester gas available for the microturbines would also result in additional natural gas demand to meet a minimum of a 50 percent methane content required for combustion in the microturbines. This would result in an increase in natural gas demand from the microturbines at the 2040 build-out scenario from 624 therms per day anticipated in the previous analysis to maximum of 1,650 therms per day, a 260 percent increase. However, with more overall fuel available, the microturbines would also generate more electricity, offsetting additional electricity-related emissions. The microturbines under proposed project modifications would generate 5,260 MWh per year. These modifications do not change the electricity demand of the wastewater treatment processes at buildout (23,182 MWh/year) and the small load from the Energy Recovery Project (1,370 MWh/year). Thus, the increased electricity generation reduces the electricity demand relative to existing conditions (i.e., electricity demand under the modified project minus electricity demand at 7.1 mgd) to 5,580 MWh/year under the 2040 build-out scenario.

To be consistent with the emission factor corrections made for the criteria air pollutant calculations, the CO_2 microturbine emission factors were revised from EPA's AP-42 emission factors for uncontrolled gas turbines to emission factors published by Capstone Turbine Corporation, the manufacturer of the 200-kW microturbines planned for the Energy Recovery Project (Capstone 2008, EPA 2000). This analysis uses the Capstone emission factors that reflect the combined heat and power configurations proposed for the project, which are 53 percent lower than the emission factors for turbines without combined heat and power. Turbines with combined heat and power capture and reuse the heat generated from the turbines during fuel combustion, allowing the turbines to be more efficient than those without combined heat and power configurations. The Capstone Turbine Corporation did not report emission factors for methane (CH_4) or nitrous oxide (N_2O). Thus, CH_4 and N_2O emission factors are still based on AP-42 factors.

Based on the changes described, operational emissions from the proposed project modifications were estimated to include both the 2020 startup scenario and 2040 build-out scenario. Emissions from operation of the proposed project facilities for 2020 were scaled from 2040 estimates by the difference in the volume of wastewater that would be treated per day (8.07 mgd at startup and 12 mgd at buildout). Table 3-2

summarizes the modeled operational GHG emissions for the proposed project under the 2020 startup scenario relative to existing conditions (7.1 mgd). Table 3-3 compares the emissions results for the 2040 build-out scenario between the 2017 IS/MND and the proposed project with modifications. Both tables show that project emissions would be less than PCAPCD's "de minimis level" mass emissions threshold of 1,100 $MTCO_2e$/year, thus other efficiency-based thresholds would not need to be applied. The 2017 IS/MND did not analyze the 2020 startup scenario, and thus the 2020 startup emissions associated with the 2017 IS/MND assumptions were not included.

Table 3-2 Summary of Modeled GHG Emissions Associated with Operation of the Energy Recovery Project at 2020 Startup with Project Modifications[1]

Emissions Source	Existing ($MT CO_2e$/year)	Energy Recovery with Project Modifications ($MT CO_2e$/year)	Net Change from Existing ($MT CO_2e$/year)
Employee Commute[2]	0	7	7
Hauling: HSW	12	4	-8
Hauling: WAS/Biosolids	17	96	79
Hauling: Chemicals	1	1	0
CNG Solid Waste Collection Vehicles[3]	2,093	1,683	-410
Wastewater Treatment Processes[4]	1,364	1,528	164
Microturbines	0	833	833
Net Electricity Consumption	2,380	2,252	-128
Landfilled WAS at WRSL[5]	1,615	0	-1,615
Total	**7,483**	**6,403**	**-1,079**
Amortized Construction Emissions[6]	0	34	34
Total with Amortized Construction Emissions	**7,483**	**6,437**	**-1,045**
		PCAPCD "De Minimis Level" GHG Emission Threshold	1,100
		Exceeds Threshold?	No

Notes: Totals may not equal sum due to rounding.

1 See Appendix B of the 2017 IS/MND and Appendix A of this document for detail on model inputs, assumptions, and project-specific modeling parameters.

2 Only the additional employee commute emissions were quantified.

3 The existing conditions related to CNG solid waste collection vehicles are different than those assumed under the 2017 IS/MND because the intention of this specific analysis is to estimate the emissions offsets associated with the maximum number of displaced vehicles. are predicated on the maximum number of vehicles being fueled by

4 Includes N_2O emissions from nitrification/denitrification and effluent discharge to rivers.

5 Net emissions from landfilling WAS at WRSL, which captures landfill gas and generates electricity with the gas. Assumes a 75 percent collection efficiency, a 99 percent destruction efficiency, and a 36.4 percent efficient generator, based on the operation of CAT 3516 engines (WPWMA 2015, CAT 2016, CARB 2010).

6 Refer Table 3.7-4 in the 2016 IS for a summary of construction-related emissions.

GHG = greenhouse gas
MT CO_2e/year = metric tons of carbon dioxide equivalent per year
HWS = high strength waste
WAS = waste activated sludge
CNG = compressed natural gas
NA = not applicable
PCAPCD = Placer County Air Pollution Control District
WRSL = Western Regional Sanitary Landfill

Source: PCAPCD 2017, Modeling conducted by Ascent Environmental in 2018.

Table 3-3 Summary of Modeled GHG Emissions Associated with Operation of the Energy Recovery Project at 2040 Buildout with Project Modifications[1]

Emissions Source	Net Change in Emissions from Existing Conditions		
	Energy Recovery under 2017 IS/MND (MT CO_2e/year)	Energy Recovery with Project Modifications (MT CO_2e/year)	Change from Previous Analysis (MT CO_2e/year)
Employee Commute[2]	7	7	0
Hauling: HSW	-8	-8	0
Hauling: WAS/Biosolids	126	126	0
Hauling: Chemicals	1	1	0
CNG Solid Waste Collection Vehicles	-1,565	-1,394	171
Wastewater Treatment Processes[3]	880	880	0
Microturbines	1,186	1,309	124
Net Electricity Consumption	882	968	86
Landfilled WAS at WRSL[4]	-1,615	-1,615	0
Total	**-108**	**273**	**381**
Amortized Construction Emissions[5]	34	34	0
Total with Amortized Construction Emissions	**-74**	**307**	**381**
PCAPCD "De Minimis Level" GHG Emission Threshold	1,100	1,100	NA
Exceeds Threshold?	No	No	NA

Notes: Totals may not equal sum due to rounding.

1 See Appendix B of the 2017 IS/MND and Appendix A of this document for detail on model inputs, assumptions, and Project-specific modeling parameters.

2 Only the additional employee commute emissions were quantified.

3 Includes N_2O emissions from nitrification/denitrification and effluent discharge to rivers.

4 Net emissions from landfilling WAS at WRSL, which captures landfill gas and generates electricity with the gas. Assumes a 75 percent collection efficiency, a 99 percent destruction efficiency, and a 36.4 percent efficient generator, based on the operation of CAT 3516 engines (WPWMA 2015, CAT 2016, CARB 2010).

5 Refer Table 3.7-4 in the 2017 IS/MND for a summary of construction-related emissions.

GHG = greenhouse gas
MT CO_2e/year = metric tons of carbon dioxide equivalent per year
HWS = high strength waste
WAS = waste activated sludge
CNG = compressed natural gas
NA = not applicable
PCAPCD = Placer County Air Pollution Control District
WRSL = Western Regional Sanitary Landfill

Source: PCAPCD 2017, Modeling conducted by Ascent Environmental in 2018.

As shown in Tables 3-2 and 3-3, the proposed project modifications would decrease GHG emissions relative to existing conditions at the 2020 startup and increase GHG emissions relative to existing conditions at the 2040 buildout. At startup, the proposed project would have less digester gas available for both vehicles and the microturbines, but the amount of emissions offset by providing rCNG fuel and avoiding the CH_4 emissions from landfilling waste activated sludge (WAS) would result in a net reduction of 1,045 $MTCO_2e$ compared to existing conditions. At buildout, WAS would still be offset and more rCNG would be available for vehicles compared to startup, but the proposed project would also send more digester gas as tail gas to the microturbines, increasing the demand for natural gas in microturbines. The increased natural gas demand is needed to meet the methane concentration requirements for the natural gas and tail gas fuel mix that is used in the microturbines. Under the proposed project modifications and with the CO_2 emission factor corrections, this analysis would change the results of the 2017 IS/MND from a net reduction in emissions to a net increase of 307 $MTCO_2e$. Nevertheless, annual GHG emissions for both the 2020 startup and 2040 build-out scenarios would be below PCAPCD's "de minimis level" mass emissions threshold of 1,100 $MTCO_2e$.

Therefore, the impacts associated with the proposed project modifications would be the same as those evaluated in the 2017 IS/MND. No new impacts of GHG emissions would result from implementation of the proposed project modifications evaluated in this addendum. In addition, Mitigation Measure 3.7-1 in the 2017 IS/MND would continue to be applicable to the project and would reduce GHG impacts to a less-than-significant level. With the project modifications, Mitigation Measure 3.7-1 would reduce GHG emissions from the Expansion Project by 25 percent rather than the 103 percent below existing conditions as described in the 2017 IS/MND. Although the project modifications would reduce the amount of GHG emissions offset by this mitigation measure, the project's GHG emissions would continue to be less than significant and below PCAPCD's "de minimis level" mass emissions threshold of 1,100 $MTCO_2e$. The mitigation monitoring and reporting program for the project has been updated to reflect the updated Mitigation Measure 3.7-1 (Appendix B).

3.2.3 Biological Resources

The 2017 IS/MND identified potentially significant impacts related to loss of 2.5 acres of foraging habitat for Swainson's hawk and white-tailed kite, and potential loss of foraging and nesting habitat for burrowing owl within the Southern Expansion Area as a result of project construction. The Southern Expansion Area is within the planning area for the *West Roseville Specific Plan* and all wetland and grassland impacts, including loss of Swainson's hawk and white-tailed kite foraging habitat, have been evaluated and mitigated for in the environmental impact report (EIR) for the *West Roseville Specific Plan* (City of Roseville 2004). Potentially significant impacts to burrowing owl would be reduced to a less-than-significant impact with implementation of Mitigation Measure 3.4-1 (Implement *West Roseville Specific Plan* EIR Mitigation Measure 4.7-6 Avoid Nesting Sites) from the 2017 IS/MND.

The 2017 IS/MND identified no impacts associated with project construction on special-status plant species, sensitive natural communities, federally-protected wetlands, or interference with wildlife movement and no impact related to conflicts with local policies, ordinances, or an approved habitat conservation plan.

The project modifications would require relocation of the proposed PG&E pipeline to an undeveloped area west of the Energy Recovery Project area that was identified in the 2017 IS/MND. The new pipeline would affect approximately 400 square feet (10 feet by 40 feet). This area was not previously covered by the 2017 IS/MND or the biological resource surveys conducted for the 2017 IS/MND. Therefore, a reconnaissance-level survey for biological resources was conducted on March 14, 2018, for the area not previously covered in the 2017 IS/MND. The revised pipeline area is comprised entirely of annual grassland. No new or sensitive biological resources were identified during the 2018 survey within the revised pipeline area.

Construction of the relocated PG&E pipeline could result in temporary loss of less than 0.01-acre (400 square feet) of annual grassland, which could provide foraging and nesting habitat for borrowing owl. However, the 2017 IS/MND assumed approximately 2.5 acres would be disturbed for construction of the Energy Recovery Project, which included a much longer PG&E pipeline extending to Westpark Drive. Therefore, the 0.01-acre of grassland that would be affected by relocation of the pipeline would reduce the overall acreage of disturbance compared to that analyzed in the 2017 IS/MND. Implementation of Mitigation Measure 3.4-1 (Implement *West Roseville Specific Plan* EIR Mitigation Measure 4.7-6 Avoid Nesting Sites) from the 2017 IS/MND would continue to be implemented to reduce impacts to burrowing owl to a less-than-significant level.

Therefore, the impacts associated with the proposed project modifications would be less than those evaluated in the 2017 IS/MND, and implementation of Mitigation Measures 3.4-1 would continue to reduce any impacts to burrowing owl to a less-than-significant level. Potential impacts to Swainson's hawk and white-tailed kite foraging habitat would continue to be mitigated for in the EIR for the *West Roseville Specific Plan*. No new impacts to biological resources would result from implementation of the proposed project modifications evaluated in this Addendum.

3.2.4 Cultural Resources

Construction-related impacts on presently undocumented cultural resources and human remains were identified as potentially significant in the 2017 IS/MND. These impacts would be reduced to a less-than-significant impact with implementation of Mitigation Measures 3.5-1 and 3.5-2. The 2017 IS/MND identified no impacts associated with construction on documented significant archaeological and historical resources and a less-than-significant impact on previously undocumented paleontological resources.

As described above, the project modifications would require relocation of the PG&E pipeline to an undeveloped area west of the Energy Recovery Project area that was evaluated as part of the 2017 IS/MND. Therefore, an intensive-level pedestrian survey was conducted on March 14, 2018 for the area not previously covered by the 2017 IS/MND. Survey transects were spaced at intervals no greater than 15 meters. During the survey, all visible ground surface within the survey area was carefully examined for cultural material (e.g., flaked stone tools, tool-making debris, stone milling tools, or fire-affected rock), soil discoloration that might indicate the presence of a cultural midden, soil depressions and features indicative of the former presence of structures or buildings (e.g., postholes, foundations), or historic-era debris (e.g., metal, glass, ceramics). Ground disturbances (e.g., animal burrows) were visually inspected. No prehistoric or historic-era archaeological, ethnographic, or historic-era built environment resources were identified during the survey within the survey area.

Therefore, no new cultural or paleontological resources not evaluated in the 2017 IS/MND would be affected by the project modifications. In addition, implementation of Mitigation Measures 3.5-1 and 3.5-2 identified in the 2017 IS/MND would continue to mitigate potential impacts to unknown resources to a less-than-significant level. No new impacts to cultural resources would result from implementation of the project modifications.

3.3 CONCLUSIONS

The project modifications as described above would not alter the conclusions of the 2017 IS/MND. No new significant environmental effects or a substantial increase in the severity of previously identified significant effects would result. Although the project modifications would reduce the amount of GHG emissions offset by Mitigation Measure 3.7-1, as discussed above, the additions would not affect the feasibility of implementing any of the mitigation measures proposed in the 2017 IS/MND. As mentioned above, none of the conditions listed in Section 15162 of the CEQA Guidelines exist for the project modification described herein. Therefore, pursuant to Section 15164 of the CEQA Guidelines, the differences between the approved project described in the 2017 IS/MND and the modifications of the project as currently proposed and described in this Addendum are minor and this Addendum provides sufficient environmental documentation of the environmental effects associated with the project modifications.

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Appendix A

Air Quality and Greenhouse Gas Modeling Data

Construction

Project Facilities

From project description
From data request
Based on best guess
From separate technical studies
Calculated

Expansion	New Construction?	Arch Coating (Interior or Exterior)	Indoors or Outdoor Processes	Building SQFT	Area Disturbed (sqft)	CalEEMod Land Use Construction Match	Notes
Four primary clarifiers with odor control facilities	Yes	Exterior Only	Indoors	9,000	9,000	Industrial General Heavy Industry	
Electrical Building	Yes	Both	Indoors	540	540	Industrial General Heavy Industry	
Solids thickening building	Yes	Exterior Only	Indoors	5,100	5,100	Industrial General Heavy Industry	
Sludge pumping system (2 pumps)	Yes	Exterior Only	Outdoor	200	200	Industrial General Heavy Industry	Approximated from google image search.
Two anaerobic digesters	Yes	Exterior Only	Indoors	12,723	12,723	unrefrigerated warehouse - no rail	
Waste gas burner	Yes	None	Outdoor	Small	-	Industrial General Heavy Industry	
Conversion of a WAS holding tank to a centrate storage tank	No	None	Indoors	NA	NA		
Conversion of a WAS holding tank to a digester sludge holding tank/secondary digester	No	None	Indoors	NA	NA		
Digester control building	Yes	Both	Indoors	6,500	7,062	Industrial General Heavy Industry	
Ancillary facilities - Electrical	Yes	None	Outdoor	NA	NA		
Ancillary facilities - Lighting	Yes	None	Outdoor	NA	NA		

		Notes
TOTAL Building SQFT	34,063	
TOTAL Area Disturbed (acres)	6.1	
TOTAL Interior SQFT for Arch Coating	10,560	See Section 4.7 in Appendix A and Section 7 in Appendix E of the CalEEMod User's Guide
TOTAL Exterior SQFT for Arch Coating	17,032	
Total Imported Material (CY)	34,000	
Total Exported Material (CY)	6,000	

Energy Recovery Facility	New Construction?	Arch Coating (Interior or Exterior)	Indoors or Outdoor Processes	Building SQFT	Area Disturbed (sqft)	CalEEMod Land Use Construction Match	Notes
Three microturbines	Yes	None	Indoors	800	800	Industrial General Heavy Industry	
High strength waste receiving facility	Yes	Exterior Only	Indoors	2,500	3,000	Industrial General Heavy Industry	
Food waste pre-processing facility	Yes	Exterior Only	Indoors	4,000	4,000	Industrial General Heavy Industry	
Digester gas conditioning system	Yes	Exterior Only	Indoors	2,500	2,500	Industrial General Heavy Industry	
Digester gas upgrading system	Yes	Exterior Only	Indoors	NA (mounted on skid)		NA	
Slow Fill Station	Yes	None	Outdoors	45 Pumps	7,500	Gas Station	CalEEMod units are in "pumps". Does not include parking spaces. Based on previous EIR assumptions. Will not be changed to reflect smaller station size under addendum because construction emissions are already LTS
Fast Fill Station	Yes	None	Outdoors	10 Pumps	600	Gas Station	
Piping Trench	Yes	None	Outdoors	500 linear feet			
Ductbank	Yes	None	Outdoors	500 linear feet			
Parking Area		Exterior Only		117,500	117,500	Surface Parking Lot	

		Notes
TOTAL Building SQFT	9,800	
TOTAL Parking area	117,500	
TOTAL Area Disturbed (acres)	2.5	
TOTAL Interior SQFT for Arch Coating	-	See Section 4.7 in Appendix A and Section 7 in Appendix E of the CalEEMod User's Guide
TOTAL Exterior SQFT for Arch Coating (non-parking)	4,900	

Model Inputs and Assumptions

Operation

Expansion Facilities

Four primary clarifiers with odor control facilities		
Electrical Building		
Solids thickening building		
Sludge pumping system		
Two anaerobic digesters		
Waste gas burner		
Digester sludge holding tank/secondary digester		
Digester control building		
Ancillary facilities - Electrical		
Ancillary facilities - Lighting		Source
Existing Electricity Use (kWh)	13,716,000	Kennedy/Jenks

Energy Recovery Facility

Electricity Generation		Source
New Electricity Generation (kWh)	5,256,000	Brown and Caldwell. 3-200 kW microturbines at full load. Email to Stephanie Rasmussen on 4/11/18
New Electricity Load (kWh)	1,370,000	Brown and Caldwell email to Stephanie Rasmussen on 2/26/18
Net Electricity Generation (kWh)	3,886,000	
Collection of FOG traps		Would not result in new activity since a third party is currently doing this collection.
Number of round trips associated with FOG collection per day	1	
Miles per trip with existing FOG collection vendor	20.5	From Clean World in Fruitridge to Roseville, CA (Google Maps)
Miles per trip with City as FOG collection vendor	7	From PGWWTP to Roseville, CA (Google Maps)
New Employees	1	
Miles per trip per employee	15	
Trips per day	2	

FOG = Fats Oils and Grease

Distance between PGWWTP and the Western Regional Sanitary Landfill (mi)	5.6

Construction Emissions Modeling Results

Maximum Daily Emissions by Project Component

Approximate Construction Schedule					**Max Daily Emissions**							
PGWWTP Expansion					Total				Exhaust		Fugitive Dust	
					lbs/day				lbs/day		lbs/day	
Phase Name	Start Date	End Date	Num Days Week	Num Days	ROG	NOX	PM10	PM2.5	PM10	PM2.5	PM10	PM2.5
01_Demolition	10/1/2017	10/5/2017	5	4	0.63	6.71	0.84	0.34	0.273	0.251	0.572	0.094
02_Grading	10/6/2017	12/27/2017	5	59	6.12	64.53	14.72	9.01	2.927	2.699	11.797	6.315
03_Trenching	10/15/2017	1/16/2018	5	67	0.58	4.81	0.46	0.36	0.362	0.333	0.102	0.027
04_Building Construction	1/17/2018	7/17/2019	5	391	0.79	6.18	0.51	0.33	0.285	0.268	0.228	0.061
05_Paving	2/1/2019	2/1/2019	5	1	0.73	7.05	0.52	0.41	0.415	0.382	0.102	0.027
06_Architectural Coating	2/2/2019	10/11/2019	5	180	0.91	1.24	0.12	0.10	0.086	0.086	0.038	0.010
PGWWTP Energy Recovery Facility					Total				Exhaust		Fugitive Dust	
					lbs/day				lbs/day		lbs/day	
Phase Name	Start Date	End Date	Num Days Week	Num Days	ROG	NOX	PM10	PM2.5	PM10	PM2.5	PM10	PM2.5
01_Slab On Grade	2/1/2018	4/15/2019	5	313	2.218	22.135	2.617	1.293	0.927	0.857	1.690	0.437
02_Bollards	4/16/2019	4/17/2019	5	2	0.597	4.708	0.987	0.356	0.137	0.127	0.850	0.229
03_Paving	4/18/2019	7/4/2019	5	56	4.469	46.679	2.881	1.977	1.844	1.697	1.038	0.279
04_Fencing	7/5/2019	7/9/2019	5	3	1.833	18.200	0.919	0.864	0.919	0.864	0.000	0.000
05_Trench for Utilities	7/10/2019	7/19/2019	5	8	1.108	10.229	0.706	0.499	0.476	0.438	0.230	0.061
06_Architectural Coating	7/20/2019	8/14/2019	5	18	3.674	3.720	0.399	0.296	0.258	0.258	0.141	0.037

Construction Emissions Modeling Results

Annual Emissions

Annual Construction Emissions

PGWWTP Expansion

	ROG	NOX	CO	SOX	PM10	PM2.5	Total CO2	CH4	N2O	CO2e
Year	tons/year						MT/year			
2017	0.197	2.049	1.049	0.002	0.448	0.276	202.985	0.058	0.000	204.437
2018	0.087	0.712	0.447	0.001	0.060	0.038	92.626	0.016	0.000	93.031
2019	0.124	0.470	0.351	0.001	0.042	0.027	69.096	0.010	0.000	69.348
Total	**0.409**	**3.231**	**1.847**	**0.004**	**0.550**	**0.341**	**364.706**	**0.084**	**0.000**	**366.816**

PGWWTP Energy Recovery Facility

	ROG	NOX	CO	SOX	PM10	PM2.5	Total CO2	CH4	N2O	CO2e
Year	tons/year						MT/year			
2017	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
2018	0.227	2.322	1.367	0.004	0.202	0.116	322.123	0.050	0.000	323.366
2019	0.231	2.087	1.394	0.004	0.156	0.097	323.293	0.063	0.000	324.875
Total	**0.458**	**4.408**	**2.761**	**0.007**	**0.357**	**0.213**	**645.416**	**0.113**	**0.000**	**648.241**

Combined

	ROG	NOX	CO	SOX	PM10	PM2.5	Total CO2	CH4	N2O	CO2e
Year	tons/year						MT/year			
2017	0.197	2.049	1.049	0.002	0.448	0.276	202.985	0.058	0.000	204.437
2018	0.3	3.0	1.8	0.0	0.3	0.2	414.749	0.066	0.000	416.397
2019	0.355	2.557	1.745	0.004	0.197	0.124	392.388	0.073	0.000	394.223
Total	**0.866**	**7.639**	**4.608**	**0.011**	**0.907**	**0.554**	**1010.122**	**0.197**	**0.000**	**1015.057**

Amortized construction emissions (MT)

	Total CO2	CH4	N2O	CO2e
PGWWTP Expansion	12.157	0.003	0.000	12.227
PGWWTP Energy Recovery Facility	21.514	0.004	0.000	21.608
Combined	33.671	0.007	0.000	33.835

Lifetime (yr) 30

Construction Emissions Modeling Results

Maximum Daily Emissions for Entire Project

Combined and Overlapping Phases					Max Daily Emissions							
					Total				Exhaust		Fugitive Dust	
					lbs/day				lbs/day	lbs/day	lbs/day	lbs/day
First Expansion Phase	Second Expansion Phase	Energy Recovery Phase	Start Date	End Date	ROG	NOX	PM10	PM2.5	PM10	PM2.5	PM10	PM2.5
01_Demolition	None	None	10/01/17	10/05/17	0.632	6.709	0.845	0.345	0.273	0.251	0.572	0.094
02_Grading	None	None	10/06/17	10/14/17	6.120	64.532	14.724	9.014	2.927	2.699	11.797	6.315
02_Grading	03_Trenching	None	10/15/17	12/27/17	6.705	69.343	15.188	9.374	3.289	3.032	11.899	6.342
03_Trenching	None	None	12/28/17	01/16/18	0.585	4.811	0.464	0.360	0.362	0.333	0.102	0.027
04_Building Construction	None	None	01/17/18	01/31/18	0.786	6.184	0.513	0.329	0.285	0.268	0.228	0.061
04_Building Construction	None	01_Slab On Grade	02/01/18	01/31/19	3.004	28.319	3.131	1.623	1.212	1.124	1.919	0.498
04_Building Construction	05_Paving	01_Slab On Grade	02/01/19	02/01/19	3.735	35.373	3.648	2.031	1.627	1.506	2.021	0.525
04_Building Construction	06_Architectural Coating	02_Bollards	02/02/19	04/17/19	2.288	12.129	1.625	0.781	0.508	0.481	1.117	0.300
04_Building Construction	06_Architectural Coating	03_Paving	04/18/19	07/17/19	6.161	54.101	3.519	2.402	2.214	2.051	1.304	0.351
06_Architectural Coating	None	03_Paving	07/18/19	07/04/19	5.375	47.916	3.005	2.073	1.930	1.783	1.076	0.290
06_Architectural Coating	None	04_Fencing	07/05/19	07/09/19	2.739	19.437	1.044	0.960	1.005	0.950	0.038	0.010
06_Architectural Coating	None	05_Trench for Utilities	07/10/19	07/19/19	2.014	11.466	0.831	0.596	0.562	0.524	0.268	0.071
06_Architectural Coating	None	06_Architectural Coating	07/20/19	10/11/19	4.580	4.957	0.523	0.392	0.344	0.344	0.179	0.048
None	None	06_Architectural Coating	10/12/19	08/14/19	3.674	3.720	0.399	0.296	0.258	0.258	0.141	0.037

	lbs/day			
Year	ROG	NOX	PM10	PM2.5
2017	6.7	69.3	15.2	9.4
2018	3.0	28.3	3.1	1.6
2019	6.2	54.1	3.6	2.4
PCAPCD Construction Threhsolds	82	82	82	NA
Exceed thresholds?	No	No	No	

Existing Emissions from Landfilling of Waste Activated Sludge

Methane Production from Landfilled WAS			
	Units	Amount	Source
Daily WAS trucked to Western Regional Sanitary Landfill	lb dry weight/day	12,306	Kennedy/Jenks
Trucking days per week	days	5	Kennedy/Jenks
Annual WAS trucked to Western Regional Sanitary Landfill	MT dry weight/year	1,451	Calculated
IPCC methane emissions factor for landfilled raw sludge	kg CH4/MT dry weight of raw sludge	195	IPCC
Annual Methane Emissions from WAS	MT CH4/year	283	Calculated
Annual Methane Emissions from WAS	MTCO2e/year	7,075.07	Calculated

Fugitive Methane Emissions			
Default Collection Efficiency	Percent of methane captured from Landfill	75%	ARB 2010 (Local Government Operations Protocol)
Fugitive Methane Emissions	MTCH4/year	71	Calculated
Fugitive Methane Emissions	MTCO2e/year	1,768.77	Calculated

Unburned Methane Emissions from Electricity Generation			
Methane sent to generator	MTCH4/year	212.25	Calculated
Default Destruction Efficiency	Percent of Methane Successfully Burned in Generators	99%	ARB 2010 (Local Government Operations Protocol)
Annual emissions from unburned methane	MTCH4/year	2.12	Calculated
Annual emissions from unburned methane	MTCO2e/year	53.06	Calculated

Emissions Credits from Electricity Production from Captured WAS Methane			
	Units	Amount	Source
Heat of Combustion of Methane	MJ/kg CH4	55.50	http://people.hofstra.edu/geotrans/eng/ch8en/conc8en/energycontent.html
Conversion	MJ/kWh	3.6	unit conversion
Energy content in burned methane	kWh/year	3,272,218.96	Calculated
CAT G3561A Efficiency	output energy/input energy	36.4%	http://www.cat.com/en_US/products/new/power-systems/electric-power-generation/gas-generator-sets/18486985.html, http://www.wpwma.com/about-wpwma/
Annual Electricity produced by WAS methane	MWh/year	1,191.09	Calculated
Utility Electricity Emission Factor in 2015	MTCO2/MWh	0.173	PGE Emission Factor for 2014
Utility Electricity Emission Factor in 2015	MTCH4/MWh	1.15E-05	PGE Emission Factor for 2014
Utility Electricity Emission Factor in 2015	MTN2O/MWh	2.10E-06	PGE Emission Factor for 2014
Emissions offset from Electricity Production	MTCO2/year	-205.60	Calculated
Emissions offset from Electricity Production	MTCH4/year	-0.01	Calculated
Emissions offset from Electricity Production	MTN2O/year	-0.002	Calculated
Emissions offset from Electricity Production	MTCO2e/year	-206.69	Calculated

Total 2015 Emissions from WAS Landfilled at Western Regional Sanitary Landfill with LFG Capture and Electricity Conversion			
Source	Units	Amount	Source
Fugitive Methane Emissions	MTCO2e/year	1,769	Calculated
Unburned Methane Emissions from Electricity Generation	MTCO2e/year	53.06	Calculated
Emissions Credits from Electricity Production from Captured WAS Methane	MTCO2e/year	-206.69	Calculated
Total	MTCO2e/year	1,615.14	Calculated

Operational Emissions Modeling Results Summary (Unmitigated)

Sources	Maximum Daily Emissions (lbs/day)				Annual Emissions (tons/ year)						(MT/Year)			
	ROG	NOX	PM10	PM2.5	ROG	NOX	CO	SOX	PM10	PM2.5	CO2	CH4	N2O	CO2e
Existing														
Mobile Sources	0.274	3.996	0.182	0.162	0.050	0.744	21.274	0.000	0.033	0.029	1,926.276	7.819	0.005	2,123.090
Electricity Use	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	2,367.613	0.158	0.029	2,380.125
Wastewater Treatment Processes	16.548	3.014	0.219	0.033	3.022	0.550	0.040	0.000	0.006	0.006	0.000	0.000	4.578	1,364.223
Landfilled WAS at WRSL	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	-205.602	72.859	-0.002	1,615.142
Emissions Total	**16.822**	**7.010**	**0.401**	**0.195**	**3.072**	**1.295**	**21.314**	**0.000**	**0.039**	**0.035**	**4,088.287**	**80.836**	**4.609**	**7,482.579**
Expansion Only														
Existing Facilities + Proposed Project														
Mobile Sources	0.309	4.841	0.372	0.172	0.063	1.116	21.317	0.002	0.043	0.034	2,055.852	7.819	0.005	2,252.681
Electricity Use	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	4,001.599	0.267	0.049	4,022.746
Wastewater Treatment Processes	27.968	5.094	0.056	0.055	5.108	0.930	0.068	0.000	0.010	0.010	0.000	0.000	7.530	2,243.839
Flaring Digester Gas/Natural Gas Boilers	10.876	19.843	0.491	0.164	1.986	3.624	12.478	0.000	0.090	0.030	1,712.793	2.139	0.031	1,775.629
Emissions Total	**39.153**	**29.777**	**0.919**	**0.391**	**7.157**	**5.670**	**33.863**	**0.002**	**0.142**	**0.074**	**7,770.244**	**10.225**	**7.614**	**10,294.896**
Difference from Existing														
Mobile Sources	0.034	0.844	0.190	0.010	0.013	0.372	0.043	0.001	0.010	0.005	129.576	0.001	0.000	129.592
Electricity Use	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	1,633.986	0.109	0.020	1,642.621
Wastewater Treatment Processes	11.420	2.080	-0.164	0.022	2.086	0.380	0.028	0.000	0.004	0.004	0.000	0.000	2.952	879.616
Flaring Digester Gas/Natural Gas Boilers	10.876	19.843	0.491	0.164	1.986	3.624	12.478	0.000	0.090	0.030	1,918.395	-70.720	0.034	160.487
Emissions Total	**22.330**	**22.767**	**0.517**	**0.196**	**4.085**	**4.376**	**12.549**	**0.001**	**0.103**	**0.039**	**3,681.957**	**-70.611**	**3.005**	**2,812.316**
										Amortized Construction Emissions	**12.157**	**0.003**	**0.000**	**12.227**
										Emissions Total with Amortized Construction Emissions	**3,694.114**	**-70.608**	**3.005**	**2,824.543**

				Total emissions per 1,000 sf	**82.9**
PCAPCD Thresholds	**55**	**55**	**82**	PCAPCD GHG Efficiency Threshold (MTCO2e/1000sf)	27.3
Exceeds Thresholds?	**No**	**No**	**No**	**Exceeds Thresholds?**	**Yes**
				Additional Reductions Needed to Meet Target	1,895

2020 Startup: Expansion + Energy Recovery

Existing Facilities + Proposed Project														
Mobile Sources	0.806	4.853	0.597	0.234	0.150	0.990	21.739	0.030	0.051	0.044	1,529.687	10.387	0.005	1,790.733
Electricity Use	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	2,239.970	0.149	0.027	2,251.807
Wastewater Treatment Processes	18.809	3.425	0.037	0.037	5.108	0.930	0.068	0.000	0.010	0.010	0.000	0.000	5.128	1,528.114
Gas Turbine	0.968	3.874	1.019	0.211	0.263	1.052	4.178	0.000	0.230	0.057	729.662	3.223	0.076	832.819
Emissions Total	**20.583**	**12.152**	**1.653**	**0.482**	**5.521**	**2.972**	**25.985**	**0.030**	**0.290**	**0.112**	**4,499.318**	**13.760**	**5.235**	**6,403.473**
Difference from Existing														
Mobile Sources	0.5	0.9	0.4	0.1	0.100	0.246	0.464	0.030	0.018	0.015	-396.590	2.569	0.000	-332.357
Electricity Use	0.0	0.0	0.0	0.0	0.000	0.000	0.000	0.000	0.000	0.000	-127.643	-0.009	-0.002	-128.318
Wastewater Treatment Processes	2.3	0.4	-0.2	0.0	2.086	0.380	0.028	0.000	0.004	0.004	0.000	0.000	0.550	163.890
Gas Turbine	1.0	3.9	1.0	0.2	0.263	1.052	4.178	0.000	0.230	0.057	935.264	-69.636	0.078	-782.322
Emissions Total	**3.8**	**5.1**	**1.3**	**0.3**	**2.449**	**1.678**	**4.670**	**0.030**	**0.251**	**0.076**	**411.031**	**-67.076**	**0.627**	**-1,079.106**
										Amortized Construction Emissions	**0.000**	**0.000**	**0.000**	**0.000**

											Emissions Total with Amortized Construction Emissions	**411.031**	**-67.076**	**0.627**	**-1,079.106**
													Total emissions per 1,000 sf		**-24.6**
PCAPCD Thresholds	**55**	**55**	**82**										PCAPCD GHG Efficiency Threshold (MTCO2e/1000sf)		27.3
Exceeds Thresholds?	**No**	**No**	**No**										**Exceeds Thresholds?**		**No**
													Additional Reductions Needed to Meet Target		0

2040 Buildout: Expansion + Energy Recovery														
Existing Facilities + Proposed Project														
Mobile Sources	2.001	5.244	0.759	0.396	0.373	1.199	22.694	0.101	0.084	0.075	438.518	16.551	0.005	853.703
Electricity Use	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	3,330.810	0.222	0.040	3,348.412
Wastewater Treatment Processes	27.968	5.094	0.056	0.055	5.108	0.930	0.068	0.000	0.010	0.010	0.000	0.000	7.530	2,243.839
Gas Turbine	1.440	5.760	1.257	0.314	0.263	1.052	4.178	0.000	0.230	0.057	1,198.692	3.203	0.102	1,309.145
Emissions Total	**31.409**	**16.098**	**2.072**	**0.765**	**5.743**	**3.181**	**26.940**	**0.101**	**0.323**	**0.143**	**4,968.020**	**19.976**	**7.677**	**7,755.100**
Difference from Existing														
Mobile Sources	1.7	1.2	0.6	0.2	0.322	0.454	1.420	0.101	0.051	0.046	-1,487.758	8.732	0.000	-1,269.386
Electricity Use	0.0	0.0	0.0	0.0	0.000	0.000	0.000	0.000	0.000	0.000	963.197	0.064	0.012	968.287
Wastewater Treatment Processes	11.4	2.1	-0.2	0.0	2.086	0.380	0.028	0.000	0.004	0.004	0.000	0.000	2.952	879.616
Gas Turbine	1.4	5.8	1.3	0.3	0.263	1.052	4.178	0.000	0.230	0.057	1,404.294	-69.657	0.104	-305.997
Emissions Total	**14.6**	**9.1**	**1.7**	**0.6**	**2.671**	**1.886**	**5.626**	**0.101**	**0.284**	**0.107**	**879.733**	**-60.860**	**3.068**	**272.520**
											Amortized Construction Emissions	**33.671**	**0.007**	**0.000**	**33.835**
											Emissions Total with Amortized Construction Emissions	**913.403**	**-60.854**	**3.068**	**306.356**

Mobile Emissions Calculations

	Existing Conditions (with CNG SWCV)	Permitted Current (with CNG SWCV)	Permitted Future - Expansion only (with CNG SWCV) - 2020 Startup	Permitted Future - Energy Recovery Only - 2020 Startup	Permitted Future - 2020 Startup with Energy Recovery (with rCNG SWCV)	Permitted Future - Expansion only (with CNG SWCV) - 2040 Full Buildout	Permitted Future - Energy Recovery Only - 2040 Full Buildout	Permitted Future - Energy Recovery (with rCNG SWCV) - 2040 Full Buildout	Notes
Employee Commute									
Number of new employees	0	0	1	1	2	1	1	2	Only the number of NEW employees were given
Working days per year	365.25	365.25	365.25	365.25	365.25	365.25	365.25	365.25	
Trips per day	2	2	2	2	2	2	2	2	Assumption
Miles per trip per employee (assumption)	15	15	15	15	15	15	15	15	Assumption
Employee VMT per year	0	0	10,957.50	10,957.50	21,915.00	10,957.50	10,957.50	21,915.00	Calculated
Vehicle Type	LDA/LDT1/LDT2								EMFAC2007 categories
Hauling Trips: Collection of HSW/FOG traps									
Number of trips per day	2	2	2	2	2	2	2	2	HSW/FOG collection would not have been diverted to the PGWWTP without the energy recovery facility. HSW/FOG provides more organics to produce 40% additional methane for vehicle fuel.
Collection Days per year	250	250	250	250	250	250	250	250	Assumption
Miles per hauling trip	21	21	21	7	7	21	7	7	Existing HSW/FOG trips are from Clean World in Fruitridge to Roseville city center. Proposed trips would be from PGWWTP to Roseville city center.
VMT per year	10,250	10,250	10,250	3,500	3,500	10,250	3,500	3,500	
Vehicle Type	MMDT								EMFAC2007 categories
Hauling Trips: Biosolids/WAS	**WAS**	**WAS**	**Biosolids**	**Biosolids**	**Biosolids**	**Biosolids**	**Biosolids**	**Biosolids**	
Trucks per day	3.23	5.4	2.29	2.29	2.29	3.41	3.41	3.41	From email from KJ to Ascent on 11/18/2016.
Number of trips per week	32	54	23	23	23	34	34	34	Calculated assuming 2 trips per day, 5 days per week.
Weeks per year	52	52	52	52	52	52	52	52	Assumption
Miles per trip	5.6	5.6	45.0	45.0	45.0	45.0	45.0	45.0	Driving distance to Western Regional Sanitary Landfill. Location of WAS/biosolids disposal not assumed to change.
VMT per year	9,406	15,725	53,661	53,661	53,661	79,794	79,794	79,794	Calculated
Vehicle Type	HHDT								EMFAC2007 categories
Hauling Trips: Chemicals									
Number of trips per week	2	2.7	2.27	2.27	2.27	3.38	3.38	3.38	From data request. Scaled by capacity increase.
Weeks per year	52	52	52	52	52	52	52	52	Assumption
Miles per trip	6.6	6.6	6.6	6.6	6.6	6.6	6.6	6.6	Default vendor distance in CalEEMod
VMT per year	686	918	780	686	780	1,160	1,160	1,160	Calculated
Vehicle Type	MMDT								EMFAC2007 categories

Mobile Emissions Calculations (Continued)

	Existing Conditions (with CNG SWCV)	Permitted Current (with CNG SWCV)	Permitted Future - Expansion only (with CNG SWCV) - 2020 Startup	Permitted Future - Energy Recovery Only - 2020 Startup	Permitted Future - 2020 Startup with Energy Recovery (with rCNG SWCV)	Permitted Future - Expansion only (with CNG SWCV) - 2040 Full Buildout	Permitted Future - Energy Recovery Only - 2040 Full Buildout	Permitted Future - Energy Recovery (with rCNG SWCV) - 2040 Full Buildout	Notes
Hauling Trips: Waste Collection Vehicles									
Number of vehicles	34	34	34	34	34	34	34	34	Numbers based on maximum fueling capacity at build out, not actual number of waste collection vehicles that would operate. Number of vehicles assumed to be the same between existing and project conditions to allow the project to only account for the change in vehicle fuels and not the change in VMT.
Hauling Days per year	365.25	365.25	365.25	365.25	365.25	365.25	365.25	365.25	Assumes all gas produced by the facility would be combusted.
Number of rCNG Vehicles Supported	0	0	0	0	10	0	0	34	From Stephanie's email on 2/15/18
DGE used per day per vehicle	27	27	27	27	27	27	27	27	From Stephanie's email on 2/15/18
DGE used per day (rCNG)	0	0	0	0	270	0	0	918	rCNG vehicles times DGE per day per vehicle
DGE used per day (CNG)	918	918	918	918	648	918	918	0	Total DGE/day minus rCNG DGE/day
Total DGE used per day	918	918	918	918	918	918	918	918	Calculated based on max number of vehicles per day and DGE per vehicle per day
Diesel gallon equivalents (DGE) used per year	335,300	335,300	335,300	335,300	335,300	335,300	335,300	335,300	Multiplied by number of days per year. This assumes all vehicle fuel produced by the Energy Recovery Facility in a year would be combusted.
Miles per diesel gallons equivalent	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	Assumption
VMT per day per vehicle	68	68	68	68	68	68	68	68	For rCNG vehicles, adds difference in miles assuming only one round trip to the fueling station per day per vehicle.
VMT per year	838,249	838,249	838,249	838,249	838,249	838,249	838,249	838,249	Calculated
MMBTU used per year (rCNG)	0	0	0	0	13,708	0	0	46,607	Calculated from rCNG DGE per day
MMBTU used per year (CNG)	46,607	46,607	46,607	46,607	32,899	46,607	46,607	0	Calculated from CNG DGE per day
Total MMBTU per year	46,607	46,607	46,607	46,607	46,607	46,607	46,607	46,607	Calculated
Vehicle Type	T7 SWCV								Solid Waste Collection vehicle under EMFAC2011 Categories

SWCV = Solid Waste Collection Vehicle

328,987.98

Vehicle Activity Summary

Trip Type	Existing Conditions (with CNG SWCV)	Permitted Current (with CNG SWCV)	Permitted Future - Expansion only (with CNG SWCV) - 2020 Startup	Permitted Future - Energy Recovery Only - 2020 Startup	Permitted Future - 2020 Startup with Energy Recovery (with rCNG SWCV)	Permitted Future - Expansion only (with CNG SWCV) - 2040 Full Buildout	Permitted Future - Energy Recovery Only - 2040 Full Buildout	Permitted Future - Energy Recovery (with rCNG SWCV) - 2040 Full Buildout	Vehicle Type
Employee Commute (VMT/year)	0	0	10,958	10,958	21,915	10,958	10,958	21,915	LDA/LDT/LDT2
Hauling Trips: Collection of HSW/FOG traps (VMT/year)	10,250	10,250	10,250	3,500	3,500	10,250	3,500	3,500	MHDT
Hauling Trips: Biosolids/WAS (VMT/year)	9,406	15,725	53,661	53,661	53,661	79,794	79,794	79,794	HHDT
Hauling Trips: Chemicals (VMT/year)	686	918	780	686	780	1,160	1,160	1,160	MHDT
Hauling Trips: Waste Collection Vehicles				838,249			838,249		
rCNG (VMT/year)	0	0	0	0	246,544	0	0	838,249	
CNG (VMT/year)	838,249	838,249	838,249	838,249	591,705	838,249	838,249	0	Non-Renewable CNG for all scenarios except with Energy Recovery whi rCNG-CNG Mix

EMFAC and CA-GREET Emission Factors

Vehicle Type	Source	ROG	NOx	CO	SOx	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N2O	Fuel Type
Tailpipe Emissions in 2020 (g/mi)											
LDA/LDT1/LDT2	EMFAC2014	0.126	0.087	2.552	0.003	0.047	0.020	309.741	0.007	0.000	Mix
HHDT	EMFAC2014	0.146	4.768	0.150	0.017	0.116	0.055	1,784.492	0.008	0.000	Mix
MHDT	EMFAC2014	0.132	2.445	0.180	0.012	0.181	0.096	1,213.274	0.008	0.000	Mix
Renewable CNG	GREET 2015	0.051	0.720	23.020	0.000	0.032	0.030	0.000	8.060	0.001	CNG
Non-Renewable CNG	GREET 2015	0.051	0.720	23.020	0.000	0.032	0.030	1,830.000	8.060	0.001	CNG
Upstream Emissions (g/MMBTU)											
Renewable CNG	CA-GREET 2.0	6.015	1.932	26.237	1.932	0.815	0.815	5,521.844	177.180	0.083	CNG
Non-Renewable CNG	CA-GREET 2.0	0.000	0.000	0.000	0.000	0.000	0.000	3,995.782	7.220	0.079	CNG

Source: EMFAC2014, CA-GREET 2.0, GREET 2015

**Criteria air pollutant factors only include pumping VOC emissions and exclude emissions emitted outside the air district). However, GHG emissions from all upstream categories are included.*

Upstream Emissions from Diesel, rCNG, and CNG

	VOC	CO	NOx	PM10	PM2.5	SOx	CO2	CH4	CH4: leakage	Total CH4	N2O
California Ultra Low-Sulfur Diesel upstream production (g/MMBTU)											
Refining	These emissions are not generated in the air district.						15,299.704	28.267	0.000	28.267	0.270
Transportation Distribution							567.758	0.000	0.000	0.761	0.011
Refueling Station and Bulk Terminal	1.087	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Total	1.087	0.000	0.000	0.000	0.000	0.000	15,867.463	28.267	0.000	29.028	0.281
Wastewater Sludge to CNG production (On-Site Refueling) (g/MMBTU)											
rCNG Production	3.948	17.222	1.268	0.535	0.535	0.017	1,897.160	28.082	134.399	162.482	0.055
On-Site Compression	2.067	9.014	0.664	0.280	0.280	0.009	3,624.684	14.698	0.000	14.698	0.029
Total	6.015	26.237	1.932	0.815	0.815	0.026	5,521.844	42.781	134.399	177.180	0.083
Conventional Compressed Natural Gas upstream production (g/MMBTU)											
NG Compression	These emissions are not generated in the air district.						3,995.782	7.220	0.000	7.220	0.079
Total	0.000	0.000	0.000	0.000	0.000	0.000	3,995.782	7.220	0.000	7.220	0.079

Source: CA-GREET 2.0

Notes: Anaerobic digestion emissions and electricity offsets not included here because they are already accounted for under the Process Emissions analysis. Heating energy needs for digestion would be available from the heat given off by the digester gas-powered microturbine.

rCNG = Renewable CNG

Mobile Emissions Calculations (Continued)

Mobile-Source Emissions Summary

	Maximum Daily Emissions				Annual Emissions									
	lbs/day				tons/ year						MT/Year			
Existing Conditions (with CNG SWCV)	**ROG**	**NOX**	**PM10**	**PM2.5**	**ROG**	**NOX**	**CO**	**SOX**	**PM10**	**PM2.5**	**CO_2**	**CH_4**	**N_2O**	**CO_2e**
Employee Commute	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Hauling Trips: Collection of HSW/FOG traps	0.012	0.221	0.016	0.009	0.001	0.028	0.002	0.000	0.002	0.001	12.436	0.000	0.000	12.438
Hauling Trips: Biosolids/WAS	0.004	0.118	0.003	0.001	0.002	0.049	0.002	0.000	0.001	0.001	16.785	0.000	0.000	16.786
Hauling Trips: Chemicals	0.001	0.015	0.001	0.001	0.000	0.002	0.000	0.000	0.000	0.000	0.833	0.000	0.000	0.833
Hauling Trips: Waste Collection Vehicles	0.258	3.643	0.162	0.152	0.047	0.665	21.271	0.000	0.030	0.028	1,896.223	7.818	0.005	2,093.032
Permitted Current (with CNG SWCV)														
Employee Commute	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Hauling Trips: Collection of HSW/FOG traps	0.012	0.221	0.016	0.009	0.001	0.028	0.002	0.000	0.002	0.001	12.436	0.000	0.000	12.438
Hauling Trips: Biosolids/WAS	0.004	0.118	0.003	0.001	0.003	0.083	0.003	0.000	0.002	0.001	28.061	0.000	0.000	28.064
Hauling Trips: Chemicals	0.001	0.020	0.001	0.001	0.000	0.002	0.000	0.000	0.000	0.000	1.114	0.000	0.000	1.114
Hauling Trips: Waste Collection Vehicles	0.258	3.643	0.162	0.152	0.047	0.665	21.271	0.000	0.030	0.028	1,896.223	7.818	0.005	2,093.032
Permitted Future - Expansion only (with CNG SWCV) - 2020 Startup														
Employee Commute	0.008	0.006	0.169	0.000	0.002	0.001	0.031	0.000	0.001	0.000	3.394	0.000	0.000	3.396
Hauling Trips: Collection of HSW/FOG traps	0.012	0.221	0.016	0.009	0.001	0.028	0.002	0.000	0.002	0.001	12.436	0.000	0.000	12.438
Hauling Trips: Biosolids/WAS	0.029	0.946	0.023	0.011	0.009	0.282	0.009	0.001	0.007	0.003	95.758	0.000	0.000	95.769
Hauling Trips: Chemicals	0.001	0.017	0.001	0.001	0.000	0.002	0.000	0.000	0.000	0.000	0.947	0.000	0.000	0.947
Hauling Trips: Waste Collection Vehicles	0.258	3.643	0.162	0.152	0.047	0.665	21.271	0.000	0.030	0.028	1,896.223	7.818	0.005	2,093.032
Permitted Future - 2020 Startup with Energy Recovery (with rCNG SWCV)														
Employee Commute	0.017	0.012	0.338	0.000	0.003	0.002	0.062	0.000	0.001	0.000	6.788	0.000	0.000	6.792
Hauling Trips: Collection of HSW/FOG traps	0.004	0.075	0.006	0.003	0.001	0.009	0.001	0.000	0.001	0.000	4.246	0.000	0.000	4.247
Hauling Trips: Biosolids/WAS	0.029	0.946	0.023	0.011	0.009	0.282	0.009	0.001	0.007	0.003	95.758	0.000	0.000	95.769
Hauling Trips: Chemicals	0.001	0.017	0.001	0.001	0.000	0.002	0.000	0.000	0.000	0.000	0.947	0.000	0.000	0.947
Hauling Trips: Waste Collection Vehicles	0.756	3.803	0.229	0.219	0.138	0.694	21.667	0.029	0.042	0.040	1,421.947	10.387	0.005	1,682.979
Permitted Future - Expansion only (with CNG SWCV) - 2040 Full Buildout														
Employee Commute	0.008	0.006	0.169	0.000	0.002	0.001	0.031	0.000	0.001	0.000	3.394	0.000	0.000	3.396
Hauling Trips: Collection of HSW/FOG traps	0.012	0.221	0.016	0.009	0.001	0.028	0.002	0.000	0.002	0.001	12.436	0.000	0.000	12.438
Hauling Trips: Biosolids/WAS	0.029	0.946	0.023	0.011	0.013	0.419	0.013	0.001	0.010	0.005	142.392	0.001	0.000	142.407
Hauling Trips: Chemicals	0.001	0.025	0.002	0.001	0.000	0.003	0.000	0.000	0.000	0.000	1.408	0.000	0.000	1.408
Hauling Trips: Waste Collection Vehicles	0.258	3.643	0.162	0.152	0.047	0.665	21.271	0.000	0.030	0.028	1,896.223	7.818	0.005	2,093.032
Permitted Future - Energy Recovery (with rCNG SWCV) - 2040 Full Buildout														
Employee Commute	0.017	0.012	0.338	0.000	0.003	0.002	0.062	0.000	0.001	0.000	6.788	0.000	0.000	6.792
Hauling Trips: Collection of HSW/FOG traps	0.004	0.075	0.006	0.003	0.001	0.009	0.001	0.000	0.001	0.000	4.246	0.000	0.000	4.247
Hauling Trips: Biosolids/WAS	0.029	0.946	0.023	0.011	0.013	0.419	0.013	0.001	0.010	0.005	142.392	0.001	0.000	142.407
Hauling Trips: Chemicals	0.001	0.025	0.002	0.001	0.000	0.003	0.000	0.000	0.000	0.000	1.408	0.000	0.000	1.408
Hauling Trips: Waste Collection Vehicles	1.950	4.186	0.391	0.381	0.356	0.765	22.619	0.099	0.071	0.070	283.685	16.550	0.005	698.850

Mobile Emissions Calculations (Continued)

Mobile-Source Emissions Summary

Difference from Existing

	Maximum Daily Emissions				Annual Emissions									
	lbs/day				tons/ year						MT/Year			
Permitted Current (with CNG SWCV)	**ROG**	**NOX**	**PM10**	**PM2.5**	**ROG**	**NOX**	**CO**	**SOX**	**PM10**	**PM2.5**	**CO_2**	**CH_4**	**N_2O**	**CO_2e**
Employee Commute	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Hauling Trips: Collection of HSW/FOG traps	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Hauling Trips: Biosolids/WAS	0.000	0.000	0.000	0.000	0.001	0.033	0.001	0.000	0.001	0.000	11.276	0.000	0.000	11.278
Hauling Trips: Chemicals	0.000	0.005	0.000	0.000	0.000	0.001	0.000	0.000	0.000	0.000	0.282	0.000	0.000	0.282
Hauling Trips: Waste Collection Vehicles	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Total Mobile Sources	0.000	0.005	0.000	0.000	0.001	0.034	0.001	0.000	0.001	0.000	11.558	0.000	0.000	11.559
Permitted Future - Expansion only (with CNG SWCV) - 2020 Startup														
Employee Commute	0.008	0.006	0.169	0.000	0.002	0.001	0.031	0.000	0.001	0.000	3.394	0.000	0.000	3.396
Hauling Trips: Collection of HSW/FOG traps	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Hauling Trips: Biosolids/WAS	0.025	0.828	0.020	0.009	0.007	0.233	0.007	0.001	0.006	0.003	78.974	0.000	0.000	78.983
Hauling Trips: Chemicals	0.000	0.002	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.114	0.000	0.000	0.114
Hauling Trips: Waste Collection Vehicles	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Total Mobile Sources	0.034	0.836	0.189	0.010	0.009	0.234	0.038	0.001	0.006	0.003	82.482	0.000	0.000	82.492
Permitted Future - 2020 Startup with Energy Recovery (with rCNG SWCV)														
Employee Commute	0.017	0.012	0.338	0.000	0.003	0.002	0.062	0.000	0.001	0.000	6.788	0.000	0.000	6.792
Hauling Trips: Collection of HSW/FOG traps	-0.008	-0.146	-0.011	-0.006	-0.001	-0.018	-0.001	0.000	-0.001	-0.001	-8.190	0.000	0.000	-8.191
Hauling Trips: Biosolids/WAS	0.025	0.828	0.020	0.009	0.007	0.233	0.007	0.001	0.006	0.003	78.974	0.000	0.000	78.983
Hauling Trips: Chemicals	0.000	0.002	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.114	0.000	0.000	0.114
Hauling Trips: Waste Collection Vehicles	0.498	0.160	0.067	0.067	0.091	0.029	0.396	0.029	0.012	0.012	-474.276	2.568	0.000	-410.054
Total Mobile Sources	0.532	0.856	0.414	0.072	0.100	0.246	0.464	0.030	0.018	0.015	-396.590	2.569	0.000	-332.357
Permitted Future - Expansion only (with CNG SWCV) - 2040 Full Buildout														
Employee Commute	0.008	0.006	0.169	0.000	0.002	0.001	0.031	0.000	0.001	0.000	3.394	0.000	0.000	3.396
Hauling Trips: Collection of HSW/FOG traps	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Hauling Trips: Biosolids/WAS	0.025	0.828	0.020	0.009	0.011	0.370	0.012	0.001	0.009	0.004	125.607	0.001	0.000	125.621
Hauling Trips: Chemicals	0.001	0.010	0.001	0.000	0.000	0.001	0.000	0.000	0.000	0.000	0.575	0.000	0.000	0.575
Hauling Trips: Waste Collection Vehicles	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Total Mobile Sources	0.034	0.844	0.190	0.010	0.013	0.372	0.043	0.001	0.010	0.005	129.576	0.001	0.000	129.592
Permitted Future - Energy Recovery (with rCNG SWCV) - 2040 Full Buildout														
Employee Commute	0.017	0.012	0.338	0.000	0.003	0.002	0.062	0.000	0.001	0.000	6.788	0.000	0.000	6.792
Hauling Trips: Collection of HSW/FOG traps	-0.008	-0.146	-0.011	-0.006	-0.001	-0.018	-0.001	0.000	-0.001	-0.001	-8.190	0.000	0.000	-8.191
Hauling Trips: Biosolids/WAS	0.025	0.828	0.020	0.009	0.011	0.370	0.012	0.001	0.009	0.004	125.607	0.001	0.000	125.621
Hauling Trips: Chemicals	0.001	0.010	0.001	0.000	0.000	0.001	0.000	0.000	0.000	0.000	0.575	0.000	0.000	0.575
Hauling Trips: Waste Collection Vehicles	1.692	0.543	0.229	0.229	0.309	0.099	1.348	0.099	0.042	0.042	-1,612.538	8.732	0.000	-1,394.183
Total Mobile Sources	1.727	1.248	0.577	0.234	0.322	0.454	1.420	0.101	0.051	0.046	-1,487.758	8.732	0.000	-1,269.386

WWTP Process Emissions Calculations (continued)

WWTP Process Emissions Equations from ARB's Local Government Protocol

Equation 10.1	Stationary CH_4 from Incomplete Combustion of Digester Gas (site-specific digester gas data)
Annual CH_4 emissions (metric tons CO_2e) =	
(Digester Gas x F_{CH4} x $\rho(CH_4)$ x (1-DE) x 0.0283 x 365.25 x 10^{-6}) x GWP	

Where:

Term		Description	Value
Digester Gas	=	measured standard cubic feet of digester gas produced per day [ft^3/day]	user input
F CH_4	=	measured fraction of CH_4 in biogas	user input
$\rho(CH_4)$	=	density of methane at standard conditions [g/m^3]	662.00
DE	=	CH_4 Destruction Efficiency	.99
0.0283	=	conversion from ft^3 to m^3 [m^3/ft^3]	0.0283
365.25	=	conversion factor [day/year]	365.25
10^{-6}	=	conversion from g to metric ton [metric ton/g]	10^{-6}
GWP	=	Global Warming Potential	21

Source: EPA *Inventory of US Greenhouse Gas Emissions and Sinks: 1990-2007*, Chapter 8, 8-7 (2009).

10.3.2.1 Process Emissions from WWTP with Nitrification/Denitrification

Equation 10.7	Process N_2O Emissions from WWTP with Nitrification/Denitrification
Annual N_2O emissions (metric tons CO_2e) =	
((P_{total} x $F_{ind-com}$) x EF nit/denit x 10^{-6}) x GWP	

Where:

Term		Description	Value
P_{total}	=	total population that is served by the centralized WWTP adjusted for industrial discharge, if applicable [person]	user input
$F_{ind-com}$	=	factor for industrial and commercial co-discharge waste into the sewer system	1.25
EF nit/denit	=	emission factor for a WWTP with nitrification/denitrification [g N_2O/person/year]	7
10^{-6}	=	conversion from g to metric ton [metric ton/g]	10^{-6}
GWP	=	N_2O Global Warming Potential	310

Source: EPA *Inventory of US Greenhouse Gas Emissions and Sinks: 1990-2007*, Chapter 8, 8-13 (2009).

WWTP Process Emissions Calculations (continued)

WWTP Process Emissions Equations from ARB's Local Government Protocol (Continued)

Equation 10.10	Process N_2O Emissions from Effluent Discharge (default N load data)

Annual N_2O emissions (metric tons CO_2e) =

$((P_{total} \times F_{ind\text{-}com}) \times (\text{Total N Load} - \text{N uptake} \times BOD_5 \text{ load}) \times \text{EF effluent} \times 44/28 \times (1 - \text{F plant nit/denit}) \times 365.25 \times 10^{-3}) \times GWP$

Where:

Term		Description	Value
P_{total}	=	population served [person]	user input
$F_{ind\text{-}com}$	=	factor for industrial and commercial co-discharge waste into the sewer system	1.25
Total N Load[27]	=	total nitrogen load [kg N/person/day]	0.026
N uptake[28]	=	nitrogen uptake for cell growth in aerobic system (kg N/kg BOD_5)	0.05[1]
	=	nitrogen uptake for cell growth in anaerobic system (e.g., lagoon) (kg N/kg BOD_5)	0.005[1]
BOD_5 load	=	amount of BOD_5 produced per person per day [kg BOD_5/person/day]	0.090
EF effluent	=	emission factor [kg N_2O-N/kg sewage-N produced]	0.005
44/28	=	molecular weight ratio of N_2O to N_2	1.57
F plant nit/denit	=	fraction of nitrogen removed for the centralized WWTP with nitrification/denitrification	0.7[1]
	=	fraction of nitrogen removed for the centralized WWTP w/o nitrification/denitrification	0.0[1]
365.25	=	conversion factor [day/year]	365.25
10^{-3}	=	conversion from kg to metric ton [metric ton/kg]	10^{-3}
GWP	=	Global Warming Potential	310

Source: EPA *Inventory of US Greenhouse Gas Emissions and Sinks: 1990-2007*, Chapter 8, 8-13 (2009), except:
[1] Grady, C. P. L., Jr., G. T. Daigger, and H. C. Lim, *Biological Wastewater Treatment*, p. 108-109, 644 2nd Edition (1999).

AP-42 Emission Factors

AP-42 Gas Turbine Emission Factors for Digester Gas Turbines (lb/MMBTU)	
VOC	0.006
NOx	0.160
PM10	0.012
CO	0.017
CO2	27.000
Source: EPA AP-42 Emission Factors	

WWTP Process Emissions Calculations (Continued)

Process Emissions Summary

	Maximum Daily Emissions						Annual Emissions									
	lbs/day	lbs/day	lbs/day	lbs/day	lbs/day	lbs/day	tons/ year	tons/ year	tons/ year	tons/ year	tons/ year	tons/ year	MT/Year	MT/Year	MT/Year	MT/Year
Scenario	**ROG**	**NOX**	**CO**	**PM10**	**PM2.5**	**TAC**	**ROG**	**NOX**	**CO**	**PM10**	**PM2.5**	**TAC**	**CO2**	**CH4**	**N2O**	**CO2e**
Existing Conditions	**16.548**	**3.014**	**0.219**	**0.033**	**0.033**	**0.000**	**3.022**	**0.550**	**0.040**	**0.006**	**0.006**	**0.000**	**0.000**	**0.000**	**4.578**	**1,213.151**
Wastewater Treatment Processes/Digester Gas Production	16.548	3.014	0.219	0.033	0.033	0.000	3.022	0.550	0.040	0.006	0.006	0.000	0.000	0.000	4.578	1,213.151
Gas Turbine	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Permitted Current	**22.142**	**4.032**	**0.293**	**0.044**	**0.044**	**0.000**	**4.044**	**0.736**	**0.054**	**0.008**	**0.008**	**0.000**	**0.000**	**0.000**	**6.125**	**1,623.231**
Wastewater Treatment Processes/Digester Gas Production	22.142	4.032	0.293	0.044	0.044	0.000	4.044	0.736	0.054	0.008	0.008	0.000	0.000	0.000	6.125	1,623.231
Gas Turbine	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Permitted Future	**28.200**	**11.453**	**1.046**	**0.532**	**0.055**	**0.018**	**5.150**	**2.092**	**0.191**	**0.097**	**0.010**	**0.003**	**177.783**	**2.628**	**7.530**	**2,246.718**
Wastewater Treatment Processes/Digester Gas Production	27.968	5.094	0.370	0.056	0.055	0.000	5.108	0.930	0.068	0.010	0.010	0.000	0.000	0.000	7.530	1,995.360
Gas Turbine	0.231	6.359	0.676	0.477	0.000	0.018	0.042	1.161	0.123	0.087	0.000	0.003	177.783	2.628	0.000	251.357

Process Emissions Summary - Difference from Existing

	Maximum Daily Emissions						Annual Emissions									
	lbs/day	lbs/day	lbs/day	lbs/day	lbs/day	lbs/day	tons/ year	tons/ year		tons/ year	tons/ year		MT/Year	MT/Year	MT/Year	MT/Year
Scenario	**ROG**	**NOX**	**CO**	**PM10**	**PM2.5**	**TAC**	**ROG**	**NOX**		**PM10**	**PM2.5**		**CO2**	**CH4**	**N2O**	**CO2e**
Permitted Current	**5.594**	**1.019**	**0.074**	**0.011**	**0.011**	**0.000**	**1.022**	**0.186**	**0.014**	**0.002**	**0.002**	**0.000**	**0.000**	**0.000**	**1.547**	**410.079**
Wastewater Treatment Processes/Digester Gas Production	5.594	1.019	0.074	0.011	0.011	0.000	1.022	0.186	0.014	0.002	0.002	0.000	0.000	0.000	1.547	410.079
Gas Turbine	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Permitted Future	**11.652**	**8.439**	**0.827**	**0.500**	**0.022**	**0.018**	**2.128**	**1.541**	**0.151**	**0.091**	**0.004**	**0.003**	**177.783**	**2.628**	**2.952**	**1,033.566**
Wastewater Treatment Processes/Digester Gas Production	11.420	2.080	0.151	0.023	0.022	0.000	2.086	0.380	0.028	0.004	0.004	0.000	0.000	0.000	2.952	782.209
Gas Turbine	0.231	6.359	0.676	0.477	0.000	0.018	0.042	1.161	0.123	0.087	0.000	0.003	177.783	2.628	0.000	251.357

Assumptions

Category	Value	Notes	Source
Conversions			
g/lb	453.592		
g/MT	1000000		
g/ton	907185		
lb/MT	2204.622622		
kg/MT	1000		
kWh/MWh	1000		
MWh/GWh	1000		
Btu/therm	100000		
MMBtu/therm	0.1		
LPG Gallons/GGE	1.344086022		
LNG Gallons/GGE	1.572327044		
gal diesel/MMBTU diesel	7.194244604		
BTU/f3	621	for digester gas only.	http://www.engineeringtoolbox.com/heating-values-fuel-gases-d_823.html
MMBTU/scf	0.000621		
gal/cubic foot	7.480519481		
gal/Liter	3.785411784		
gallon/acrefoot	325851.429		
GWP			
CO2	1		
CH4	28	100 year lifespan.	IPCC Fifth Assessment Report - Chapter 8. Table 8.7
N2O	265	100 year lifespan.	IPCC Fifth Assessment Report - Chapter 8. Table 8.7
Energy Emission Factors	**Value**	**Notes**	**Source**
lbs CO2/MWh	434.92	Electricity (2014 PGE EF)	The Climate Registry 2016
MT CO2/MWh	0.197	Electricity (2014 PGE EF)	Calculated
MT CO2/MWh	0.253	Electricity (2014 PGE EF)	Calculated
lb CH4/GWh	31.12	Electricity (22.7% renewable)	eGrid 2012 (Updated October 2015) https://www.epa.gov/energy/egrid-faq/ State-wide RPS percent from CPUC 2016 for 2013.
lb N2O/GWh	5.67	Electricity (22.7% renewable)	
MT CO2/MWh	0.197	Electricity - 2014 (28% renewable)	CPUC 2016 http://www.cpuc.ca.gov/RPS_Homepage/
MT CO2/MWh	0.173	Electricity - 2020 (37% renewable)	CPUC 2016 (PGE is under a 37% RPS contract by 2020)
MT CH4/MWh	1.15E-05	Electricity (37% renewable)	Calculated from eGrid 2012 assuming eGrid factors are represented by 22.7% renewables
MT N2O/MWh	2.10E-06	Electricity (37% renewable)	
lbs CO2/MWh	434.92	Electricity - 2014 (28% renewable)	Calculated
lbs CO2/MWh	380.56	Electricity - 2020 (37% renewable)	Calculated
lb CH4/MWh	0.027	Electricity (37% renewable)	Calculated
lb N2O/MWh	0.00499	Electricity (37% renewable)	Calculated

Appendix B

Revised Mitigation Monitoring and Reporting Program

MITIGATION MONITORING AND REPORTING PROGRAM

INTRODUCTION

In accordance with the California Environmental Quality Act (CEQA) Public Resources Code Section 21000 et seq.), the City of Roseville (City) prepared an Initial Study/Mitigated Negative Declaration (IS/MND) that identified adverse environmental impacts related to construction and operation of the Pleasant Grove Wastewater Treatment Plant (PGWWTP) Expansion and Energy Recovery Project (Project). The IS/MND also identifies mitigation measures that would reduce the identified impacts to a less-than-significant level, or that would eliminate these impacts all together.

CEQA Guidelines require public agencies "to adopt a reporting and monitoring program for changes to the project which it has adopted or made a condition of project approval in order to mitigate or avoid significant effects on the environment." A Mitigation Monitoring and Reporting Program (MMRP) is required for the Project because the IS/MND identifies potential significant adverse impacts related to the Project implementation, and mitigation measures have been identified to reduce those impacts. Adoption of the MMRP would occur along with approval of the Project.

PURPOSE OF MITIGATION MONITORING AND REPORTING PROGRAM

This MMRP has been prepared to ensure that all required mitigation measures are implemented and completed in a satisfactory manner before and during Project construction and operation. The MMRP may be modified by the City during Project implementation, as necessary, in response to changing conditions or other refinements. The attached table has been prepared to assist the responsible parties in implementing the mitigation measures. The table identifies individual mitigation measures, monitoring/mitigation timing, person/agency responsible for implementing each measure, monitoring and reporting procedures, and provides space to confirm implementation of the mitigation measures. The numbering of mitigation measures follows the numbering sequence found in the IS/MND.

ROLES AND RESPONSIBILITIES

Unless otherwise specified herein, the City is responsible for taking all actions necessary to implement the mitigation measures under its jurisdiction according to the specifications provided for each measure and for demonstrating that the action has been successfully completed. The City, at its discretion, may delegate implementation responsibility or portions thereof to a licensed contractor or other designated agent.

The City would be responsible for overall administration of the MMRP and for verifying that City staff members and/or the construction contractor has completed the necessary actions for each measure. The City would designate a project manager to oversee implementation of the MMRP. Duties of the project manager include the following:

- Ensure routine inspections of the construction site are conducted by appropriate City staff; check plans, reports, and other documents required by the MMRP; and conduct report activities.
- Serve as a liaison between the City and the contractor or project applicant regarding mitigation monitoring issues.
- Complete forms and maintain reports and other records and documents generated for the MMRP.

- Coordinate and ensure that corrective actions or enforcement measures are taken, if necessary.

The responsible party for implementation of each item would identify the staff members responsible for coordinating with the City on the MMRP.

MITIGATION MONITORING AND REPORTING PLAN TABLE

The categories identified in Table 1 are described below.

- Mitigation Measure – This column provides the text of the mitigation measures identified in the approved IS/MND.
- Applicable Project – This column indicates whether the mitigation measure listed would be required for implementation of the Expansion Project, Energy Recovery Project, or both.
- Responsible Party/Monitor – this column identifies the party responsible for enforcing compliance with the requirements of the mitigation measure and monitoring that compliance.
- Timing – this column identifies the time frame in which the mitigation will be implemented.

Table 1 PGWWTP Expansion and Energy Recovery Project Mitigation Monitoring and Reporting Program

Mitigation Measure	Applicable Project	Responsible Party/Monitor	Timing/Phase	Verification of Compliance
3.4 Biological Resources				
Mitigation Measure 3.4-1 (Implement *West Roseville Specific Plan* EIR Mitigation Measure 4.7-6 Avoid Nesting Sites): The *West Roseville Specific Plan* EIR includes Mitigation Measure 4.7-6 Avoid Nesting Sites. This mitigation measure addresses potential impacts to fully protected bird and raptor species. The only protected bird species that has the potential to be affected by the Energy Recovery Project is burrowing owl. Therefore, those requirements listed under Mitigation Measure 4.7-6 that are not applicable to the Project have been omitted below: (b) Prior to the beginning of mass grading, including grading for major infrastructure improvements, during the period between February 15 and August 30, all trees and potential burrowing owl habitat within 350 feet of grading or earthmoving activity shall be surveyed for active raptor nests or burrows by a qualified biologist no more than 3 days prior to disturbance. In addition, if there is a break in construction activity lasting longer than 2 weeks, new nesting bird surveys must be conducted prior to resuming construction activities. If active raptor nests or burrows are found, and the site is within 350 feet of potential construction activity, a fence shall be erected around the tree or burrow(s) at a distance of 350 feet, depending on the species, from the edge of the canopy to prevent construction disturbance and intrusions on the nest area. The appropriate buffer shall be determined by the City in consultation with CDFW. (c) No construction vehicles shall be permitted within restricted areas (i.e., raptor protection zones), unless directly related to the management or protection of the legally protected species. (d) In the event that a nest is abandoned, despite efforts to minimize disturbance, and if the nestlings are still alive, the City shall contact CDFW and, subject to CDFW approval, fund the recovery and hacking (controlled release of captive reared young) of the nestling(s). (f) The City, in consultation with CDFW, shall conduct a pre-construction survey within the phases of the project site that are scheduled for construction activities. The survey shall be conducted by a qualified biologist to determine if burrowing owls are occupying the project site. The survey shall be conducted no more than three weeks prior to grading of the project site. Should construction activities cause the nesting bird to vocalize, make defensive flights at intruders, get up from a brooding position, or fly off the nest, then the exclusionary buffer will be increased such that activities are far enough from the nest to stop this agitated behavior. The exclusionary buffer will remain in place until the chicks have fledged or as otherwise determined by a qualified biologist. If the above survey does not identify burrowing owls on the project site, then no further mitigation would be required. However, should burrowing owls be found on the project site, the following measures shall be required. (g) The City shall avoid all potential burrowing owl burrows that may be disturbed by project construction during the breeding season between February 15 and August 30 (the period when the nest burrows are typically occupied by adults with eggs or young). Avoidance shall include the establishment of a 350-foot diameter non-disturbance buffer zone around any occupied burrows.	Energy Recovery Project	City of Roseville	Prior to and during construction	

Table 1 PGWWTP Expansion and Energy Recovery Project Mitigation Monitoring and Reporting Program

Mitigation Measure	Applicable Project	Responsible Party/Monitor	Timing/Phase	Verification of Compliance
The buffer zone shall be delineated by highly visible temporary construction fencing. Disturbance of any occupied burrows shall only occur outside of the breeding season (August 30 through February 15). (h) Based on approval by CDFW, preconstruction and nonbreeding season exclusion measures may be implemented to preclude burrowing owl occupation of the project site prior to project-related disturbance (such as grading). Burrowing owls may be passively excluded from burrows in the construction area by placing one-way doors in the burrows according to current CDFW protocol. The one-way doors must be in place for a minimum of three days. All burrows that may be occupied by burrowing owls, regardless of whether they exhibit signs of occupation, must be cleared. Burrows that have been cleared through the use of one-way doors shall then be closed or backfilled to prevent owls from entering the burrow. The one-way doors shall not be used more than two weeks before construction to ensure that owls do not recolonize the area of construction.				
3.5 Cultural Resources				
Mitigation Measure 3.5-1: In the event that any prehistoric or historic-era subsurface archaeological features or deposits, including locally darkened soil (potentially a "midden"), that could conceal cultural deposits, are discovered during construction, all ground-disturbing activity within 100 feet of the resources shall be halted and a qualified professional archaeologist shall be retained to assess the significance of the find. If the find is determined to be significant by the qualified archaeologist (i.e., because it is determined to constitute either an historical resource or a unique archaeological resource), the archaeologist shall develop appropriate procedures to protect the integrity of the resource and ensure that no additional resources are affected. Procedures could include but would not necessarily be limited to preservation in place, archival research, subsurface testing, or contiguous block unit excavation and data recovery.	Expansion Project & Energy Recovery Project	City of Roseville/Contractor	During construction	
Mitigation Measure 3.5-2: If human remains are discovered during any construction activities, potentially damaging ground-disturbing activities in the area of the remains will be halted immediately, and the City will notify the Placer County coroner and the NAHC immediately, according to Section 5097.98 of the State Public Resources Code and Section 7050.5 of California's Health and Safety Code. If the remains are determined by the NAHC to be Native American, the guidelines of the NAHC will be adhered to in the treatment and disposition of the remains. The City will also retain a professional archaeologist with Native American burial experience to conduct a field investigation of the specific site and consult with the Most Likely Descendant (MLD), if any, identified by the NAHC. Following the coroner's and NAHC's findings, the archaeologist, and the NAHC-designated MLD will determine the ultimate treatment and disposition of the remains and take appropriate steps to ensure that additional human interments are not disturbed. The responsibilities for acting upon notification of a discovery of Native American human remains are identified in California Public Resources Code Section 5097.94.	Expansion Project & Energy Recovery Project	City of Roseville/Contractor	During construction	

Table 1 PGWWTP Expansion and Energy Recovery Project Mitigation Monitoring and Reporting Program

Mitigation Measure	Applicable Project	Responsible Party/Monitor	Timing/Phase	Verification of Compliance
3.7 Greenhouse Gas Emissions				
Mitigation Measure 3.7-1: To reduce GHG emissions from the Expansion Project, the City may choose any combination of the following measures, to achieve a net reduction of 1,725 MT CO_2e/year (equivalent to reducing the use of 194,104 gallons of gasoline or generating 9,941 MWh/year of electricity from renewable energy): ◢ improve energy efficiency and provide renewable vehicle fuels through the construction and implementation of the Energy Recovery Project which would reduce additional operational emissions from the Expansion Project by 25 percent; ◢ purchase electricity from a higher percentage of renewable sources; or ◢ purchase GHG offsets. Implementation of Mitigation Measure 3.7-1 would ensure that GHG emissions would be reduced below recommended thresholds of significance. The cogeneration capabilities of the Energy Recovery Project would prevent methane-containing digester gas from being flared at the PGWWTP, would combine the conditioned and upgraded digester gas with natural gas to create renewable fuel blend for CNG vehicles, and use the waste tail gas, from digester gas upgrade process (blended with natural gas) for the generation of electricity and heat for digesters. This cogeneration capability would relieve electrical load from local utilities by providing a direct and renewable source of electricity for the PGWWTP.	Expansion Project	City of Roseville	Following construction	
3.12 Noise				
Mitigation Measure 3.12-1: Noise curtains shall be used during any nighttime construction activity (i.e., occurring between 10:00 p.m. and 7:00 a.m.) involving the operation of heavy equipment or haul trucks on the west side of the Project site (i.e., where there are sensitive receptors closer than 1,600 feet). The temporary noise curtains shall meet the following criteria: ◢ The temporary noise curtains shall achieve at a minimum 3 dB noise reduction; ◢ The temporary noise curtains shall be located or as close as possible to the area where heavy construction equipment would be operated; and ◢ Temporary noise curtains shall consist of durable, flexible composite material featuring a noise barrier layer bounded to sound-absorptive material on one side. The noise barrier layer shall consist of rugged, impervious, material with a surface weight of at least one pound per square foot, and shall be designed to block the line-of sight between construction activities and affected receptors.	Expansion Project & Energy Recovery Project	Contractor/City of Roseville	During construction	

Table 1 PGWWTP Expansion and Energy Recovery Project Mitigation Monitoring and Reporting Program

Mitigation Measure	Applicable Project	Responsible Party/Monitor	Timing/Phase	Verification of Compliance
3.16 Transportation/Traffic				
Mitigation Measure 3.16-1: The City will require the construction contractor to implement a traffic management plan before construction activities begin. The traffic management plan will include measures to ensure local traffic, including bicycle traffic, is accommodated during construction. This plan would identify general methods by which construction activities will be managed to minimize substantial hazards related to large trucks. These methods may include (but are not limited to): ◢ appropriately sequencing activities (e.g., segment phasing, timing of grading, hours of construction) to minimize conflicts with traffic on affected roadways, ◢ maintaining traffic flow in the project area to the extent possible, ◢ maintaining bicycle and pedestrian access, and ◢ use of flaggers to direct traffic, as needed for ingress or egress of large trucks.	Expansion Project & Energy Recovery Project	Contractor/City of Roseville	Prior to and during construction	