APPENDICES

CEQA Plus Initial Study and Mitigated Negative Declaration

Stirling City Sewer Rehabilitation Planning Project

April 2020

Lead Agency:

Butte County Department of Public Works
7 County Center Drive
Oroville, California 95965

Prepared by:

ECORP Consulting, Inc.
ENVIRONMENTAL CONSULTANTS

55 Hanover Lane
Suite A
Chico, California 95973

Appendices

Appendix A

Stirling City Sewer Rehabilitation Planning Project – Emissions Memorandum

ECORP Consulting, Inc.
ENVIRONMENTAL CONSULTANTS

February 14, 2020

Butte County Department of Public Works
7 County Center Dr.,
Oroville, California 95965

RE: Stirling City Sewer Rehabilitation Planning Project – Emissions Memorandum

To Whom it May Concern:

On behalf of ECORP Consulting, Inc. (Seth Myers - Senior AQ and Noise Specialist) has conducted an Emissions Memorandum (Air Quality/Global Greenhouse Gas Emissions Analysis) for the proposed Stirling City Sewer Rehabilitation Planning Project (Project) located in the community of Stirling City in unincorporated Butte County, California. The purpose of this memorandum is to assess the projects potential impacts related to air quality and greenhouse gas emissions within the area.

PROJECT DESCRIPTION

The Project is the rehabilitation of a portion of the wastewater collection system under the authority of County Service Area (CSA) 82, Stirling City Sewer System. Replacement and repair of portions of the system has been completed in the past, but further rehabilitation is needed. Approximately 2,700 linear feet of the original 5,500-foot clay pipe wastewater collection system needs replacement. The Project will also include the replacement of 12 existing manholes with ten standard manholes and the installation of 75 new laterals (12 linear feet each). Known deficiencies determined by the County include aging pipe, lack of standard manholes for proper system maintenance, possible root intrusion and infiltration and inflow due to disjointed piping. All construction will occur within the existing pipeline right-of-way under unpaved alleys and roads throughout the small community.

The Proposed Project will:

- replace the existing 12 manholes with ten standard precast concrete sewer manholes
- replace some or all of the existing 8" clay sewer mains with 8" polyvinyl chloride (PVC) sewer mains
- re-establish existing sewer lateral connections to the proposed sewer main.

ENVIRONMENTAL SETTING

Northern Sacramento Valley Air Basin

The Proposed Project is located within the Northern Sacramento Valley Air Basin (NSVAB). The NSVAB consists of seven counties: Sutter, Yuba, Colusa, Butte, Glenn, Tehama, and Shasta. The NSVAB is bounded on the north and west by the Coastal Mountain Range and on the east by the southern end of the Cascade Mountain Range and the northern end of the Sierra Nevada. These mountain ranges reach

55 Hanover Lane • Chico, CA 95973 • Tel: (530) 965-5925 • Fax: (916) 782-9134 • Web: www.ecorpconsulting.com

heights in excess of 6,000 feet above mean sea level, with individual peaks rising much higher. The mountains form a substantial physical barrier to locally created pollution as well as to pollution transported northward on prevailing winds from the Sacramento metropolitan area (SVAQEEP 2015).

The environmental conditions of Butte County are conducive to potentially adverse air quality conditions. The basin area traps pollutants between two mountain ranges to the east and the west. This problem is exacerbated by a temperature inversion layer that traps air at lower levels below an overlying layer of warmer air. Prevailing winds in the area are generally from the south and southwest. Sea breezes flow over the San Francisco Bay Area and into the Sacramento Valley, transporting pollutants from the large urban areas. Growth and urbanization in Butte County have also contributed to an increase in emissions.

CRITERIA AIR POLLUTANTS

Criteria air pollutants are defined as those pollutants for which the federal and state governments have established air quality standards for outdoor or ambient concentrations to protect public health with a determined margin of safety. Ozone (O_3), course particulate matter (PM_{10}), and fine particulate matter ($PM_{2.5}$) are generally considered to be regional pollutants because they or their precursors affect air quality on a regional scale. Pollutants such as carbon monoxide (CO), nitrogen dioxide (NO_2), and sulfur dioxide (SO_2) are considered to be local pollutants because they tend to accumulate in the air locally. PM is also considered a local pollutant.

AIR QUALITY ANALYSIS

Would the Project Conflict with or Obstruct Implementation of the Applicable Air Quality Plan?

As part of its enforcement responsibilities, the USEPA requires each state with nonattainment areas to prepare and submit a State Implementation Plan that demonstrates the means to attain the federal standards. The SIP must integrate federal, state, and local plan components and regulations to identify specific measures to reduce pollution in nonattainment areas, using a combination of performance standards and market-based programs. Air quality attainment plans outline emissions limits and control measures to achieve and maintain these standards by the earliest practical date. The Butte County portion of the NSVAB is classified nonattainment for the federal O_3 standard.

The *2015 Air Quality Attainment Plan* is the most recent air quality planning document covering Butte County. Air quality attainment plans are a compilation of new and previously submitted plans, programs (such as monitoring, modeling, permitting, etc.), district rules, state regulations, and federal controls describing how the state will attain ambient air quality standards. State law makes CARB the lead agency for all purposes related to the *Air Quality Attainment Plan*. Local air districts prepare air quality attainment plans and submit them to CARB for review and approval. The *2015 Air Quality Attainment Plan* includes forecast reactive organic gas (ROG) and NO_X emissions (O_3 precursors) for the entire NSVAB through the year 2020. The plan also includes control strategies necessary to attain the California O_3 standard at the earliest practicable date, as well as developed emissions inventories and associated emissions projections for the region showing a downtrend for both ROG and NO_X.

The consistency of the proposed Project with the *2015 Air Quality Attainment Plan* is determined by its consistency with air pollutant emission projections in the plan. The *2015 Air Quality Attainment Plan* addresses growth by projecting the growth in emissions based on different indicators. For example, population forecasts adopted by local governments are used to forecast population-related emissions. Through the planning process, emission growth is offset by basin-wide controls on stationary, area, and transportation sources of air pollution. In other words, the plans and control measures in the *Air Quality Attainment Plan* are based on information derived from projected growth in order to predict future emissions and then determine strategies and regulatory controls for the reduction of emissions. The Project does not include development of new housing or employment centers and would not induce population or employment growth. Therefore, the Project would not affect local plans for population growth and the proposed Project would be considered consistent with the population, housing, and employment growth projections utilized in the preparation of the *2015 Air Quality Attainment Plan*. Furthermore, once the Project is completed, there will be no resultant increase in automobile trips to the area because the proposed improvements will not require daily visits.

Would the Project Violate any Air Quality Standard or Contribute Substantially to an Existing or Projected Air Quality Violation?

The Proposed Project would result in short-term emissions from construction activities. Construction generated emissions are short term and of temporary duration, lasting only as long as construction activities occur. Three basic sources of short-term emissions will be generated through construction of the Proposed Project: operation of the construction vehicles (i.e., excavators, trenchers, dump trucks), the creation of fugitive dust during clearing and grading, and the use of asphalt or other oil-based substances during paving activities. Construction associated with the proposed Project would generate short-term emissions of criteria air pollutants, including ROG, CO, NO_X, PM_{10}, and $PM_{2.5}$.

Construction-generated emissions associated with the Proposed Project were calculated using the CARB-approved CalEEMod computer program, which is designed to model emissions for land use development projects, based on typical construction requirements. The CalEEMod model was adjusted to account for the demolition of existing roadway pavement and hauling of demolished material associated with the trenching in roadways necessary for the installation of proposed pipelines. Excess soil generated from pipeline installation would need to be hauled and this activity is also accounted. Air quality impacts were assessed in accordance with methodologies recommended the Butte County Air Quality Management District (BCAQMD), which has established significance thresholds to determine if a project would violate any ambient air quality standard or contribute substantially to an existing or projected air quality violation.

Predicted maximum construction-generated emissions for the Proposed Project are summarized in Table 1.

Table 1. Construction-Related Emissions						
Construction Year	ROG	NO_X	CO	SO_2	PM_{10}	$PM_{2.5}$
Pounds per Day						
Project Construction	2.69	26.33	23.74	0.04	2.12	1.27
BCAQMD Daily Significance Threshold	*137*	*137*	-	-	*80*	-
Exceed BCAQMD Threshold?	No	No	No	No	No	No
Tons per Year						
Project Construction	0.1	1.3	1.1	0.0	0.1	0.1
BCAQMD Annual Significance Threshold	*4.5*	*4.5*	-	-	-	-
Exceed BCAQMD Threshold?	No	No	No	No	No	No

Source: CalEEMod version 2016.3.2. Refer to Attachment A for Model Data Outputs.

Notes: Emissions calculations account for the trenching of 5,500 linear feet for the installation of replacement pipelines and 900 linear feet for the installation of new laterals. Emissions modeling accounts for the hauling of 300 cubic yards of native soil export and 300 cubic yards of soil import. Emissions modeling also accounts for the demolition of 462.8 tons of existing roadway and hauling this material from the construction site.

As shown in Table 1, emissions generated during Project construction would not exceed the BCAQMD's regional thresholds of significance.

Operational emissions impacts are long-term air emissions impacts that are associated with any changes in the permanent use of the Project site by onsite stationary and offsite mobile sources that substantially increase emissions. The Project proposes the rehabilitation of existing sewage collection facilities. Once installation is complete it would not be a source of operational emissions. Therefore, the proposed Project would not change the permanent use of the Project site or contribute to on- or offsite emissions.

EPA CONFORMITY DETERMINATION ANALYSIS

General Conformity ensures that the actions taken by federal agencies do not interfere with a state's plans to attain and maintain national standards for air quality.

Established under the Clean Air Act (section 176(c)(4)), the General Conformity rule plays an important role in helping states improve air quality in those areas that do not meet the National Ambient Air Quality Standards (NAAQS). Under the General Conformity rule, federal agencies must work with state and local governments in a nonattainment or maintenance area to ensure that federal actions conform to the air quality plans established in the applicable state or tribal implementation plan. The overall purpose of the General Conformity rule is to ensure that:

- federal activities do not cause or contribute to new violations of NAAQS;

- actions do not worsen existing violations of the NAAQS; and
- attainment of the NAAQS is not delayed.

Predicted annual construction-generated emissions for the Proposed Project are summarized in Table 2. Construction-generated emissions are short term and of temporary duration, lasting only as long as construction activities occur, but would be considered a significant air quality impact if the volume of pollutants generated exceeds the Conformity Determination thresholds.

Table 2. Construction-related Emissions (EPA Conformity Determination Analysis)

Construction	Pollutant (tons per year)					
	ROG	NO_X	CO	SO_2	PM_{10}	$PM_{2.5}$
Project Construction	0.1	1.3	1.1	0.0	0.1	0.1
EPA Conformity Determination Thresholds (40 CFR 93.153)	*100*	*100*	*100*	*100*	*100*	*100*
Exceed EPA Conformity Threshold?	No	No	No	No	No	No

Source: CalEEMod version 2016.3.2. Refer to Attachment A for Model Data Outputs.

Notes: Emissions calculations account for the trenching of 5,500 linear feet for the installation of replacement pipelines and 900 linear feet for the installation of new laterals. Emissions modeling accounts for the hauling of 300 cubic yards of native soil export and 300 cubic yards of soil import. Emissions modeling also accounts for the demolition of 462.8 tons of existing roadway and hauling this material from the construction site.

As shown in Table 2, projected emissions resulting from the Project fall below the EPA Conformity Determination thresholds. The Project would not generate emissions during operations.

Would the Project Expose Sensitive Receptors to Substantial Pollutant Concentrations?

Sensitive receptors are defined as facilities or land uses that include members of the population that are particularly sensitive to the effects of air pollutants, such as children, the elderly, and people with illnesses. Examples of these sensitive receptors are residences, schools, hospitals, and daycare centers. CARB has identified the following groups of individuals as the most likely to be affected by air pollution: the elderly over 65, children under 14, athletes, and persons with cardiovascular and chronic respiratory diseases such as asthma, emphysema, and bronchitis. The nearest sensitive receptors include residences surrounding the site.

Construction-related activities would result in temporary, short-term Project-generated emissions of diesel particulate matter (DPM) from the exhaust of off-road, heavy-duty diesel equipment for site preparation (e.g., clearing, grading), soil hauling truck traffic, paving, and other miscellaneous activities. For construction activity, DPM is the primary TAC of concern. Particulate exhaust emissions from diesel-fueled engines (i.e., DPM) were identified as a TAC by the CARB in 1998. The potential cancer risk from the inhalation of DPM, as discussed below, outweighs the potential for all other health impacts (i.e., non-cancer chronic risk, short-term acute risk) and health impacts from other TACs. Accordingly, DPM is the focus of this discussion.

Based on the emission modeling conducted the maximum construction-related onsite emissions of exhaust $PM_{2.5}$, considered a surrogate for DPM, would be 1.11 pound per day during construction activity ($PM_{2.5}$ is considered a surrogate for DPM because more than 90 percent of DPM is less than one microgram in diameter and therefore is a subset of particulate matter under 2.5 microns in diameter [i.e., $PM_{2.5}$]. Most $PM_{2.5}$ derives from combustion, such as use of gasoline and diesel fuels by motor vehicles.) Furthermore, even during the most intense month of construction, emissions of DPM would be generated from different locations on the Project site, rather than a single location, because different types of construction activities (e.g., site preparation, trenching, grading) would not occur at the same place at the same time.

The dose to which receptors are exposed is the primary factor used to determine health risk (i.e., potential exposure to TAC emission levels that exceed applicable standards). Dose is a function of the concentration of a substance or substances in the environment and the duration of exposure to the substance. Dose is positively correlated with time, meaning that a longer exposure period would result in a higher exposure level for any exposed receptor. Thus, the risks estimated for an exposed individual are higher if a fixed exposure occurs over a longer period of time. According to the Office of Environmental Health Hazard Assessment, health risk assessments, which determine the exposure of sensitive receptors to TAC emissions, should be based on a 70-, 30-, or nine-year exposure period; however, such assessments should be limited to the period/duration of activities associated with the proposed Project. Consequently, an important consideration is the fact that construction of the Proposed Project is anticipated to last 100 days. Therefore, considering the relatively low mass of DPM emissions that would be generated during even the most intense season of construction, the relatively short duration of construction activities required to develop the site, and the highly dispersive properties of DPM, construction-related TAC emissions would not expose sensitive receptors to substantial amounts of air toxics.

In terms of operations, the Proposed Project involves the rehabilitation of existing sewage collection facilities. The Proposed Project would not include the provision of new permanent stationary or mobile sources of emissions, and therefore, by its very nature, would not generate quantifiable air toxic emissions from Project operations.

Would the Project Create Objectional Odors Affecting a Substantial Number of People?

Typically, odors are regarded as an annoyance rather than a health hazard. However, manifestations of a person's reaction to foul odors can range from psychological (e.g., irritation, anger, or anxiety) to physiological (e.g., circulatory and respiratory effects, nausea, vomiting, and headache).

With respect to odors, the human nose is the sole sensing device. The ability to detect odors varies considerably among the population and overall is quite subjective. Some individuals have the ability to smell minute quantities of specific substances; others may not have the same sensitivity but may have sensitivities to odors of other substances. In addition, people may have different reactions to the same odor; in fact, an odor that is offensive to one person (e.g., from a fast-food restaurant) may be perfectly acceptable to another. It is also important to note that an unfamiliar odor is more easily detected and is more likely to cause complaints than a familiar one. This is because of the phenomenon known as odor

fatigue, in which a person can become desensitized to almost any odor and recognition only occurs with an alteration in the intensity.

Quality and intensity are two properties present in any odor. The quality of an odor indicates the nature of the smell experience. For instance, if a person describes an odor as flowery or sweet, then the person is describing the quality of the odor. Intensity refers to the strength of the odor. For example, a person may use the word "strong" to describe the intensity of an odor. Odor intensity depends on the odorant concentration in the air. When an odorous sample is progressively diluted, the odorant concentration decreases. As this occurs, the odor intensity weakens and eventually becomes so low that the detection or recognition of the odor is quite difficult. At some point during dilution, the concentration of the odorant reaches a detection threshold. An odorant concentration below the detection threshold means that the concentration in the air is not detectable by the average human.

During construction, the Proposed Project presents the potential for generation of objectionable odors in the form of diesel exhaust in the immediate vicinity of the site. However, these emissions are short-term in nature and will rapidly dissipate and be diluted by the atmosphere downwind of the emission sources. Additionally, odors would be localized and generally confined to the construction area. Therefore, construction odors would result in a less than significant impact related to odor emissions.

CARB's *Air Quality and Land Use Handbook* (2005) identifies the sources of the most common operational odor complaints received by local air districts. Typical sources include facilities such as sewage treatment plants, landfills, recycling facilities, petroleum refineries, and livestock operations. The Project does not contain any of the land uses identified as typically associated with emissions of objectionable odors. The Project involves the installation of a sewer conveyance pipe. However, the sewer conveyance pipe would fully contain conveyed sewage and would not result in the introduction of any new processes that are considered to have a high odor-generation potential.

GREENHOUSE GAS EMISSIONS

Greenhouse gases (GHGs) are released as byproducts of fossil fuel combustion, waste disposal, energy use, land use changes, and other human activities. This release of gases, such as carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O), and chlorofluorocarbons, creates a blanket around the earth that allows light to pass through but traps heat at the surface, preventing its escape into space. While this is a naturally occurring process known as the greenhouse effect, human activities have accelerated the generation of GHGs beyond natural levels. The overabundance of GHGs in the atmosphere has led to an unexpected warming of the earth and has the potential to severely impact the earth's climate system.

Each GHG differs in its ability to absorb heat in the atmosphere based on the lifetime, or persistence, of the gas molecule in the atmosphere. CH_4 traps over 25 times more heat per molecule than CO_2, and N_2O absorbs 298 times more heat per molecule than CO_2. Often, estimates of GHG emissions are presented in carbon dioxide equivalents (CO_2e). Expressing GHG emissions in carbon dioxide equivalents takes the contribution of all GHG emissions to the greenhouse effect and converts them to a single unit equivalent to the effect that would occur if only CO_2 were being emitted.

GREENHOUSE GAS EMISSIONS ANALYSIS

Would the Project Generate Greenhouse Gas Emissions, Either Directly or Indirectly, that May Have a Significant Impact on the Environment?

The BCAQMD does not promulgate thresholds for GHG emissions; therefore, the analysis will rely on the significance thresholds established by the California Air Pollution Control Officers Association (CAPCOA), a non-profit association of the air pollution control officers from all 35 local air quality agencies throughout California. CAPCOA also considers projects that generate more than 900 metric tons of GHG to be significant. This threshold was developed to ensure at least 90 percent of new GHG emissions would be reviewed and assessed for mitigation, thereby contributing to the Statewide GHG emissions reduction goals for the year 2020 promulgated under AB 32 and the post-2020 reduction goals promulgated under SB 32. Thus, both cumulatively and individually, projects that generate less than 900 metric tons CO_2e per year have a negligible contribution to overall emissions.

Construction-related activities that would generate GHGs include worker commute trips, haul trucks carrying supplies and materials to and from the Project site, and off-road construction equipment (e.g., dozers, loaders, excavators). Construction-generated GHG emissions associated the Proposed Project were calculated using the CARB-approved CalEEMod computer program, which is designed to model emissions for land use development projects, based on typical construction requirements. Predicted maximum annual construction-generated emissions for the Proposed Project are summarized in Table 3.

Table 3. Construction-Related Greenhouse Gas Emissions

Emissions Source	CO_2e (Metric Tons / Year)
Project Construction	195
GHG Significance Threshold	*900*
Exceed Threshold	No

Source: CalEEMod version 2016.3.2. Refer to Attachment A for Model Data Outputs.

Notes: Emissions calculations account for the trenching of 5,500 linear feet for the installation of replacement pipelines and 900 linear feet for the installation of new laterals. Emissions modeling accounts for the hauling of 300 cubic yards of native soil export and 300 cubic yards of soil import. Emissions modeling also accounts for the demolition of 462.8 tons of existing roadway and hauling this material from the construction site.

As shown in Table 3, GHG emissions would remain below the respective threshold during Project construction.

In terms of operational GHG emissions, the Proposed Project involves the rehabilitation of existing sewage collection facilities. The Proposed Project would not include the provision of new permanent stationary or mobile sources of emissions, and therefore, by its very nature, would not generate quantifiable GHG emissions from Project operations. The Project does not propose any buildings and therefore no permanent source or stationary source emissions. Once the Project is completed, there would be no resultant increase in automobile trips to the area because the pipeline would not require daily visits.

Would the Project Conflict with an Applicable Plan, Policy or Regulation Adopted for the Purpose of Reducing the Emissions of Greenhouse Gases?

The Butte County Climate Action Plan (CAP) was adopted on February 25, 2014. The Butte County CAP provides goals, policies, and programs to reduce GHG emissions, address climate change adaptation, and improve quality of life in the county. The Butte County CAP also supports statewide GHG emission-reduction goals. Programs and actions in the CAP are intended to help the County sustain its natural resources, grow efficiently, ensure long-term resiliency to a changing environmental and economic climate, and improve transportation. The Butte County CAP also serves as a Qualified GHG Reduction Strategy under CEQA, simplifying development review for new projects that are consistent with the CAP.

The Proposed Project involves the rehabilitation of existing sewage collection facilities and would in no way conflict with the goals, policies, or programs promulgated by the CAP. The Proposed Project would not include the provision of new permanent stationary or mobile sources of emissions, and therefore, by its very nature, would not generate quantifiable GHG emissions from Project operations. The Project does not propose any buildings and therefore no permanent source or stationary source emissions. Once the Project is completed, there would be no resultant increase in automobile trips to the area because the pipeline would not require daily visits.

If you have any questions, please call me at (530) 965-5925.

Sincerely,

Seth Myers
Air Quality Specialist
ECORP Consulting, Inc.

REFERENCES

CARB. 2005. *Air Quality and Land Use Handbook*

SVAQEEP (Sacramento Valley Air Quality Engineering and Enforcement Professionals) 2015. *Northern Sacramento Valley Planning Area: 2015, Triennial Air Quality Attainment Plan*.

ATTACHMENT A

Emissions Modeling Output

Stirling City Sewer Rehabilitation Project

Butte County, Summer

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Other Non-Asphalt Surfaces	55.00	1000sqft	1.26	55,000.00	0
Other Non-Asphalt Surfaces	9.00	1000sqft	0.21	9,000.00	0

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	2.2	**Precipitation Freq (Days)**	71
Climate Zone	3			**Operational Year**	2021
Utility Company	Pacific Gas & Electric Company				
CO2 Intensity (lb/MWhr)	641.35	**CH4 Intensity (lb/MWhr)**	0.029	**N2O Intensity (lb/MWhr)**	0.006

1.3 User Entered Comments & Non-Default Data

Project Characteristics -

Land Use -

Construction Phase - Project implementation expected to last 100 work days

Off-road Equipment - Equipment per Project Description

Off-road Equipment - Ibid

Off-road Equipment -

Grading -

Demolition -

Table Name	Column Name	Default Value	New Value
tblConstructionPhase	NumDays	20.00	100.00
tblConstructionPhase	NumDays	10.00	87.00
tblConstructionPhase	NumDays	2.00	100.00
tblConstructionPhase	PhaseEndDate	3/10/2020	8/18/2021
tblConstructionPhase	PhaseEndDate	1/6/2021	8/18/2021
tblConstructionPhase	PhaseEndDate	3/12/2020	8/18/2021
tblConstructionPhase	PhaseStartDate	2/12/2020	4/1/2021
tblConstructionPhase	PhaseStartDate	12/24/2020	4/20/2021
tblConstructionPhase	PhaseStartDate	3/11/2020	4/1/2021
tblGrading	MaterialExported	0.00	300.00
tblGrading	MaterialImported	0.00	300.00
tblOffRoadEquipment	LoadFactor	0.38	0.38
tblOffRoadEquipment	LoadFactor	0.36	0.36
tblOffRoadEquipment	LoadFactor	0.43	0.43
tblOffRoadEquipment	OffRoadEquipmentType		Excavators
tblOffRoadEquipment	OffRoadEquipmentType		Rubber Tired Loaders
tblOffRoadEquipment	OffRoadEquipmentType		Crawler Tractors
tblOffRoadEquipment	OffRoadEquipmentType		Dumpers/Tenders
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	3.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00

2.0 Emissions Summary

2.1 Overall Construction (Maximum Daily Emission)

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2021	2.6908	26.3320	23.7450	0.0464	0.9182	1.2080	2.1262	0.1490	1.1268	1.2758	0.0000	4,471.2069	4,471.2069	1.1705	0.0000	4,500.4693
Maximum	**2.6908**	**26.3320**	**23.7450**	**0.0464**	**0.9182**	**1.2080**	**2.1262**	**0.1490**	**1.1268**	**1.2758**	**0.0000**	**4,471.2069**	**4,471.2069**	**1.1705**	**0.0000**	**4,500.4693**

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2021	2.6908	26.3320	23.7450	0.0464	0.9182	1.2080	2.1262	0.1490	1.1268	1.2758	0.0000	4,471.2069	4,471.2069	1.1705	0.0000	4,500.4693
Maximum	**2.6908**	**26.3320**	**23.7450**	**0.0464**	**0.9182**	**1.2080**	**2.1262**	**0.1490**	**1.1268**	**1.2758**	**0.0000**	**4,471.2069**	**4,471.2069**	**1.1705**	**0.0000**	**4,500.4693**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

2.2 Overall Operational

Unmitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Area	0.0355	6.0000e-005	6.5600e-003	0.0000		2.0000e-005	2.0000e-005		2.0000e-005	2.0000e-005		0.0140	0.0140	4.0000e-005		0.0149
Energy	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Mobile	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Total	**0.0355**	**6.0000e-005**	**6.5600e-003**	**0.0000**	**0.0000**	**2.0000e-005**	**2.0000e-005**	**0.0000**	**2.0000e-005**	**2.0000e-005**		**0.0140**	**0.0140**	**4.0000e-005**	**0.0000**	**0.0149**

Mitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Area	0.0355	6.0000e-005	6.5600e-003	0.0000		2.0000e-005	2.0000e-005		2.0000e-005	2.0000e-005		0.0140	0.0140	4.0000e-005		0.0149
Energy	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Mobile	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Total	**0.0355**	**6.0000e-005**	**6.5600e-003**	**0.0000**	**0.0000**	**2.0000e-005**	**2.0000e-005**	**0.0000**	**2.0000e-005**	**2.0000e-005**		**0.0140**	**0.0140**	**4.0000e-005**	**0.0000**	**0.0149**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Demolition	Demolition	4/1/2021	8/18/2021	5	100	
2	Site Preparation	Site Preparation	4/1/2021	8/18/2021	5	100	
3	Paving	Paving	4/20/2021	8/18/2021	5	87	

Acres of Grading (Site Preparation Phase): 50

Acres of Grading (Grading Phase): 0

Acres of Paving: 1.47

Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 0; Non-Residential Outdoor: 0; Striped Parking Area: 0 (Architectural Coating – sqft)

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Demolition	Excavators	1	8.00	158	0.38
Paving	Cement and Mortar Mixers	1	6.00	9	0.56
Demolition	Concrete/Industrial Saws	1	8.00	81	0.73
Demolition	Rubber Tired Loaders	1	8.00	203	0.36
Site Preparation	Crawler Tractors	1	8.00	212	0.43
Site Preparation	Dumpers/Tenders	1	4.00	16	0.38
Site Preparation	Graders	0	8.00	187	0.41
Paving	Pavers	1	6.00	130	0.42
Paving	Rollers	1	7.00	80	0.38
Demolition	Rubber Tired Dozers	0	8.00	247	0.40
Demolition	Tractors/Loaders/Backhoes	1	8.00	97	0.37
Paving	Tractors/Loaders/Backhoes	1	8.00	97	0.37
Site Preparation	Tractors/Loaders/Backhoes	0	8.00	97	0.37
Paving	Paving Equipment	1	8.00	132	0.36
Site Preparation	Rubber Tired Dozers	0	7.00	247	0.40

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Demolition	4	10.00	0.00	46.00	12.54	10.52	20.00	LD_Mix	HDT_Mix	HHDT
Site Preparation	2	5.00	0.00	75.00	12.54	10.52	20.00	LD_Mix	HDT_Mix	HHDT
Paving	5	13.00	0.00	0.00	12.54	10.52	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

3.2 Demolition - 2021

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					0.0990	0.0000	0.0990	0.0150	0.0000	0.0150			0.0000			0.0000
Off-Road	1.1471	10.9810	10.8291	0.0208		0.5193	0.5193		0.4916	0.4916		2,004.5100	2,004.5100	0.4910		2,016.7859
Total	**1.1471**	**10.9810**	**10.8291**	**0.0208**	**0.0990**	**0.5193**	**0.6184**	**0.0150**	**0.4916**	**0.5066**		**2,004.5100**	**2,004.5100**	**0.4910**		**2,016.7859**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	3.4300e-003	0.1174	0.0161	3.8000e-004	8.0600e-003	4.3000e-004	8.4900e-003	2.2100e-003	4.2000e-004	2.6300e-003		39.3176	39.3176	2.7500e-003		39.3863
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0624	0.0426	0.5225	1.0000e-003	0.0954	7.2000e-004	0.0961	0.0253	6.7000e-004	0.0260		99.1778	99.1778	4.5100e-003		99.2905
Total	**0.0658**	**0.1599**	**0.5386**	**1.3800e-003**	**0.1034**	**1.1500e-003**	**0.1046**	**0.0275**	**1.0900e-003**	**0.0286**		**138.4954**	**138.4954**	**7.2600e-003**		**138.6768**

3.2 Demolition - 2021

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					0.0990	0.0000	0.0990	0.0150	0.0000	0.0150			0.0000			0.0000
Off-Road	1.1471	10.9810	10.8291	0.0208		0.5193	0.5193		0.4916	0.4916	0.0000	2,004.5100	2,004.5100	0.4910		2,016.7859
Total	**1.1471**	**10.9810**	**10.8291**	**0.0208**	**0.0990**	**0.5193**	**0.6184**	**0.0150**	**0.4916**	**0.5066**	**0.0000**	**2,004.5100**	**2,004.5100**	**0.4910**		**2,016.7859**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	3.4300e-003	0.1174	0.0161	3.8000e-004	8.0600e-003	4.3000e-004	8.4900e-003	2.2100e-003	4.2000e-004	2.6300e-003		39.3176	39.3176	2.7500e-003		39.3863
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0624	0.0426	0.5225	1.0000e-003	0.0954	7.2000e-004	0.0961	0.0253	6.7000e-004	0.0260		99.1778	99.1778	4.5100e-003		99.2905
Total	**0.0658**	**0.1599**	**0.5386**	**1.3800e-003**	**0.1034**	**1.1500e-003**	**0.1046**	**0.0275**	**1.0900e-003**	**0.0286**		**138.4954**	**138.4954**	**7.2600e-003**		**138.6768**

3.3 Site Preparation - 2021

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					0.5309	0.0000	0.5309	0.0574	0.0000	0.0574			0.0000			0.0000
Off-Road	0.5861	7.1809	2.5537	8.2000e-003		0.2702	0.2702		0.2493	0.2493		788.7103	788.7103	0.2485		794.9228
Total	**0.5861**	**7.1809**	**2.5537**	**8.2000e-003**	**0.5309**	**0.2702**	**0.8011**	**0.0574**	**0.2493**	**0.3066**		**788.7103**	**788.7103**	**0.2485**		**794.9228**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	5.5900e-003	0.1914	0.0262	6.1000e-004	0.0131	7.1000e-004	0.0139	3.6000e-003	6.8000e-004	4.2800e-003		64.1047	64.1047	4.4800e-003		64.2168
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0312	0.0213	0.2613	5.0000e-004	0.0477	3.6000e-004	0.0481	0.0127	3.3000e-004	0.0130		49.5889	49.5889	2.2500e-003		49.6452
Total	**0.0368**	**0.2127**	**0.2874**	**1.1100e-003**	**0.0608**	**1.0700e-003**	**0.0619**	**0.0163**	**1.0100e-003**	**0.0173**		**113.6936**	**113.6936**	**6.7300e-003**		**113.8620**

3.3 Site Preparation - 2021

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					0.5309	0.0000	0.5309	0.0574	0.0000	0.0574			0.0000			0.0000
Off-Road	0.5861	7.1809	2.5537	8.2000e-003		0.2702	0.2702		0.2493	0.2493	0.0000	788.7103	788.7103	0.2485		794.9228
Total	**0.5861**	**7.1809**	**2.5537**	**8.2000e-003**	**0.5309**	**0.2702**	**0.8011**	**0.0574**	**0.2493**	**0.3066**	**0.0000**	**788.7103**	**788.7103**	**0.2485**		**794.9228**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	5.5900e-003	0.1914	0.0262	6.1000e-004	0.0131	7.1000e-004	0.0139	3.6000e-003	6.8000e-004	4.2800e-003		64.1047	64.1047	4.4800e-003		64.2168
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0312	0.0213	0.2613	5.0000e-004	0.0477	3.6000e-004	0.0481	0.0127	3.3000e-004	0.0130		49.5889	49.5889	2.2500e-003		49.6452
Total	**0.0368**	**0.2127**	**0.2874**	**1.1100e-003**	**0.0608**	**1.0700e-003**	**0.0619**	**0.0163**	**1.0100e-003**	**0.0173**		**113.6936**	**113.6936**	**6.7300e-003**		**113.8620**

3.4 Paving - 2021

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	0.7739	7.7422	8.8569	0.0135		0.4153	0.4153		0.3830	0.3830		1,296.8664	1,296.8664	0.4111		1,307.1442
Paving	0.0000					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**0.7739**	**7.7422**	**8.8569**	**0.0135**		**0.4153**	**0.4153**		**0.3830**	**0.3830**		**1,296.8664**	**1,296.8664**	**0.4111**		**1,307.1442**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0811	0.0553	0.6793	1.3000e-003	0.1240	9.4000e-004	0.1249	0.0329	8.7000e-004	0.0338		128.9312	128.9312	5.8600e-003		129.0776
Total	**0.0811**	**0.0553**	**0.6793**	**1.3000e-003**	**0.1240**	**9.4000e-004**	**0.1249**	**0.0329**	**8.7000e-004**	**0.0338**		**128.9312**	**128.9312**	**5.8600e-003**		**129.0776**

3.4 Paving - 2021

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	0.7739	7.7422	8.8569	0.0135		0.4153	0.4153		0.3830	0.3830	0.0000	1,296.8664	1,296.8664	0.4111		1,307.1442
Paving	0.0000					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**0.7739**	**7.7422**	**8.8569**	**0.0135**		**0.4153**	**0.4153**		**0.3830**	**0.3830**	**0.0000**	**1,296.8664**	**1,296.8664**	**0.4111**		**1,307.1442**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0811	0.0553	0.6793	1.3000e-003	0.1240	9.4000e-004	0.1249	0.0329	8.7000e-004	0.0338		128.9312	128.9312	5.8600e-003		129.0776
Total	**0.0811**	**0.0553**	**0.6793**	**1.3000e-003**	**0.1240**	**9.4000e-004**	**0.1249**	**0.0329**	**8.7000e-004**	**0.0338**		**128.9312**	**128.9312**	**5.8600e-003**		**129.0776**

4.0 Operational Detail - Mobile

4.1 Mitigation Measures Mobile

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Mitigated	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Unmitigated	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
Other Non-Asphalt Surfaces	0.00	0.00	0.00		
Other Non-Asphalt Surfaces	0.00	0.00	0.00		
Total	0.00	0.00	0.00		

4.3 Trip Type Information

	Miles			Trip %			Trip Purpose %		
Land Use	H-W or C-W	H-S or C-C	H-O or C-NW	H-W or C-W	H-S or C-C	H-O or C-NW	Primary	Diverted	Pass-by
Other Non-Asphalt Surfaces	10.52	10.52	10.52	0.00	0.00	0.00	0	0	0
Other Non-Asphalt Surfaces	10.52	10.52	10.52	0.00	0.00	0.00	0	0	0

4.4 Fleet Mix

Land Use	LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
Other Non-Asphalt Surfaces	0.514547	0.034230	0.180067	0.120126	0.034848	0.006594	0.018358	0.079646	0.001635	0.001462	0.005861	0.001268	0.001358

5.0 Energy Detail

Historical Energy Use: N

5.1 Mitigation Measures Energy

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
NaturalGas Mitigated	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
NaturalGas Unmitigated	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000

5.2 Energy by Land Use - NaturalGas

Unmitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	lb/day										lb/day					
Other Non-Asphalt Surfaces	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

Mitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	lb/day										lb/day					
Other Non-Asphalt Surfaces	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

6.0 Area Detail

6.1 Mitigation Measures Area

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Mitigated	0.0355	6.0000e-005	6.5600e-003	0.0000		2.0000e-005	2.0000e-005		2.0000e-005	2.0000e-005		0.0140	0.0140	4.0000e-005		0.0149
Unmitigated	0.0355	6.0000e-005	6.5600e-003	0.0000		2.0000e-005	2.0000e-005		2.0000e-005	2.0000e-005		0.0140	0.0140	4.0000e-005		0.0149

6.2 Area by SubCategory

Unmitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	lb/day										lb/day					
Architectural Coating	0.0122					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	0.0227					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Landscaping	6.1000e-004	6.0000e-005	6.5600e-003	0.0000		2.0000e-005	2.0000e-005		2.0000e-005	2.0000e-005		0.0140	0.0140	4.0000e-005		0.0149
Total	**0.0355**	**6.0000e-005**	**6.5600e-003**	**0.0000**		**2.0000e-005**	**2.0000e-005**		**2.0000e-005**	**2.0000e-005**		**0.0140**	**0.0140**	**4.0000e-005**		**0.0149**

6.2 Area by SubCategory

Mitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	lb/day										lb/day					
Architectural Coating	0.0122					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	0.0227					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Landscaping	6.1000e-004	6.0000e-005	6.5600e-003	0.0000		2.0000e-005	2.0000e-005		2.0000e-005	2.0000e-005		0.0140	0.0140	4.0000e-005		0.0149
Total	**0.0355**	**6.0000e-005**	**6.5600e-003**	**0.0000**		**2.0000e-005**	**2.0000e-005**		**2.0000e-005**	**2.0000e-005**		**0.0140**	**0.0140**	**4.0000e-005**		**0.0149**

7.0 Water Detail

7.1 Mitigation Measures Water

8.0 Waste Detail

8.1 Mitigation Measures Waste

9.0 Operational Offroad

Equipment Type	Number	Hours/Day	Days/Year	Horse Power	Load Factor	Fuel Type

10.0 Stationary Equipment

Fire Pumps and Emergency Generators

Equipment Type	Number	Hours/Day	Hours/Year	Horse Power	Load Factor	Fuel Type

Boilers

Equipment Type	Number	Heat Input/Day	Heat Input/Year	Boiler Rating	Fuel Type

User Defined Equipment

Equipment Type	Number

11.0 Vegetation

Stirling City Sewer Rehabilitation Project

Butte County, Annual

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Other Non-Asphalt Surfaces	55.00	1000sqft	1.26	55,000.00	0
Other Non-Asphalt Surfaces	9.00	1000sqft	0.21	9,000.00	0

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	2.2	**Precipitation Freq (Days)**	71
Climate Zone	3			**Operational Year**	2021
Utility Company	Pacific Gas & Electric Company				
CO2 Intensity (lb/MWhr)	641.35	**CH4 Intensity (lb/MWhr)**	0.029	**N2O Intensity (lb/MWhr)**	0.006

1.3 User Entered Comments & Non-Default Data

Project Characteristics -

Land Use -

Construction Phase - Project implementation expected to last 100 work days

Off-road Equipment - Equipment per Project Description

Off-road Equipment - Ibid

Off-road Equipment -

Grading -

Demolition -

Table Name	Column Name	Default Value	New Value
tblConstructionPhase	NumDays	20.00	100.00
tblConstructionPhase	NumDays	10.00	87.00
tblConstructionPhase	NumDays	2.00	100.00
tblConstructionPhase	PhaseEndDate	3/10/2020	8/18/2021
tblConstructionPhase	PhaseEndDate	1/6/2021	8/18/2021
tblConstructionPhase	PhaseEndDate	3/12/2020	8/18/2021
tblConstructionPhase	PhaseStartDate	2/12/2020	4/1/2021
tblConstructionPhase	PhaseStartDate	12/24/2020	4/20/2021
tblConstructionPhase	PhaseStartDate	3/11/2020	4/1/2021
tblGrading	MaterialExported	0.00	300.00
tblGrading	MaterialImported	0.00	300.00
tblOffRoadEquipment	LoadFactor	0.38	0.38
tblOffRoadEquipment	LoadFactor	0.36	0.36
tblOffRoadEquipment	LoadFactor	0.43	0.43
tblOffRoadEquipment	OffRoadEquipmentType		Excavators
tblOffRoadEquipment	OffRoadEquipmentType		Rubber Tired Loaders
tblOffRoadEquipment	OffRoadEquipmentType		Crawler Tractors
tblOffRoadEquipment	OffRoadEquipmentType		Dumpers/Tenders
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	3.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00

2.0 Emissions Summary

2.1 Overall Construction

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2021	0.1278	1.2669	1.1143	2.2100e-003	0.0445	0.0577	0.1022	7.1000e-003	0.0539	0.0609	0.0000	193.1790	193.1790	0.0506	0.0000	194.4436
Maximum	**0.1278**	**1.2669**	**1.1143**	**2.2100e-003**	**0.0445**	**0.0577**	**0.1022**	**7.1000e-003**	**0.0539**	**0.0609**	**0.0000**	**193.1790**	**193.1790**	**0.0506**	**0.0000**	**194.4436**

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2021	0.1278	1.2669	1.1143	2.2100e-003	0.0445	0.0577	0.1022	7.1000e-003	0.0539	0.0609	0.0000	193.1787	193.1787	0.0506	0.0000	194.4434
Maximum	**0.1278**	**1.2669**	**1.1143**	**2.2100e-003**	**0.0445**	**0.0577**	**0.1022**	**7.1000e-003**	**0.0539**	**0.0609**	**0.0000**	**193.1787**	**193.1787**	**0.0506**	**0.0000**	**194.4434**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

Quarter	Start Date	End Date	Maximum Unmitigated ROG + NOX (tons/quarter)	Maximum Mitigated ROG + NOX (tons/quarter)
5	2-12-2021	5-11-2021	0.3663	0.3663
6	5-12-2021	8-11-2021	0.9536	0.9536
7	8-12-2021	9-30-2021	0.0726	0.0726
		Highest	0.9536	0.9536

2.2 Overall Operational

Unmitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Area	6.4200e-003	1.0000e-005	5.9000e-004	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	1.1400e-003	1.1400e-003	0.0000	0.0000	1.2200e-003
Energy	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Mobile	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Waste						0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Water						0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**6.4200e-003**	**1.0000e-005**	**5.9000e-004**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**1.1400e-003**	**1.1400e-003**	**0.0000**	**0.0000**	**1.2200e-003**

2.2 Overall Operational

Mitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Area	6.4200e-003	1.0000e-005	5.9000e-004	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	1.1400e-003	1.1400e-003	0.0000	0.0000	1.2200e-003
Energy	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Mobile	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Waste						0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Water						0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**6.4200e-003**	**1.0000e-005**	**5.9000e-004**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**1.1400e-003**	**1.1400e-003**	**0.0000**	**0.0000**	**1.2200e-003**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Demolition	Demolition	4/1/2021	8/18/2021	5	100	
2	Site Preparation	Site Preparation	4/1/2021	8/18/2021	5	100	
3	Paving	Paving	4/20/2021	8/18/2021	5	87	

Acres of Grading (Site Preparation Phase): 50

Acres of Grading (Grading Phase): 0

Acres of Paving: 1.47

Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 0; Non-Residential Outdoor: 0; Striped Parking Area: 0 (Architectural Coating – sqft)

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Demolition	Excavators	1	8.00	158	0.38
Paving	Cement and Mortar Mixers	1	6.00	9	0.56
Demolition	Concrete/Industrial Saws	1	8.00	81	0.73
Demolition	Rubber Tired Loaders	1	8.00	203	0.36
Site Preparation	Crawler Tractors	1	8.00	212	0.43
Site Preparation	Dumpers/Tenders	1	4.00	16	0.38
Site Preparation	Graders	0	8.00	187	0.41
Paving	Pavers	1	6.00	130	0.42
Paving	Rollers	1	7.00	80	0.38
Demolition	Rubber Tired Dozers	0	8.00	247	0.40
Demolition	Tractors/Loaders/Backhoes	1	8.00	97	0.37
Paving	Tractors/Loaders/Backhoes	1	8.00	97	0.37
Site Preparation	Tractors/Loaders/Backhoes	0	8.00	97	0.37
Paving	Paving Equipment	1	8.00	132	0.36
Site Preparation	Rubber Tired Dozers	0	7.00	247	0.40

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Demolition	4	10.00	0.00	46.00	12.54	10.52	20.00	LD_Mix	HDT_Mix	HHDT
Site Preparation	2	5.00	0.00	75.00	12.54	10.52	20.00	LD_Mix	HDT_Mix	HHDT
Paving	5	13.00	0.00	0.00	12.54	10.52	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

3.2 Demolition - 2021

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					4.9500e-003	0.0000	4.9500e-003	7.5000e-004	0.0000	7.5000e-004	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0574	0.5491	0.5415	1.0400e-003		0.0260	0.0260		0.0246	0.0246	0.0000	90.9230	90.9230	0.0223	0.0000	91.4799
Total	**0.0574**	**0.5491**	**0.5415**	**1.0400e-003**	**4.9500e-003**	**0.0260**	**0.0309**	**7.5000e-004**	**0.0246**	**0.0253**	**0.0000**	**90.9230**	**90.9230**	**0.0223**	**0.0000**	**91.4799**

3.2 Demolition - 2021

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	1.7000e-004	6.0300e-003	8.5000e-004	2.0000e-005	3.9000e-004	2.0000e-005	4.1000e-004	1.1000e-004	2.0000e-005	1.3000e-004	0.0000	1.7656	1.7656	1.3000e-004	0.0000	1.7689
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	2.6800e-003	2.3400e-003	0.0219	4.0000e-005	4.5700e-003	4.0000e-005	4.6000e-003	1.2200e-003	3.0000e-005	1.2500e-003	0.0000	4.0512	4.0512	1.8000e-004	0.0000	4.0557
Total	**2.8500e-003**	**8.3700e-003**	**0.0228**	**6.0000e-005**	**4.9600e-003**	**6.0000e-005**	**5.0100e-003**	**1.3300e-003**	**5.0000e-005**	**1.3800e-003**	**0.0000**	**5.8168**	**5.8168**	**3.1000e-004**	**0.0000**	**5.8246**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					4.9500e-003	0.0000	4.9500e-003	7.5000e-004	0.0000	7.5000e-004	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0574	0.5491	0.5415	1.0400e-003		0.0260	0.0260		0.0246	0.0246	0.0000	90.9229	90.9229	0.0223	0.0000	91.4798
Total	**0.0574**	**0.5491**	**0.5415**	**1.0400e-003**	**4.9500e-003**	**0.0260**	**0.0309**	**7.5000e-004**	**0.0246**	**0.0253**	**0.0000**	**90.9229**	**90.9229**	**0.0223**	**0.0000**	**91.4798**

3.2 Demolition - 2021

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	1.7000e-004	6.0300e-003	8.5000e-004	2.0000e-005	3.9000e-004	2.0000e-005	4.1000e-004	1.1000e-004	2.0000e-005	1.3000e-004	0.0000	1.7656	1.7656	1.3000e-004	0.0000	1.7689
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	2.6800e-003	2.3400e-003	0.0219	4.0000e-005	4.5700e-003	4.0000e-005	4.6000e-003	1.2200e-003	3.0000e-005	1.2500e-003	0.0000	4.0512	4.0512	1.8000e-004	0.0000	4.0557
Total	**2.8500e-003**	**8.3700e-003**	**0.0228**	**6.0000e-005**	**4.9600e-003**	**6.0000e-005**	**5.0100e-003**	**1.3300e-003**	**5.0000e-005**	**1.3800e-003**	**0.0000**	**5.8168**	**5.8168**	**3.1000e-004**	**0.0000**	**5.8246**

3.3 Site Preparation - 2021

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0266	0.0000	0.0266	2.8700e-003	0.0000	2.8700e-003	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0293	0.3591	0.1277	4.1000e-004		0.0135	0.0135		0.0125	0.0125	0.0000	35.7753	35.7753	0.0113	0.0000	36.0571
Total	**0.0293**	**0.3591**	**0.1277**	**4.1000e-004**	**0.0266**	**0.0135**	**0.0401**	**2.8700e-003**	**0.0125**	**0.0153**	**0.0000**	**35.7753**	**35.7753**	**0.0113**	**0.0000**	**36.0571**

3.3 Site Preparation - 2021

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	2.8000e-004	9.8400e-003	1.3900e-003	3.0000e-005	6.3000e-004	4.0000e-005	6.7000e-004	1.7000e-004	3.0000e-005	2.1000e-004	0.0000	2.8786	2.8786	2.1000e-004	0.0000	2.8840
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	1.3400e-003	1.1700e-003	0.0110	2.0000e-005	2.2800e-003	2.0000e-005	2.3000e-003	6.1000e-004	2.0000e-005	6.2000e-004	0.0000	2.0256	2.0256	9.0000e-005	0.0000	2.0279
Total	**1.6200e-003**	**0.0110**	**0.0124**	**5.0000e-005**	**2.9100e-003**	**6.0000e-005**	**2.9700e-003**	**7.8000e-004**	**5.0000e-005**	**8.3000e-004**	**0.0000**	**4.9042**	**4.9042**	**3.0000e-004**	**0.0000**	**4.9119**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0266	0.0000	0.0266	2.8700e-003	0.0000	2.8700e-003	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0293	0.3591	0.1277	4.1000e-004		0.0135	0.0135		0.0125	0.0125	0.0000	35.7753	35.7753	0.0113	0.0000	36.0571
Total	**0.0293**	**0.3591**	**0.1277**	**4.1000e-004**	**0.0266**	**0.0135**	**0.0401**	**2.8700e-003**	**0.0125**	**0.0153**	**0.0000**	**35.7753**	**35.7753**	**0.0113**	**0.0000**	**36.0571**

3.3 Site Preparation - 2021

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	2.8000e-004	9.8400e-003	1.3900e-003	3.0000e-005	6.3000e-004	4.0000e-005	6.7000e-004	1.7000e-004	3.0000e-005	2.1000e-004	0.0000	2.8786	2.8786	2.1000e-004	0.0000	2.8840
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	1.3400e-003	1.1700e-003	0.0110	2.0000e-005	2.2800e-003	2.0000e-005	2.3000e-003	6.1000e-004	2.0000e-005	6.2000e-004	0.0000	2.0256	2.0256	9.0000e-005	0.0000	2.0279
Total	**1.6200e-003**	**0.0110**	**0.0124**	**5.0000e-005**	**2.9100e-003**	**6.0000e-005**	**2.9700e-003**	**7.8000e-004**	**5.0000e-005**	**8.3000e-004**	**0.0000**	**4.9042**	**4.9042**	**3.0000e-004**	**0.0000**	**4.9119**

3.4 Paving - 2021

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0337	0.3368	0.3853	5.9000e-004		0.0181	0.0181		0.0167	0.0167	0.0000	51.1776	51.1776	0.0162	0.0000	51.5832
Paving	0.0000					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0337**	**0.3368**	**0.3853**	**5.9000e-004**		**0.0181**	**0.0181**		**0.0167**	**0.0167**	**0.0000**	**51.1776**	**51.1776**	**0.0162**	**0.0000**	**51.5832**

3.4 Paving - 2021

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	3.0300e-003	2.6400e-003	0.0248	5.0000e-005	5.1700e-003	4.0000e-005	5.2100e-003	1.3700e-003	4.0000e-005	1.4100e-003	0.0000	4.5820	4.5820	2.0000e-004	0.0000	4.5870
Total	**3.0300e-003**	**2.6400e-003**	**0.0248**	**5.0000e-005**	**5.1700e-003**	**4.0000e-005**	**5.2100e-003**	**1.3700e-003**	**4.0000e-005**	**1.4100e-003**	**0.0000**	**4.5820**	**4.5820**	**2.0000e-004**	**0.0000**	**4.5870**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0337	0.3368	0.3853	5.9000e-004		0.0181	0.0181		0.0167	0.0167	0.0000	51.1776	51.1776	0.0162	0.0000	51.5832
Paving	0.0000					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0337**	**0.3368**	**0.3853**	**5.9000e-004**		**0.0181**	**0.0181**		**0.0167**	**0.0167**	**0.0000**	**51.1776**	**51.1776**	**0.0162**	**0.0000**	**51.5832**

3.4 Paving - 2021

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	3.0300e-003	2.6400e-003	0.0248	5.0000e-005	5.1700e-003	4.0000e-005	5.2100e-003	1.3700e-003	4.0000e-005	1.4100e-003	0.0000	4.5820	4.5820	2.0000e-004	0.0000	4.5870
Total	**3.0300e-003**	**2.6400e-003**	**0.0248**	**5.0000e-005**	**5.1700e-003**	**4.0000e-005**	**5.2100e-003**	**1.3700e-003**	**4.0000e-005**	**1.4100e-003**	**0.0000**	**4.5820**	**4.5820**	**2.0000e-004**	**0.0000**	**4.5870**

4.0 Operational Detail - Mobile

4.1 Mitigation Measures Mobile

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Mitigated	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Unmitigated	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
Other Non-Asphalt Surfaces	0.00	0.00	0.00		
Other Non-Asphalt Surfaces	0.00	0.00	0.00		
Total	0.00	0.00	0.00		

4.3 Trip Type Information

	Miles			Trip %			Trip Purpose %		
Land Use	H-W or C-W	H-S or C-C	H-O or C-NW	H-W or C-W	H-S or C-C	H-O or C-NW	Primary	Diverted	Pass-by
Other Non-Asphalt Surfaces	10.52	10.52	10.52	0.00	0.00	0.00	0	0	0
Other Non-Asphalt Surfaces	10.52	10.52	10.52	0.00	0.00	0.00	0	0	0

4.4 Fleet Mix

Land Use	LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
Other Non-Asphalt Surfaces	0.514547	0.034230	0.180067	0.120126	0.034848	0.006594	0.018358	0.079646	0.001635	0.001462	0.005861	0.001268	0.001358

5.0 Energy Detail

Historical Energy Use: N

5.1 Mitigation Measures Energy

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Electricity Mitigated						0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Electricity Unmitigated						0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
NaturalGas Mitigated	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
NaturalGas Unmitigated	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

5.2 Energy by Land Use - NaturalGas

Unmitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	tons/yr										MT/yr					
Other Non-Asphalt Surfaces	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

Mitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	tons/yr										MT/yr					
Other Non-Asphalt Surfaces	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

5.3 Energy by Land Use - Electricity

Unmitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
Other Non-Asphalt Surfaces	0	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**

Mitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
Other Non-Asphalt Surfaces	0	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**

6.0 Area Detail

6.1 Mitigation Measures Area

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Mitigated	6.4200e-003	1.0000e-005	5.9000e-004	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	1.1400e-003	1.1400e-003	0.0000	0.0000	1.2200e-003
Unmitigated	6.4200e-003	1.0000e-005	5.9000e-004	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	1.1400e-003	1.1400e-003	0.0000	0.0000	1.2200e-003

6.2 Area by SubCategory

Unmitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	tons/yr										MT/yr					
Architectural Coating	2.2200e-003					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	4.1400e-003					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Landscaping	6.0000e-005	1.0000e-005	5.9000e-004	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	1.1400e-003	1.1400e-003	0.0000	0.0000	1.2200e-003
Total	**6.4200e-003**	**1.0000e-005**	**5.9000e-004**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**1.1400e-003**	**1.1400e-003**	**0.0000**	**0.0000**	**1.2200e-003**

6.2 Area by SubCategory

Mitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	tons/yr										MT/yr					
Architectural Coating	2.2200e-003					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	4.1400e-003					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Landscaping	6.0000e-005	1.0000e-005	5.9000e-004	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	1.1400e-003	1.1400e-003	0.0000	0.0000	1.2200e-003
Total	**6.4200e-003**	**1.0000e-005**	**5.9000e-004**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**1.1400e-003**	**1.1400e-003**	**0.0000**	**0.0000**	**1.2200e-003**

7.0 Water Detail

7.1 Mitigation Measures Water

	Total CO2	CH4	N2O	CO2e
Category	MT/yr			
Mitigated	0.0000	0.0000	0.0000	0.0000
Unmitigated	0.0000	0.0000	0.0000	0.0000

7.2 Water by Land Use

Unmitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
Other Non-Asphalt Surfaces	0 / 0	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**

7.2 Water by Land Use

Mitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
Other Non-Asphalt Surfaces	0 / 0	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**

8.0 Waste Detail

8.1 Mitigation Measures Waste

Category/Year

	Total CO2	CH4	N2O	CO2e
	MT/yr			
Mitigated	0.0000	0.0000	0.0000	0.0000
Unmitigated	0.0000	0.0000	0.0000	0.0000

8.2 Waste by Land Use

Unmitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
Other Non-Asphalt Surfaces	0	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**

Mitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
Other Non-Asphalt Surfaces	0	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**

9.0 Operational Offroad

Equipment Type	Number	Hours/Day	Days/Year	Horse Power	Load Factor	Fuel Type

10.0 Stationary Equipment

Fire Pumps and Emergency Generators

Equipment Type	Number	Hours/Day	Hours/Year	Horse Power	Load Factor	Fuel Type

Boilers

Equipment Type	Number	Heat Input/Day	Heat Input/Year	Boiler Rating	Fuel Type

User Defined Equipment

Equipment Type	Number

11.0 Vegetation

Appendix B

Biological Resources Assessment

Biological Resources Assessment

Stirling City Sewer Rehabilitation Project

Butte County, California

Prepared for:

Butte County

March 6, 2020

ECORP Consulting, Inc.
ENVIRONMENTAL CONSULTANTS

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LIST OF ACRONYMS AND ABBREVIATIONS

AOU	American Ornithologist's Union
BRA	Biological Resources Assessment
CDFW	California Department of Fish and Wildlife
CFR	Code of Federal Regulations
CNDDB	California Natural Diversity Data Base
CNPS	California Native Plant Society
CSA 82	County Service Area 82
CWA	Clean Water Act
ESA	Endangered Species Act
MBTA	Migratory Bird Treaty Act
NMFS	National Marine Fisheries Service
NPPA	Native Plant Protection Act
NRCS	Natural Resources Conservation Service
NWI	National Wetlands Inventory
Project	Stirling City Sewer Rehabilitation Project
ROW	Right-of-way
SAA	Streambed Alteration Agreement
SSAR	Study of Amphibians and Reptiles
SSC	Species of Special Concern
SWRCB	State Water Resources Control Board
USACE	U.S. Army Corps of Engineers
USC	U.S. Code

LIST OF ACRONYMS AND ABBREVIATIONS

USEPA	U.S. Environmental Protection Agency
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey

1.0 INTRODUCTION

ECORP Consulting, Inc. was retained to conduct a biological resources assessment (BRA) for the proposed Stirling City Sewer Rehabilitation Project (Project) in Butte County, California. Butte County proposes to develop 90 percent construction documents and prepare a financial analysis to rehabilitate approximately 2,700 linear feet of the wastewater collection system that was originally constructed in the late 1940s. The County has identified system deficiencies that must be addressed soon, including aging pipe, lack of standard manholes for proper system maintenance, and possible root intrusion and inflow and infiltration due to disjointed piping.

1.1 Location and Setting

Stirling City is an unincorporated community in northern Butte County, north of Magalia. The Project area within Stirling City is in an alley between Manzanita Street and Skyway Road, bound by Gypsum Street at the northwest and approximately 100 feet past Diamond Street to the southeast. The linear Project site spans a length of approximately 2,700 feet north to south in the partially paved alley. The Project site occurs in Township 24 North, Range 4 East (Mount Diablo Base and Meridian) of the "Stirling City, California" U.S. Geological Survey (USGS) 7.5-minute topographic quadrangle maps (USGS 1995) (Figure 1. *Project Location and Vicinity*). The approximate center of the Project is located at 39.907619˚ North and -121.529123˚ West within the North Fork Feather watershed (USGS Hydrological Unit Code #18020121) (Natural Resources Conservation Service [NRCS] et al. 2018). The Project Survey Area was defined as the proposed sewer pipeline alignment with a 100-foot buffer (Figure 2. *Project Survey Area*).

1.2 Project Description and Purpose

Butte County (County) has received a Small Community Wastewater Program grant from the California State Water Resources Control Board (SWRCB) Clean Water State Revolving Fund. The grant is for the small community of Stirling City to fund a planning study to evaluate alternatives to the wastewater collection system. The County retained an engineering group to develop 90 percent construction documents and prepare a financial analysis to rehabilitate approximately 2,700 linear feet of the wastewater collection system that was originally constructed in the late 1940s.

The County operates and maintains the wastewater collection and treatment system for a portion of the community of Stirling City under the authority of County Service Area 82 (CSA 82). The system was originally constructed and operated by Diamond Match, now Sierra Pacific Industries, and was turned over to the Stirling City Sewer Maintenance District in 1960. The district operated the system until it dissolved in 1981 and CSA 82 was formed to take over operation and maintenance functions.

Since the formation of CSA 82, the County has replaced approximately one half of the collection system. The total collection system is approximately 5,500 feet, of which approximately 2,300 feet is original clay pipe. The County began rehabilitating the lower portion of the system but has been unable to complete rehabilitation of the upper half of the system due to lack of resources. CSA 82 replaced the septic tanks at the treatment plant in 2006 and is still making payments on that loan. The County has identified system deficiencies that must be addressed soon, including aging pipe, lack of standard manholes for proper system maintenance, and possible root intrusion and inflow and infiltration due to disjointed piping.

A Plan of Study was prepared by the County in order to accurately develop a project report consistent with the SWRCB Division of Financial Assistance's funding application requirements and ensure all necessary documents will be included. This Project aims to prepare all documents necessary to complete the plan of study, including completing the necessary funding applications. An inspection of the system and smoke testing will be conducted prior to preparation of a Project report that identifies the deficiencies and repairs needed and provides an analysis of the effectiveness of the current system. Preliminary engineering will include a geotechnical investigation, topographic survey, right-of-way mapping, and preparation and submittal of 90 percent plans, specifications, and estimate to the County. A technical memorandum detailing funding sources available for this Project and ability of the County to apply for them will be prepared. An income survey and environmental clearance document will be prepared for use when completing funding application(s).

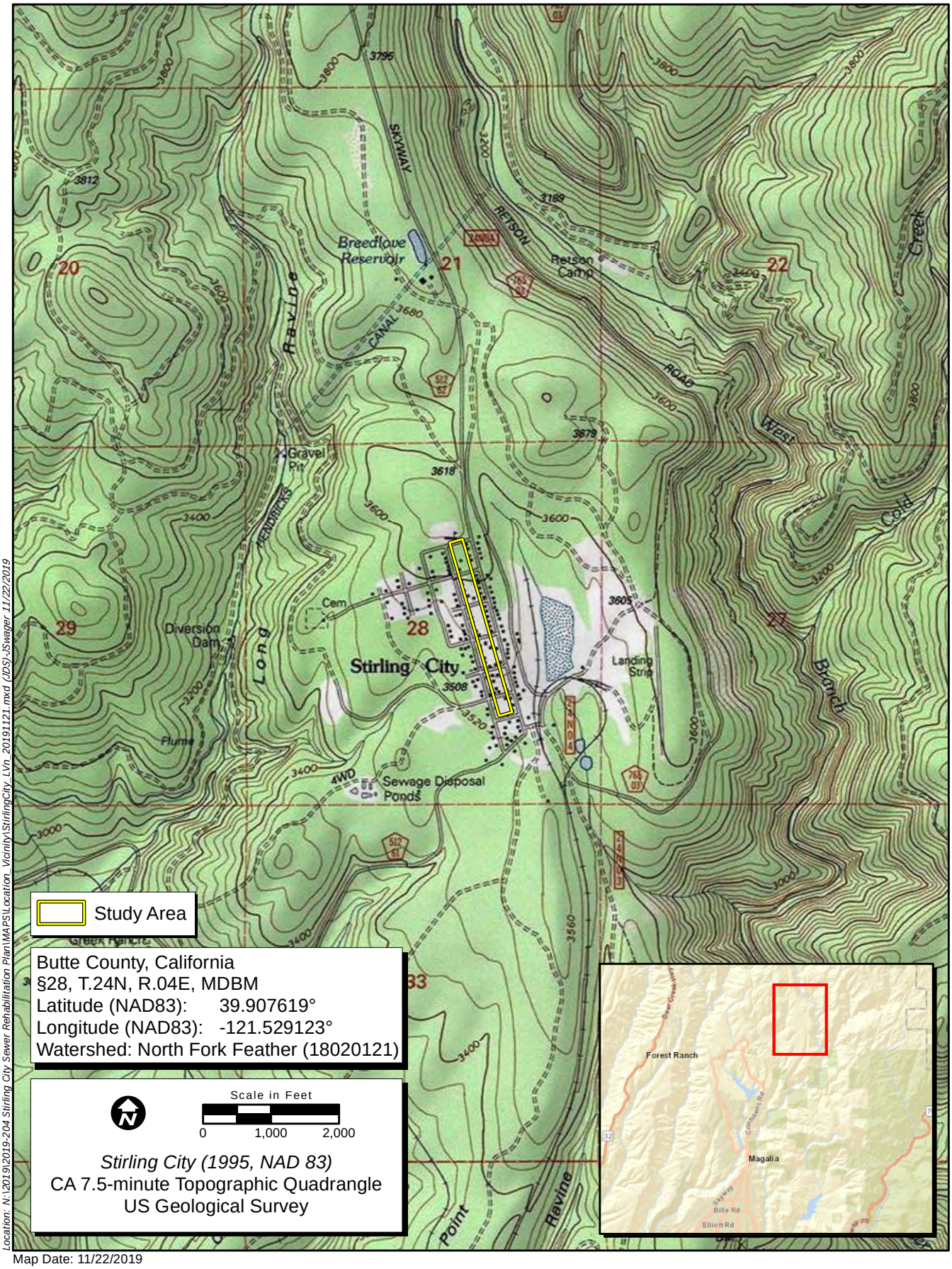
The existing sewer main in the alley is eight-inch clay pipe and maintains approximately two to 12 feet of cover. The existing sanitary sewer manhole structures are 36-inch corrugated metal pipes set into the ground with circular or rectangular steel plates covering the top. The clay pipe passes directly through the structures and holes have been made in the top of the pipe.

Although this Project will evaluate alternatives to the existing sewer collection system in Stirling City, it is likely that the proposed Project will:

- replace the existing sewer structures with standard precast concrete sewer manholes;
- replace some or all of the existing eight-inch clay sewer mains with eight-inch polyvinyl chloride sewer mains; and
- re-establish existing sewer lateral connections to the proposed sewer main.

2.0 REGULATORY SETTING

This biological reconnaissance survey was conducted to identify potential issues and ensure compliance with relevant State, local, and federal regulations regarding listed, protected, and sensitive species and resources. The regulations are detailed below.



Location: N:\2019\2019-204 Stirling City Sewer Rehabilitation Plan\MAPS\Location_Vicinity\StirlingCity_LVn_20191121.mxd (JDS) JSwager 11/22/2019

Map Date: 11/22/2019
Sources: ESRI, USGS

Figure 1. Project Location and Vicinity

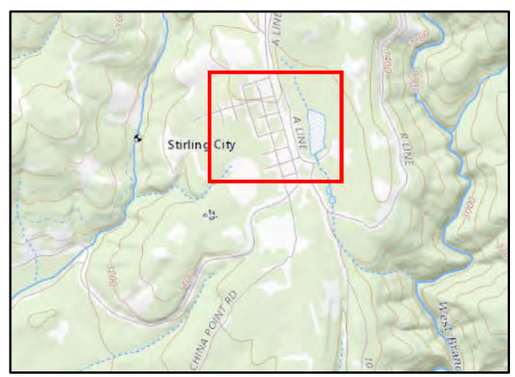
2019-204 Stirling City Sewer Rehabilitation Plan

ECORP Consulting, Inc.
ENVIRONMENTAL CONSULTANTS

Map Features

- Approximate Study Area
- Approximate Replacement Line

Sources: ESRI, USGS, NAIP (2018)



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Map Date: 3/6/2020

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Scale in Feet
0 300

Figure 2. Project Survey Area

2019-204 Stirling City Sewer Rehabilitation Plan

2.1 Federal Regulations

2.1.1 The Federal Endangered Species Act

The federal Endangered Species Act (ESA) protects plants and animals that are listed as endangered or threatened by the U.S. Fish and Wildlife Service (USFWS) and the National Marine Fisheries Service (NMFS). Section 9 of the ESA prohibits the taking of endangered wildlife, where taking is defined as "harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, collect, or attempt to engage in such conduct" (50 Code of Federal Regulations [CFR] 17.3). For plants, this statute governs removing, possessing, maliciously damaging, or destroying any endangered plant on federal land and removing, cutting, digging up, damaging, or destroying any endangered plant on non-federal land in knowing violation of State law (16 U.S. Code [USC] 1538). Under Section 7 of the ESA, federal agencies are required to consult with the USFWS if their actions, including permit approvals or funding, could adversely affect a listed (or proposed) species (including plants) or its critical habitat. Through consultation and the issuance of a biological opinion, the USFWS may issue an incidental take statement allowing take of the species that is incidental to an otherwise authorized activity provided the activity will not jeopardize the continued existence of the species. Section 10 of the ESA provides for issuance of incidental take permits where no other federal actions are necessary provided a habitat conservation plan is developed.

2.1.2 Migratory Bird Treaty Act

The Migratory Bird Treaty Act (MBTA) implements international treaties between the U.S. and other nations devised to protect migratory birds, any of their parts, eggs, and nests from activities such as hunting, pursuing, capturing, killing, selling, and shipping, unless expressly authorized in the regulations or by permit. As authorized by the MBTA, the USFWS issues permits to qualified applicants for the following types of activities: falconry, raptor propagation, scientific collecting, special purposes (rehabilitation, education, migratory game bird propagation, and salvage), take of depredating birds, taxidermy, and waterfowl sale and disposal. The regulations governing migratory bird permits can be found in 50 CFR Part 13 General Permit Procedures and 50 CFR Part 21 Migratory Bird Permits. The State of California has incorporated the protection of birds of prey in Sections 3800, 3513, and 3503.5 of the California Fish and Game Code.

2.1.3 Federal Clean Water Act

The purpose of the federal Clean Water Act (CWA) is to "restore and maintain the chemical, physical, and biological integrity of the nation's waters." Section 404 of the CWA prohibits the discharge of dredged or fill material into Waters of the U.S. without a permit from the U.S. Army Corps of Engineers (USACE). The definition of Waters of the U.S. includes rivers, streams, estuaries, the territorial seas, ponds, lakes, and wetlands. Wetlands are defined as those areas "that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions" (33 CFR 328.3 7b). The U.S. Environmental Protection Agency (USEPA) acts as a cooperating agency to set policy, guidance and criteria for use in evaluation permit applications and also reviews USACE permit applications.

The USACE regulates "fill" or dredging of fill material within its jurisdictional features. "Fill material" means any material used for the primary purpose of replacing an aquatic area with dry land or changing the bottom elevation of a water body. Substantial impacts to wetlands may require an individual permit. Projects that

only minimally affect wetlands may meet the conditions of one of the existing Nationwide Permits. A Water Quality Certification or waiver pursuant to Section 401 of the CWA is required for Section 404 permit actions; this certification or waiver is issued by the SWRCB, administered by each of nine California Regional Water Quality Control Boards.

2.2 State and Local Regulations

2.2.1 California Endangered Species Act

The California ESA generally parallels the main provisions of the ESA but, unlike its federal counterpart, the California ESA applies the take prohibitions to species proposed for listing (called "candidates" by the State). Section 2080 of the California Fish and Game Code prohibits the taking, possession, purchase, sale, and import or export of endangered, threatened, or candidate species, unless otherwise authorized by permit or in the regulations. Take is defined in Section 86 of the California Fish and Game Code as "hunt, pursue, catch, capture, or kill, or attempt to hunt, pursue, catch, capture, or kill." The California ESA allows for take incidental to otherwise lawful development projects. State lead agencies are required to consult with California Department of Fish and Wildlife (CDFW) to ensure that any action they undertake is not likely to jeopardize the continued existence of any endangered or threatened species or result in destruction or adverse modification of essential habitat.

2.2.2 Fully Protected Species

The State of California first began to designate species as "fully protected" prior to the creation of the federal and California ESAs. Lists of fully protected species were initially developed to provide protection to those animals that were rare or faced possible extinction, and included fish, amphibians and reptiles, birds, and mammals. Most fully protected species have since been listed as threatened or endangered under the federal and/or California ESAs. The regulations that implement the Fully Protected Species Statute (California Fish and Game Code § 4700) provide that fully protected species may not be taken or possessed at any time. Furthermore, CDFW prohibits any State agency from issuing incidental take permits for fully protected species, except for necessary scientific research.

2.2.3 Native Plant Protection Act

The Native Plant Protection Act (NPPA) of 1977 (California Fish and Game Code §§ 1900-1913) was created with the intent to "preserve, protect and enhance rare and endangered plants in this State." The NPPA is administered by CDFW. The Fish and Wildlife Commission has the authority to designate native plants as "endangered" or "rare" and to protect endangered and rare plants from take. The California ESA of 1984 (California Fish and Game Code § 2050-2116) provided further protection for rare and endangered plant species, but the NPPA remains part of the California Fish and Game Code.

2.2.4 California Fish and Game Code

Streambed Alteration Agreement

Section 1602 of the California Fish and Game Code requires that a Notification of Lake or Streambed Alteration be submitted to CDFW for "any activity that may substantially divert or obstruct the natural flow or substantially change the bed, channel, or bank of any river, stream, or lake." The CDFW reviews the proposed

actions and, if necessary, submits to the Applicant a proposal for measures to protect affected fish and wildlife resources. The final proposal that is mutually agreed upon by CDFW and the Applicant is the Streambed Alteration Agreement (SAA). Often, projects that require an SAA also require a permit from the USACE under Section 404 of the CWA. In these instances, the conditions of the Section 404 permit and the SAA may overlap.

Migratory and Nesting Birds

The CDFW enforces the protection of nongame native birds in §§ 3503, 3503.5, and 3800 of the California Fish and Game Code. Section 3513 of the California Fish and Game Code prohibits the possession or take of birds listed under the federal MBTA. These sections mandate the protection of California nongame native birds' nests and also make it unlawful to take these birds. All raptor species are protected from "take" pursuant to California Fish and Game Code § 3503.5 and are also protected at the federal level by the MBTA of 1918 (USFWS 1918).

2.2.5 Butte County General Plan 2030

The Butte County General Plan was adopted in 2010 and "represents the basic community values, ideals and aspirations with respect to land use, development and conservation policy that will govern Butte County through 2030. The elements of the 2030 General Plan include: land use, housing, economic development, agriculture, water resources, circulation, conservation and open space, health and safety, public facilities and services area and neighborhood plans. Goals, policies and actions provide guidance to the County on how to direct changes and manage its resources over the next 20 years.

Items of note within the general plan as related to biological resources include Policy CIR-P3.10 within the Circulation Element which states that "trees located along urban streets shall be protected. If maintenance or upgrading requires tree removal, the trees shall be replaced." Additionally, the Biological Resources section of the Conservation and Open Space Element contains numerous goals and resultant policies aimed to protect natural and biological resources. Goal COS-6 asserts that entities engage in cooperative planning efforts to protect biological resources, while Goal COS-7 realizes the need to conserve and enhance habitat for protected species and sensitive biological communities. The need to maintain and promote native vegetation is emphasized by Goal COS-8, while Goal COS-9 recognizes the need to protect special-status plant and animal species. Lastly, Goal COS-10 aims to facilitate the survival of deer herds in winter and critical winter migratory deer herd ranges.

2.3 METHODS

2.3.1 Literature Review/Database Queries

ECORP biologists queried the CDFW's California Natural Diversity Data Base (CNDDB; CDFW 2019a) and the California Native Plant Society's (CNPS) Electronic Inventory (CNPS 2019) to determine the special-status plant and wildlife species that have been documented historically in the vicinity of the Project site. The CNDDB database search was conducted on November 22, 2019. ECORP searched CNDDB records within the Project boundaries as depicted on the Stirling City USGS 7.5-minute topographic quadrangles, and parts of the surrounding topographic quadrangles, including the Kimshew Point, Pulga, Paradise East, Paradise West, Cohasset, Hamlin Canyon, Jonesville, Butte Meadows, Storrie, Soapstone Hill, Richardson Springs, Devils

Parade Ground, Berry Creek, Barkley Mtn, Ishi Caves, Humboldt Peak, Belden, and Onion Butte USGS quads. The CNDDB and CNPS databases contain records of reported occurrences of federal- or State-listed endangered, threatened, proposed endangered or threatened species, California Species of Special Concern (SSC), and/or other special-status species or habitat that may occur within or near the Project site. Additional information was gathered from the following sources and includes, but is not limited to the following:

- NRCS *Web Soil Survey* (NRCS 2019).
- National Wetlands Inventory (NWI, 2019).
- *State and Federally Listed Endangered and Threatened Animals of California* (CDFW 2019b).
- *Special Animals List* (CDFW 2019c).
- *The Jepson Manual*; 2nd Ed. (Baldwin et al. 2012).
- *The Manual of California Vegetation*, 2nd Edition (Sawyer et al. 2009).
- Various online websites (e.g., Calflora 2019).

Using this information and observations in the field, a list of special-status plant and animal species that have potential to occur within the Project area was generated. For the purposes of this assessment, special-status species are defined as plants or animals that:

- have been designated as either rare, threatened, or endangered by CDFW, CNPS, or the USFWS, and/or are protected under either the federal or California ESAs;
- are candidate species being considered or proposed for listing under these same acts;
- are fully protected by the California Fish and Game Code, §§ 3511, 4700, 5050, or 5515; and/or
- are of expressed concern to resource and regulatory agencies or local jurisdictions.

Special-status species were assessed for their potential to occur within the Project area based on the following guidelines:

- **Present:** The species was observed during a site visit or focused survey.
- **High:** Habitat (including soils and elevation factors) for the species occurs onsite and a known occurrence has been recorded within five miles of a project site.
- **Moderate:** Either habitat (including soils and elevation factors) for the species occurs onsite and a known occurrence has been reported in the database, but not within five miles of a project site, or a known occurrence occurs within five miles of a site and marginal or limited amounts of habitat occurs onsite.
- **Low:** Limited to no suitable habitat for the species occurs onsite and a known occurrence has been reported in the database, but not within five miles of a site, or suitable habitat strongly associated with the species occurs onsite, but no records were found in the database search.

- **Absent:** Focused surveys were conducted and the species was not found, or species was found in the database search but habitat (including soils and elevation factors) is not present onsite, or the known geographic range of the species does not include the Project area.

Note that location information on some special-status species may be of questionable accuracy or unavailable. Therefore, for survey purposes, the environmental factors associated with a species' occurrence requirements may be considered sufficient reason to give a species a positive potential for occurrence. In addition, just because a record of a species does not exist in the databases does not mean it does not occur. In many cases, records may not be present in the databases because an area has not been surveyed for that particular species.

A desktop review of the NRCS' Web Soil Survey (NRCS 2019), the NWI database, and the corresponding USGS topographic maps was also conducted to determine if there were any aquatic features that might potentially fall under the jurisdiction of either federal or state agencies were present on the Project site.

2.3.2 Biological Reconnaissance Survey

Project elements were evaluated in the field on December 11, 2019 by walking the Project site and 100-foot buffer (collectively, Survey Area) to determine the vegetation communities, wildlife habitats, and potential for special-status species to occur in the Survey Area. Data were recorded on a Global Positioning System unit, field notebooks, and/or maps. Photographs were also taken during the survey to provide visual representation of the various vegetation communities within the Project site. The Survey Area was also examined to assess its potential to facilitate wildlife movement or function as a movement corridor for wildlife moving throughout the region.

Plant and wildlife species, including any special-status species that were observed during the survey, were recorded. Plant nomenclature follows that of *The Jepson Manual: Vascular Plants of California* (Baldwin et al. 2012). Wildlife nomenclature follows Society for the Study of Amphibians and Reptiles (SSAR 2019), *Checklist of North American Birds* (American Ornithologist's Union [AOU] 2016), and the *Revised Checklist of North American Mammals North of Mexico* (Bradley et al. 2014). .

3.0 RESULTS

The results of the literature review and site reconnaissance are summarized below.

3.1 Literature Review/Database Queries

3.1.1 Special-Status Plants and Wildlife

The CNDDB and CNPS database searches were conducted on November 22, 2019. These queries reported 54 special-status plant species (Appendix A) and 24 special-status wildlife species (Appendix B) historically within in the nine-quad vicinity of the Project Survey Area.

3.1.2 Designated Critical Habitat

The Project area is not located within NMFS- or USFWS-designated critical habitat.

3.1.3 Soils

According to the NRCS soil survey for Tehama County, California (Version 14, Oct 16, 2019), one soil unit occurs in the Project site (Figure 3. *Natural Resources Conservation Service Soil Types*) (NRCS 2019*)*. Soil onsite is composed of Paradiso loam, on 2 percent -15 percent slopes. This soil type is very deep and well-drained, occurring over volcanic rocks. It is not considered hydric. The Project site contains a proportion of imported fill dirt and gravel as well.

3.1.4 Aquatic Features

The NWI identifies one freshwater pond and two riverine features near the defined Survey Area. An unnamed ephemeral drainage runs north to south east of town, and a seasonally inundated pond fills from it. Another riverine feature occurs southwest of the Survey Area outside the town limits (Figure 4. *National Wetlands Inventory*).

3.2 Biological Reconnaissance Survey

The biological reconnaissance survey of the Survey Area was conducted on December 11, 2019 by ECORP biologist Eric Stitt. Mr. Stitt has more than 20 years of experience conducting surveys and habitat assessments for special-status plant and wildlife species of northern California. Air temperature during the survey was 60 degrees Fahrenheit. Sky was overcast and a light drizzle/rain fell at times. Ground was wet and saturated from previous rains, and small patches of snow occurred in places. Winds were mild at three to five miles per hour.

3.2.1 Site Vegetation and Land Cover

The Project area is an approximately 30-foot wide alleyway situated behind houses facing either Skyway Road or Manzanita Street. The alley appears to be frequently used to access buildings and dwellings, and many stored vehicles, piles of debris, small outbuildings, and other urban items (many discarded) occur throughout the alley. No special-status habitats or vegetation communities were observed on within the Project Survey Area. Plant species observed were typical of roadsides, the developed land present on the Project site, and the time of the year in which the survey was conducted.

Map Features

- Approximate Study Area
- Approximate Replacement Line

Series Number - Series Name

- 829 - Paradiso loam, 2 to 15 percent slopes

**Natural Resources Conservation Service (NRCS)
Soil Survey Geographic (gSSURGO) Database for
Butte County, CA**

Sources: ESRI, USGS, NAIP (2018)

ECORP- N:\2019\2019-204 Stirling City Sewer Rehabilitation Plan\MAPS\Soils_and_Geology\StirlingCity_Soils_20191121_mxd (JDS) amyers 3/6/2020

Map Date: 3/6/2020

ECORP Consulting, Inc.
ENVIRONMENTAL CONSULTANTS

Scale in Feet
0 300

Figure 3. Natural Resources Conservation Service Soil Types

2019-204 Stirling City Sewer Rehabilitation Plan

Map Features

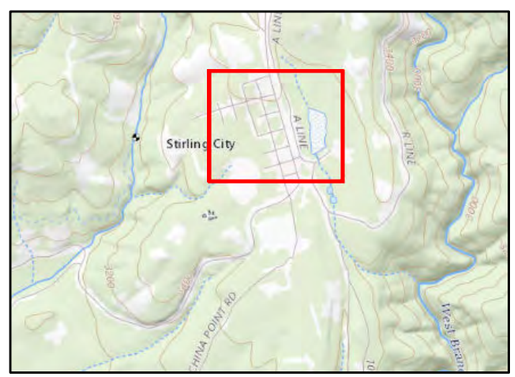
- Approximate Study Area
- Approximate Replacement Line

NWI Features

- Freshwater Pond
- Riverine

USFWS National Wetlands Inventory
Version 2, October 2019

Sources: ESRI, USGS, USFWS, NAIP (2018)



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Map Date: 3/6/2020

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ENVIRONMENTAL CONSULTANTS

Scale in Feet
0 300

Figure 4. National Wetlands Inventory

2019-204 Stirling City Sewer Rehabilitation Plan

Ornamental landscaping, escaped human commensal species, and large native conifers (Jeffrey pine (*Pinus jeffreyi*), ponderosa pine (*Pinus ponderosa*), incense cedar (*Calocedrus decurrens*), and Douglas fir (*Pseudotsuga menziesii*)) dominate the vegetation. Vines including English ivy (*Hedera helix*), Scotch broom (*Cytisus scoparius*), periwinkle (*Vinca major*), wisteria (*Wisteria sinensis*), California rose (*Rosa californica*), and Himalayan blackberry (*Rubus armeniacus*) often covered fences and borders with surrounding yards. Forbs and ground covers were generally difficult to identify as the visit was timed with the start of the growing season, but those identified included plantain (*Plantago* sp.), knotweed (*Polygonum* sp.), and St. John's wort (*Hypericum perforatum*). Filling out the vegetation were scattered manzanita (*Arctostaphylos* sp.), madrone (*Arbutus menziesii*), black oak (*Quercus kelloggii*), persimmon (*Diospyros* sp.), privet (*Ligustrum* sp.), birch (*Betula* sp.), *Prunus,* and apple (*Malus* sp.) trees. The alley appears to be sprayed with herbicide on occasion to control weed growth. Numerous discarded or idle cars in various stages of decay or repair occur throughout the Survey Area.

Representative photographs of the Project site can be found in Appendix C. A list of plant species observed during the survey is included in Appendix D.

3.2.2 Wildlife

Due to the urban nature of the Project area and the fact that work will be performed within the alley, hardscapes, and in developed areas, the Project area provides very limited habitat for wildlife species. Wildlife observed during the survey included Steller's jay (*Cyanocitta stelleri*), common raven (*Corvus corax*), red-shouldered hawk (*Buteo lineatus*), and red-breasted nuthatch (*Sitta canadensis*). Trees and vegetation adjacent to work areas have the potential to support nesting birds during select times of the year. Appendix E contains a list of all wildlife species identified during the survey.

3.2.3 Potential for Special-Status Plant and Wildlife Species to Occur on the Project Site

Fifty-four plants and 24 special status wildlife species were returned in the database queries for the Survey Area (Appendices A and B). The Survey Area does not support suitable habitat for any of the plant species listed in Appendix A. Of the 24 animal species returned in the database query, seven sensitive bird species have moderate to low potential to occur within the Survey Area based on current site conditions and habitat characteristics. These are: sharp-shinned hawk (*Accipiter striatus*), Cooper's hawk (*A. cooperii*), Nuttall's woodpecker (*Picoides nuttallii*), Williamson's sapsucker (*Sphyrapicus thyroideus*), olive-sided flycatcher (*Contopus cooperi*), oak titmouse (*Baelophus inornatus*), and Cassin's finch (*Haemorhous cassinii*) (Appendix B).

3.2.4 Potentially Regulated Aquatic Habitats/Features

A formal jurisdictional delineation was not conducted, but no potential waters or wetlands occur within the Survey Area. All Project activities will be within pavement or ruderal areas and no impact will occur to ditches, regulated aquatic habitats, or waters.

3.2.5 Nesting Birds

Potential nesting habitat for birds protected by the federal MBTA and California Fish and Game Code is present within trees in the Survey Area. Raptors typically breed between February and August, and songbirds

and other passerines generally nest between March and August. No large stick-nests indicative of raptors were documented in any trees within the Survey Area.

3.2.6 Wildlife Movement Corridors, Linkages, and Significant Ecological Areas

The Project area was assessed for its ability to function as a wildlife corridor. The concept of habitat corridors addresses the linkage between large blocks of habitat that allow safe movement for mammals and other wildlife species from one habitat area to another. The definition of a corridor is varied, but corridors may include areas such as greenbelts, refuges, underpasses, riparian areas, creeks, and biogeographic land bridges. In general, a corridor can be described as a linear habitat, embedded within a dissimilar matrix, which connects two or more larger blocks of habitat.

Wildlife movement corridors are critical for the functioning of ecological systems for several reasons. Corridors can connect and preserve the integrity of water, food, and cover sources. In addition, wildlife movement among corridors and between subpopulations provides for genetic exchange, thereby maintaining genetic variability and ability to respond to changing environmental conditions. Corridors may be especially critical for small populations already subject to loss of variability from genetic drift and effects of inbreeding. As can be expected, corridor use and wildlife dispersal and immigration patterns vary greatly among taxa.

4.0 IMPACT ANALYSIS AND RECOMMENDATIONS TO BE INCLUDED AS CONSTRUCTION DETAILS AND COMPLETED AS PART OF CONSTRUCTION

The Project work area is a residential alley surrounded by development on all sides. Movement opportunities for wildlife are very restricted from west to east due to housing, residential fences, and other infrastructure. Terrestrial wildlife (mesocarnivores, California quail (*Callipepla californica*), turkey (*Meleagris gallopavo*), mule deer (*Odocoileus hemionus*)) probably use the alley to traverse north-south through town, however. The Project will not permanently impact wildlife movement opportunities because the pipeline to be repaired is underground.

The Project site is unlikely to support sensitive plant species for the reasons described in the previous section, and as summarized in Appendix A.

With implementation of the following recommendations, impacts to sensitive bird species (Appendix B), nesting birds, and birds protected by the MBTA, will be avoided.

There are no aquatic resources located in the Survey Area.

4.1 Impacts to Nesting Birds

Nesting birds, including Cooper's hawk, Nuttall's woodpecker, and oak titmouse, as well as all other birds protected under the MBTA, could suffer nest failure if they establish nests in close proximity to work areas. However, given that the Project site is within town limits and behind houses in an alley, any nesting birds are assumed to be tolerant of high levels of disturbance. To avoid impacts to nesting birds, implement the following mitigation measures:

Recommendation 1: Nesting Bird Work Window. Complete all ground-disturbing and vegetation-disturbing work during the non-nesting season to avoid impacts to nesting birds. The non-nesting season generally corresponds to the period September 1 through January 31.

Recommendation 2: Nesting Bird Pre-construction Surveys. If it is not feasible to implement Recommendation 1, a qualified biologist shall complete nesting bird surveys within 100 feet of all areas to be disturbed by Project construction no more than 14 days in advance of activities. If active nests are detected, and depending on the location of the active nest(s) and the bird species concerned, the qualified biologist may establish a no-work buffer around an active nest. Active nests may be monitored over time, with construction allowed only after the young have successfully fledged or the nest has failed, as determined by the qualified biologist

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LIST OF APPENDICES

APPENDIX A

Special-Status Plant Species Reported in the Vicinity of the Project Site

Special-Status Plant Species Reported in the Vicinity of the Project Site

Common Name (Scientific Name)	Status			Habitat Description	Blooming Period	Potential To Occur Onsite
	ESA	CESA	Other			
Western goblin (*Botrychium montanum)*			2B.1	Lower montane coniferous forest, meadows and seeps, and upper montane coniferous forest (4,800' – 7,150').	July - September	Absent-Suitable habitat not present in survey area.
Thread-leaved beakseed (*Bulbostylis capillaris*)	–	–	4.2	Lower montane coniferous forest, meadows and seeps, and upper montane coniferous forest (1,296'–6,808').	June–August	Absent-Suitable habitat not present in survey area.
Butte County Calycadenia (*Calycadenia oppositifolia*)			4.2	Found in openings on volcanic, granitic, or serpentinite soils. IN chaparral, cismontane woodland, lower montane coniferous forest, meadows and seeps, and valley and foothill grassland (300' – 3,100').	April - July	Absent-Suitable habitat not present in survey area.
Butte County morning glory (*Calystegia atriplicifolia* ssp. *buttensis*)			4.2	Found on rocky substrates in chaparral, lower montane coniferous forest, and valley and foothill grassland (1,850' – 5,000').	May - July	Absent-Suitable habitat not present in survey area.
Dissected-leaved toothwort (*Cardamine pachystigma* var. *dissectifolia*)			1B.2	Serpentinite soils in chaparral and lower montane coniferous forest (835' – 6,900').	February - May	Absent-Suitable habitat not present in survey area.
Davy's sedge (*Carex davyi*)			1B.3	Subalpine coniferous forest, upper montane coniferous forest (5,000' – 10,500').	May - August	Absent-Suitable habitat not present in survey area.
Geyer's sedge *(Carex geyeri)*			4.2	Great Basin scrub and lower montane coniferous forest (3,790' – 7,200').	May – August	Absent-Suitable habitat not present in survey area.
Mud sedge *(Carex limosa)*			2B.2	Bogs, fens, lower montane coniferous forest, meadows, seeps, marshes, swamps, and upper montane coniferous forest (3,940' – 8,850').	June - August	Absent-Suitable habitat not present in survey area.
Chaparral sedge (*Carex xerophila)*			1B.2	Serpentine and gabbro soils in chaparral, cismontane woodland, and lower montane coniferous forest (1,450' – 2,525').	March - June	Absent-Suitable habitat not present in survey area.

Common Name (Scientific Name)	Status			Habitat Description	Blooming Period	Potential To Occur Onsite
	ESA	CESA	Other			
White-stemmed clarkia *(Clarkia gracilis)*			1B.2	Sometime on serpentine soils in chaparral and cismontane woodland (800' – 3'560').	May - July	Absent-Suitable habitat not present in survey area.
Golden-anthered clarkia *(Clarkia mildrediae* ssp. *lutescens)*			4.2	Rocky soils in cismontane woodland and lower montane coniferous forest (900' – 5,750').	June - August	Absent-Suitable habitat not present in survey area.
Mildred's clarkia *(Clarkia mildrediae ssp. mildrediae)*			1B.3	Sandy granitic soils in cismontane woodland and lower montane coniferous forest (800' – 5,610').	May - August	Absent-Suitable habitat not present in survey area.
Mosquin's clarkia *Clarkia mosquinii* ssp. *Mosquinii*			1B.1	Rocky areas in cismontane woodland and lower montane coniferous forest (600' – 5,000').	May - July	Absent-Suitable habitat not present in survey area.
Streambank spring beauty *(Claytonia parviflora* ssp. *grandiflora)*	–	–	4.2	Occurs in rocky cismontane woodland (820'–3,937').	February–May	Absent-Suitable habitat not present in survey area.
Silky cryptantha *(Cryptantha crinita)*			1B.2	Found in gravelly streambeds in cismontane woodland, lower montane coniferous forest, riparian forest, riparian woodland, and valley and foothill grassland (200' – 4,000').	April - May	Absent-Suitable habitat not present in survey area.
California lady's-slipper (*Cypripedium californicum)*	–	–	4.2	Usually within serpentinite seeps and streambanks of bogs and ferns, and lower montane coniferous forest (98'–9,022').	April–August	Absent-Suitable habitat not present in survey area.
California pitcherplant *(Darlingtonia californica)*	–	–	4.2	Mesic areas in generally serpentinite seeps of bogs and ferns, and meadows and seeps (0'–8,481').	April–August	Absent-Suitable habitat not present in survey area.
Swamp larkspur *(Delphinium uliginosum)*	–	–	4.2	Serpentinite seeps in chaparral and valley and foothill grassland (1,115'–2,001').	May–June	Absent-Suitable habitat not present in survey area.
English sundew *(Drosera anglica)*			2B.3	Found in bogs, fens, meadows, and seeps (4,265' – 7,400').	June - September	Absent-Suitable habitat not present in survey area.
Clifton's eremogone *(Eremogone cliftonii)*			1B.3	Found in granitic openings in chaparral, lower and upper montane coniferous forest (1,495' – 6,825').	April - September	Absent-Suitable habitat not present in survey area.
Ahart's buckwheat *(Eriogonum umbellatum* var. *ahartii)*	–	–	1B.2	Serpentine slopes in chaparral and cismontane woodland (1,315' – 6,575').	June - September	Absent-Suitable habitat not present in survey area.

Common Name (Scientific Name)	Status			Habitat Description	Blooming Period	Potential To Occur Onsite
	ESA	CESA	Other			
Fern-leaved monkeyflower *(Erythranthe filicifolia)*	–	–	1B.2	Slow draining ephemeral meadows and seeps in chaparral and lower montane coniferous forest (1,360' – 5,610').	April–June	Absent-Suitable habitat not present in survey area.
Caribou coffeeberry *(Frangula purshiana ssp. ultramafica)*			1B.2	Serpentine soils in chaparral, lower montane coniferous forest, meadows and seeps, and upper montane coniferous forest (2,600' – 6,630').	May - July	Absent-Suitable habitat not present in survey area.
Butte County fritillary *(Fritillaria eastwoodiae)*	–	–	3.2	Chaparral, cismontane woodland, and openings in lower montane coniferous forest and occasionally is found on serpentinite soils (164'–4,921').	March–June	Absent-Suitable habitat not present in survey area.
Woolly rose-mallow *(Hibiscus lasiocarpos* var. *occidentalis)*	–	–	1B.2	Marshes and freshwater swamps. Often in riprap on sides of levees (0'–394').	June–September	Absent-Suitable habitat not present in survey area.
Baker's globe mallow *(Iliamna bakeri)*			4.2	On volcanic soils in chaparral, Great Basin scrub, lower montane coniferous forest, and pinyon/juniper woodland (3,280' – 8,200').	June - September	Absent-Suitable habitat not present in survey area.
California satintail *(Imperata brevifolia)*	–	–	2B.1	Mesic areas in chaparral, coastal scrub, Mojavean desert scrub, meadows and seeps (often alkali) and riparian scrub (0'–3,986').	September - May	Absent-Suitable habitat not present in survey area.
Red Bluff dwarf rush *(Juncus leiospermus* var. *leiospermus)*	–	–	1B.1	Vernally mesic areas in chaparral, cismontane woodland, meadows and seeps, valley and foothill grassland, and vernal pools (115'–4,101').	March–June	Absent-Suitable habitat not present in survey area.
Cantelow's lewisia *(Lewisia cantelovii)*	–	–	1B.2	In granitic or sometimes serpentinite soils within mesic areas of broad–leaved upland forest, chaparral, cismontane woodland, and lower montane coniferous forest (1,083'–4,495').	May–October	Absent-Suitable habitat not present in survey area.
Hutchison's lewisia *(Lewisia kelloggii* ssp. *hutchisonii)*	–	–	3.2	Openings, ridgetops, often slate, sometimes rhyolite tuff in upper montane coniferous forest (2,510'–7,759').	May–August	Absent-Suitable habitat not present in survey area.

Common Name (Scientific Name)	Status			Habitat Description	Blooming Period	Potential To Occur Onsite
	ESA	CESA	Other			
Humboldt lily *(Lilium humboldtii* ssp. *humboldtii)*	–	–	4.2	Occurs in openings within chaparral, cismontane woodland, and lower montane coniferous forest (295'–4,199').	May–August	Absent-Suitable habitat not present in survey area.
Three-ranked hump moss *(Meesia triquetra)*			4.2	Found in bogs, fens, meadows, seeps, in subalpine coniferous forest and upper montane coniferous forest (4,265' – 9,700').	July	Absent-Suitable habitat not present in survey area.
Broad-nerved hump moss *(Meesia uliginosa)*			2B.2	Found in damp soil in Found in bogs, fens, meadows, seeps, in subalpine coniferous forest and upper montane coniferous forest (4,000' – 9,200').	July and October	Absent-Suitable habitat not present in survey area.
Lewis Rose's ragwort (*Packera eurycephala var. lewisrosei*)			1B.2	Serpentine soil in chaparral, cismontane woodland, lower montane coniferous forest communities (900' – 6,200').	March - July	Absent-Suitable habitat not present in survey area.
Closed-throated beardtongue *(Penstemon personatus)*			1B.2	Volcanic soils in chaparral, lower and upper montane coniferous forest (3,500' – 7,000').	June - September	Absent-Suitable habitat not present in survey area.
Sierra blue grass (*Poa sierrae*)	–	–	1B.3	Lower montane coniferous forest openings (1,198'–4,921').	April–July	Absent-Suitable habitat not present in survey area.
California beaked-rush (*Rhynchospora Californica*)			1B.1	Bogs, fens, lower montane coniferous forest, meadows, seeps, marshes and swamps (145' – 3,315').	May - July	Absent-Suitable habitat not present in survey area.
Brownish beaked-rush (*Rhynchospora capitellata*)	–	–	2B.2	Mesic areas in lower montane coniferous forest, upper montane coniferous forests, meadows, seeps, marshes, and swamps (148'–6,562').	July–August	Absent-Suitable habitat not present in survey area.
Hall's rupertia (*Rupertia hallii*)			1B.2	Roadsides and openings in cismontane woodland and lower montane coniferous forest (1,790' – 7,400').	June - August	Absent-Suitable habitat not present in survey area.
Water bulrush *Schoenoplectus Subterminalis*			2B.3	Found in bogs, fens, marshes, and swamps (2,460' – 7,400').	June - August	Absent-Suitable habitat not present in survey area.
Feather River stonecrop (*Sedum albomarginatum)*			1B.2	Serpentine soils in chaparral and lower montane coniferous forest (850' – 6,400').	May - June	Absent-Suitable habitat not present in survey area.

Common Name (Scientific Name)	Status			Habitat Description	Blooming Period	Potential To Occur Onsite
	ESA	CESA	Other			
Butte County checkerbloom (*Sidalcea robusta*)	–		1B.2	Found in chaparral and cismontane woodland (300' – 5,250').	April and June	Absent-Suitable habitat not present in survey area.
Long-stiped campion (*Silene occidentalis* ssp. *longistipitata*)			1B.2	Chaparral, lower montane coniferous forest, upper montane coniferous forest (3,280' – 6,560').	June - August	Absent-Suitable habitat not present in survey area.
Long-leaved starwort (*Stellaria longifolia*)			2B.2	Bogs, fens, meadows, and seeps, in riparian woodland and upper montane coniferous forest (2,950' – 6,000').	May - August	Absent-Suitable habitat not present in survey area.
Flat-leaved bladderwort (*Utricularia intermedia*)			2B.2	Bogs, fens, meadows, seeps, marshes, swamps, and vernal pools (3,940' – 8,900').	June - August	Absent-Suitable habitat not present in survey area.

Status Codes:

FESA	Federal Endangered Species Act
CESA	California Endangered Species Act
CE	CESA or NPPA listed, Endangered.
1B	CRPR/Rare or Endangered in California and elsewhere.
2B	Plants rare, threatened, or endangered in California but more common elsewhere.
3	CRPR/Plants About Which More Information is Needed – A Review List.
4	CRPR/Plants of Limited Distribution – A Watch List.
0.1	Threat Rank/Seriously threatened in California (over 80% of occurrences threatened / high degree and immediacy of threat)
0.2	Threat Rank/Moderately threatened in California (20-80% occurrences threatened / moderate degree and immediacy of threat)
0.3	Threat Rank/Not very threatened in California (<20% of occurrences threatened / low degree and immediacy of threat or no current threats known)

APPENDIX B

Special-Status Wildlife Species Reported in the Vicinity of the Survey Area

Special-Status Wildlife Species Reported in the Vicinity of the Survey Area

Common Name *Scientific Name*	Status			Habitat Description	Potential for Occurrence
	ESA	CESA	Other		
Invertebrates					
Western bumble bee *Bombus occidentalis*	-	CE	-	In California, the species is largely restricted to high elevation sites in the Sierra Nevada, where it inhabits meadows and grasslands with abundant floral resources. Primarily nests underground in cavities created by ground dwelling animals. Visits a wide variety of flowering plants, but its short tongue is most suitable for foraging at open flowers with short corollas.	Absent-Suitable habitat not present in survey area.
Amphibians					
Southern long-toed salamander *Ambystoma macrodactylum sigillatum*	-	-	SSC	A medium-sized (to 8.9 snout vent length) pond breeding salamander of ponds and other lentic waters. Has an extended larval stage, and in some populations the larvae overwinter. In California, occurs at high elevations in the Northern Sierra Nevada and Trinity Alps. Adults are terrestrial and return to water to breed in May and June.	Absent-Suitable habitat not present in survey area.
Foothill yellow-legged frog *Rana boylii*	-	CT	SSC	Uses sunny to partially-shaded shallow streams and creeks with a rocky or cobble substrate. Needs cobble as egg-laying substrate, and larvae (with adaptations for high velocity water) need at least 15 weeks to reach metamorphosis. Occurs from sea level to 6000 feet.	Absent-Suitable habitat not present in survey area.
Cascades frog *Rana cascadae*	-	CC	SSC	A diurnal frog of aquatic montane areas in coniferous forests, found in fishless streams, pools, meadows, lakes, bogs, ponds, and marshes. Occurs to nearly tree line.	Absent-Suitable habitat not present in survey area.
Sierra Nevada yellow-legged frog *Rana sierrae*	FE	CT	CDFW WL	Historically ranged from Plumas County south through the Sierra Nevada to Inyo County. The southern part of the range is marked by Middle and South Forks of the Kings River. This frog also occurs at locations east of the Sierra Nevada crest. Always occurs near water at ponds, tarns, lakes, and streams. Tadpole may require 2 - 4 years to complete larval development.	Absent--Suitable habitat not present in survey area.

Common Name *Scientific Name*	Status			Habitat Description	Potential for Occurrence
	ESA	CESA	Other		
Reptiles					
Northwestern pond turtle *Actinemys marmorata*	-	-	SSC	This turtle requires basking sites and upland habitats up to 0.5 KM from water for egg laying. Uses ponds, streams, creeks, detention basins, and irrigation ditches.	Absent-Suitable habitat not present in survey area.
Birds					
Bald eagle (nesting and wintering) *Haliaeetus leucocephalus*	FD	CE	CFP, BCC	Typically breeds in forested areas near large bodies of water in the northern half of California; they nest in trees and rarely on cliffs usually absent of human disturbance; wintering habitat includes forest and woodland communities near waterbodies (e.g. rivers, lakes), wetlands, flooded agricultural fields, open grasslands	Absent-Suitable habitat not present in survey area.
Sharp-shinned hawk (nesting) *Accipiter striatus*	-	-	CDFW WL	Nests in trees in most forest types with at least some conifers. In California, nesting occurs in Sierra Nevada and Cascade Ranges (foothills to tree line) and northwestern coastal range.	Low-habitat present but nesting unlikely to be within developed areas.
Cooper's hawk (nesting) *Accipiter cooperii*	-	-	CDFW WL	Nests in trees in riparian woodlands in deciduous, mixed and evergreen forests, as well as urban landscapes	Low-habitat present but nesting unlikely to be within developed areas.
Northern goshawk (nesting) *Accipiter gentilis*	-	-	SSC	Nesting occurs in mature to old-growth forests composed primarily of large trees with high canopy closure. In California, nests are built primarily in conifer trees in the Sierra Nevada, Cascade and northwestern coastal Ranges.	Absent-Suitable habitat not present in survey area.
California black rail *Laterallus jamaicensis coturniculus*	-	CT	BCC, CFP	Salt marsh, shallow freshwater marsh, wet meadows, and flooded grassy vegetation. In California, primarily found in coastal and Bay-Delta communities, but also in Sierran foothills (Butte, Yuba, Nevada, Placer counties)	Absent-Suitable habitat not present in survey area.
California spotted owl *Strix occidentalis occidentalis*	-	-	BCC, SSC	Found in the southern Cascade Range and northern Sierra Nevada from Pit River, Shasta County south to Tehachapi Mountains, Kern County, in the coastal ranges from Monterey County to Santa Barbara County, in Transverse and Peninsular Ranges south to northern Baja California. At lower elevations, they breed in hardwood forests and coniferous forests at higher elevations. They use forests with greater complexity and structure.	Absent-Suitable habitat not present in survey area.

Common Name *Scientific Name*	Status			Habitat Description	Potential for Occurrence
	ESA	CESA	Other		
Great gray owl (nesting) *Strix nebulosa*	-	CE	-	Found in the Cascade and Sierra Nevada Ranges south to Fresno County. Nesting occurs in deciduous and coniferous forests adjacent to meadows (in California, at elevations between 750-2250 meters). Nest in broken-topped dead trees, old raptor nests, mistletoe brooms, or human-made platforms.	Absent-Suitable habitat not present in survey area.
Calliope hummingbird *Selasphorus calliope*			BCC	In California, breeds in Cascade-Sierra Nevada region (1200-3400 meters); winters in Mexico; nesting habitat includes shrub-sapling and late shrub-sapling seral stage aspen thickets, often near streams, and open montane forests.	Absent-Suitable habitat not present in survey area.
Nuttall's woodpecker *Picoides nuttallii*			BCC	Resident from northern California south to Baja California. Nests in tree cavities in oak woodlands and riparian woodlands.	Moderate-Habitat present and this species coexists with habitation.
Williamson's sapsucker *Sphyrapicus thyroideus*			BCC	In California, breeds in the Cascade-Sierra Nevada region; with disjunct breeding populations in southern California. Breeding occurs in middle to high elevation conifer and mixed conifer-deciduous forests. Nesting habitat cavities excavated in western larch, Douglas fir, ponderosa pine, montane spruce, and quaking aspen.	Moderate-Habitat present.
Olive-sided flycatcher *Contopus cooperi*	-	-	SSC, BCC	Nests in montane and northern coniferous forests, in forest openings, forest edges, semiopen forest stands. In California, nests in coastal forests, Cascade and Sierra Nevada region. Winters in Central to South America.	Moderate-Habitat present.
Willow flycatcher (nesting) *Empidonax traillii*	-	CE	BCC	In California, breeding range includes Cascade-Sierra Nevada region (*brewsteri* subspecies); nesting habitat includes moist, shrubby riparian willow thickets, often with standing or running water. Winters in Central and South America.	Absent-Suitable habitat not present in survey area.
Purple martin (nesting) *Progne subis*	-	-	SSC	In California, breeds along coast range, Cascade-northern Sierra Nevada region and isolated population in Sacramento. Nesting habitat includes montane forests, Pacific lowlands with dead snags; the isolated Sacramento population nests in weep holes under elevated highways/bridges. Winters in South America.	Absent-Suitable habitat not present in survey area.

Common Name *Scientific Name*	Status			Habitat Description	Potential for Occurrence
	ESA	CESA	Other		
Oak titmouse *Baelophus inornatus*			BCC	Nests in tree cavities within dry oak or oak-pine woodland and riparian; where oaks are absent, they nest in juniper woodland, open forests (gray, Jeffrey, Coulter, pinyon pines and Joshua tree)	Moderate-Habitat present and this species coexists with habitation.
Yellow-breasted chat (nesting) *Icteria virens*	-	-	SSC	In California, breeds in Klamath Mountains, inner Northern Coast Range south to San Francisco Bay, locally distributed from Santa Clara County south to San Diego County, Sacramento and San Joaquin Valleys, along west slope of Sierra Nevada from the Feather River to Kern River, Mono and Inyo Counties In the west, nesting habitat includes dense riparian areas.	Absent-Suitable habitat not present in survey area.
Cassin's finch *Haemorhous cassinii*	-	-	BCC	Breeds throughout the conifer belts of North America's western interior mountains, from central British Columbia to northern New Mexico and Arizona; mostly between 3,000'-10,000' elevation. Often in mature forests of pine, spruce and aspen; especially open, dry pine forests.	Low-habitat is marginal for this species.
Mammals					
Sierra Nevada mountain beaver *Aplodontia rufa californica*	-	-	SSC	Found in montane riparian environments with open canopy and dense understory. Needs a cool, moist microclimate with friable soils for burrowing.	Absent-Suitable habitat not present in survey area.
Sierra Nevada red fox *Vulpes vulpes necator*	-	CT	-	Found in a variety of habitats including alpine dwarf shrub, wet meadow, subalpine conifer forest, montane riparian, and mixed conifer forests; however, it prefers forests interspersed with meadows or alpine fell-fields.	Absent-Suitable habitat not present in survey area.

Status Codes:

FESA	Federal Endangered Species Act
CESA	California Endangered Species Act
FE	FESA listed, Endangered.
FT	FESA listed, Threatened.
BCC	USFWS Bird of Conservation Concern (USFWS 2002).
CE	CESA or NPPA listed, Endangered.
CT	CESA- or NPPA-listed, Threatened.
CC	Candidate for CESA listing as Endangered or Threatened.
CFP	California Fish and Game Code Fully Protected Species (§ 3511-birds, § 4700-mammals, §5 050-reptiles/amphibians).
SSC	CDFW Species of Special Concern (CDFW, updated July 2017).
CDFW WL	CDFW Watch List

APPENDIX C

Representative Project Site Photographs

Photo 1. Looking northwest from top of Survey Area.

Photo 2. Looking southeast from top of Survey Area.

Photo 3. Another view looking southeast in the Survey Area.

Photo 4. Looking southeast in Survey Area.

Photo 5. Looking northwest from within Survey Area.

Photo 6. Looking southeast near bottom of project.

Photo 7. Looking northwest from Photo 6 (above).

Photo 8. Looking northeast

APPENDIX D

Plant List

Plant List

Scientific Name	Common Name
Arbutus menziesii	Madrone
Arctostaphylos sp.	Manzanita
Avena fatua	Wild oats
Betula sp.	Birch
Bromus diandrus	Ripgut brome
Calocedrus decurrens	Incense cedar
Cynodon dactylon	Bermuda grass
Cytisus scoparius	Scotch broom
Diospyros sp.	Persimmon
Hedera helix	English ivy
Hordeum murinum	Barley
Hypericum perforatum	St. John's wort
Ligustrum sp.	Privet
Malus sp.	Apple
Pinus jeffreyi	Jeffrey pine
Pinus ponderosa	Ponderosa pine
Plantago lanceolata	Narrowleaf plantain
Poa annua	Annual bluegrass
Polygonum sp.	Knotweed
Prunus dulcis	Almond
Quercus kelloggii	Black oak
Quercus lobata	Valley oak
Rosa californica	California rose
Rubus armeniacus	Himalayan blackberry
Vinca major	Periwinkle
Wisteria sinensis	Wisteria

APPENDIX E

Wildlife List

Wildlife List

Scientific Name	Common Name
Buteo striatus	Red-shouldered hawk
Callipepla californica	California quail
Cathartes aura	Turkey vulture
Colaptes auratus	Northern flicker
Corvus brachyrhynchos	American crow
Corvus corax	Common raven
Cyanocitta stelleri	Steller's jay
Melozone crissalis	California towhee
Regulus calendula	Ruby-crowned kinglet
Sitta canadensis	Red-breasted nuthatch
Zonotrichia leucophrys	White-crowned sparrow

Appendix C

Stirling City Sewer Rehabilitation Planning Project – Noise Impact Memorandum

February 14, 2020

Butte County Department of Public Works
7 County Center Dr.,
Oroville, California 95965

RE: Stirling City Sewer Rehabilitation Planning Project – Noise Impact Memorandum

To Whom it May Concern:

On behalf of ECORP Consulting, Inc. (Seth Myers - Senior AQ and Noise Specialist) has conducted a Noise Impact Memorandum for the proposed Stirling City Sewer Rehabilitation Planning Project (Project) located in the community of Stirling City in unincorporated Butte County, California. The purpose of this memorandum is to assess the projects potential impacts related to noise within the area.

PROJECT DESCRIPTION

The Project is the rehabilitation of a portion of the wastewater collection system under the authority of County Service Area (CSA) 82, Stirling City Sewer System. Replacement and repair of portions of the system has been completed in the past, but further rehabilitation is needed. Approximately 2,700 linear feet of the original 5,500-foot clay pipe wastewater collection system needs replacement. The Project will also include the replacement of 12 existing manholes with ten standard manholes and the installation of 75 new laterals (12 linear feet each). Known deficiencies determined by the County include aging pipe, lack of standard manholes for proper system maintenance, possible root intrusion and infiltration and inflow due to disjointed piping. All construction will occur within the existing pipeline right-of-way under unpaved alleys and roads throughout the small community.

The Proposed Project will:

- replace the existing 12 manholes with ten standard precast concrete sewer manholes
- replace some or all of the existing 8" clay sewer mains with 8" polyvinyl chloride (PVC) sewer mains
- re-establish existing sewer lateral connections to the proposed sewer main.

55 Hanover Lane • Chico, CA 95973 • Tel: (530) 965-5925 • Fax: (916) 782-9134 • Web: www.ecorpconsulting.com

FUNDAMENTALS OF SOUND AND ENVIRONMENTAL NOISE EXISTING

Addition of Decibels

The decibel (dB) scale is logarithmic, not linear, and therefore sound levels cannot be added or subtracted through ordinary arithmetic. Two sound levels 10 dB apart differ in acoustic energy by a factor of 10. When the standard logarithmic decibel is A-weighted (dBA), an increase of 10 dBA is generally perceived as a doubling in loudness. For example, a 70-dBA sound is half as loud as an 80-dBA sound and twice as loud as a 60-dBA sound. When two identical sources are each producing sound of the same loudness, the resulting sound level at a given distance would be 3 dB higher than one source under the same conditions (Federal Transit Administration 2018). For example, a 65-dB source of sound, such as a truck, when joined by another 65-dB source results in a sound amplitude of 68 dB, not 130 dB (i.e., doubling the source strength increases the sound pressure by 3 dB). Under the dB scale, three sources of equal loudness together would produce an increase of 5 dB.

Sound Propagation and Attenuation

Noise can be generated by a number of sources, including mobile sources such as automobiles, trucks and airplanes, and stationary sources such as construction sites, machinery, and industrial operations. Sound spreads (propagates) uniformly outward in a spherical pattern, and the sound level decreases (attenuates) at a rate of approximately six dB (dBA) for each doubling of distance from a stationary or point source. Sound from a line source, such as a highway, propagates outward in a cylindrical pattern, often referred to as cylindrical spreading. Sound levels attenuate at a rate of approximately three dBA for each doubling of distance from a line source, such as a roadway, depending on ground surface characteristics (Federal Highway Administration [FHWA] 2011). No excess attenuation is assumed for hard surfaces like a parking lot or a body of water. Soft surfaces, such as soft dirt or grass, can absorb sound, so an excess ground-attenuation value of 1.5 dBA per doubling of distance is normally assumed.

Noise levels may also be reduced by intervening structures; generally, a single row of detached buildings between the receptor and the noise source reduces the noise level by about 5 dBA (FHWA 2008), while a solid wall or berm generally reduces noise levels by 10 to 20 dBA (FHWA 2011). However, noise barriers or enclosures specifically designed to reduce site-specific construction noise can provide a sound reduction of 35 dBA or greater (Western Electro-Acoustic Laboratory, Inc. 2000). To achieve the most potent noise-reducing effect, a noise enclosure/barrier must physically fit in the available space, must completely break the "line of sight" between the noise source and the receptors, must be free of degrading holes or gaps, and must not be flanked by nearby reflective surfaces. Noise barriers must be sizable enough to cover the entire noise source and extend length-wise and vertically as far as feasibly possible to be most effective. The limiting factor for a noise barrier is not the component of noise transmitted through the material, but rather the amount of noise flanking around and over the barrier. In general, barriers contribute to decreasing noise levels only when the structure breaks the line of sight between the source and the receiver.

The manner in which older homes in California were constructed generally provides a reduction of exterior-to-interior noise levels of about 20 to 25 dBA with closed windows. The exterior-to-interior reduction of newer residential units is generally 30 dBA or more.

Noise Descriptors

The decibel scale alone does not adequately characterize how humans perceive noise. The dominant frequencies of a sound have a substantial effect on the human response to that sound. Several rating scales have been developed to analyze the adverse effect of community noise on people. Because environmental noise fluctuates over time, these scales consider that the effect of noise on people is largely dependent on the total acoustical energy content of the noise, as well as the time of day when the noise occurs. The L_{eq} is a measure of ambient noise, while the L_{dn} and CNEL (Community Noise Equivalent Level) are measures of community noise. Each is applicable to this analysis and defined as follows:

- **Equivalent Noise Level (L_{eq})** is the average acoustic energy content of noise for a stated period of time. Thus, the L_{eq} of a time-varying noise and that of a steady noise are the same if they deliver the same acoustic energy to the ear during exposure. For evaluating community impacts, this rating scale does not vary, regardless of whether the noise occurs during the day or the night.
- **Day-Night Average (L_{dn})** is a 24-hour average L_{eq} with a 10-dBA "weighting" added to noise during the hours of 10:00 pm to 7:00 am to account for noise sensitivity in the nighttime. The logarithmic effect of these additions is that a 60 dBA 24-hour L_{eq} would result in a measurement of 66.4 dBA L_{dn}.
- **Community Noise Equivalent Level (CNEL)** is a 24-hour average L_{eq} with a 5-dBA weighting during the hours of 7:00 pm to 10:00 pm and a 10-dBA weighting added to noise during the hours of 10:00 pm to 7:00 am to account for noise sensitivity in the evening and nighttime, respectively.

Human Response to Noise

The human response to environmental noise is subjective and varies considerably from individual to individual. Noise in the community has often been cited as a health problem, not in terms of actual physiological damage, such as hearing impairment, but in terms of inhibiting general well-being and contributing to undue stress and annoyance. The health effects of noise in the community arise from interference with human activities, including sleep, speech, recreation, and tasks that demand concentration or coordination. Hearing loss can occur at the highest noise intensity levels.

Noise environments and consequences of human activities are usually well represented by median noise levels during the day or night or over a 24-hour period. Environmental noise levels are generally considered low when the CNEL is below 60 dBA, moderate in the 60- to 70-dBA range, and high above 70 dBA. Examples of low daytime levels are isolated, natural settings with noise levels as low as 20 dBA and quiet, residential streets with noise levels around 40 dBA. Noise levels above 45 dBA at night can disrupt sleep. Examples of moderate-level noise environments are urban residential or semi-commercial areas (typically 55 to 60 dBA) and commercial locations (typically 60 dBA). People may consider louder environments adverse, but most will accept the higher levels associated with noisier urban residential or

residential-commercial areas (60 to 75 dBA), or dense urban or industrial areas (65 to 80 dBA). Regarding increases in dBA noise levels, the following relationships should be noted in understanding this analysis:

- Except in carefully controlled laboratory experiments, a change of 1 dBA cannot be perceived by humans.
- Outside of the laboratory, a 3-dBA change is considered a just-perceivable difference.
- A change in level of at least 5 dBA is required before any noticeable change in community response would be expected.
- A 10-dBA change is subjectively heard as an approximate doubling in loudness and would almost certainly cause an adverse change in community response.

Noise-Sensitive Land Uses

Noise-sensitive land uses are generally considered to include those uses where noise exposure could result in health-related risks to individuals, as well as places where quiet is an essential element of their intended purpose. Residential dwellings are of primary concern because of the potential for increased and prolonged exposure of individuals to both interior and exterior noise levels. Additional land uses such as parks, historic sites, cemeteries, and recreation areas are considered sensitive to increases in exterior noise levels. Schools, churches, hotels, libraries, and other places where low interior noise levels are essential are also considered noise-sensitive land uses. The nearest sensitive noise receptors include residences surrounding the site.

Existing Ambient Noise Environment

The existing ambient noise levels experienced within Stirling City are typical of a quiet, rural residential area. As previously described, rural residential noise levels generally range around 40 dBA CNEL.

REGULATORY FRAMEWORK

Butte County General Plan Health and Safety Element

The County of Butte Health and Safety Element of the General Plan establishes goals and policies addressing major noise sources within the community. The Project is predominately construction in nature in that it proposes the rehabilitation of existing sewage collection facilities. Once installation is complete it would not change the permanent use of the Project site or result in regular visits. The following provides the applicable goals, policies and criteria for evaluating the feasibility and potential noise impact associated with the Proposed Project:

- **Policy HS-P1.7**: Applicants for discretionary permits shall be required to limit noise-generating construction activities located within 1,000 feet of residential uses to daytime hours between 7:00 a.m. and 6:00 p.m. on weekdays and non-holidays.
- **Policy HS-P1.9**: The following standard construction noise control measures shall be required at construction sites in order to minimize construction noise impacts:

a) Equip all internal combustion engine driven equipment with intake and exhaust mufflers that are in good condition and appropriate for the equipment.

b) Locate stationary noise-generating equipment as far as possible from sensitive receptors when sensitive receptors adjoin or are near a construction project area.

c) Utilize quiet air compressors and other stationary noise-generating equipment where appropriate technology exists and is feasible.

County of Butte Municipal Code

The County of Butte Municipal Code, Chapter 41A, *Noise Control*, specifies additional noise regulations pertaining to construction noise. Section 41A-9, *Exemptions*, of this chapter exempts construction noise from numeric noise thresholds, provided construction activities do not take place between the following hours:

- Sunset to sunrise on weekdays and non-holidays;
- Friday commencing at 6:00 p.m. through and including 8:00 a.m. on Saturday, as well as not before 8:00 a.m. on holidays;
- Saturday commencing at 6:00 p.m. through and including 10:00 a.m. on Sunday; and,
- Sunday after the hour of 6:00 p.m.

NOISE IMPACT ANALYSIS

This analysis employs noise prediction modeling and empirical observations. In order to estimate the worst-case construction noise levels that may occur at the nearest noise-sensitive receptors in the Project vicinity, predicted construction noise levels were calculated utilizing the Federal Highway Administration's Roadway Construction Model (2008).

Groundborne vibration levels associated with construction-related activities for the Project were evaluated utilizing typical groundborne vibration levels associated with construction equipment. Potential groundborne vibration impacts related to structural damage and human annoyance were evaluated, taking into account the distance from construction activities to nearby structures and typically applied criteria for structural damage and human annoyance.

Would the Project result in a generation of a substantial temporary or permanent increase in ambient noise levels in the vicinity of the Project in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies?

Project Construction

Construction noise associated with the Proposed Project would be temporary and would vary depending on the nature of the activities being performed. Noise generated would primarily be associated with the operation of off-road equipment for onsite construction activities as well as construction vehicle traffic on area roadways. Construction noise typically occurs intermittently and varies depending on the nature or

phase of construction (e.g., building construction, paving). Noise generated by construction equipment, including earthmovers, material handlers, and portable generators, can reach high levels. Typical operating cycles for these types of construction equipment may involve one or two minutes of full power operation followed by three to four minutes at lower power settings. Other primary sources of acoustical disturbance would be random incidents, which would last less than one minute (such as dropping large pieces of equipment or the hydraulic movement of machinery lifts). During construction, exterior noise levels could negatively affect sensitive receptors in the vicinity of the construction site.

Table 1 indicates the anticipated noise levels of construction equipment. The average noise levels presented in Table 1 are based on the quantity, type, and acoustical use factor for each type of equipment that is anticipated to be used.

Table 1. Typical Construction Equipment Noise Levels

Type of Equipment	Maximum Noise (L_{max}) at 50 Feet (dBA)	Maximum 8-Hour Noise (L_{eq}) at 50 Feet (dBA)
Crane	80.6	72.6
Dozer	81.7	77.7
Excavator	80.7	76.7
Generator	80.6	77.6
Grader	85.0	81.0
Other Equipment (greater than 5 horsepower)	85.0	82.0
Paver	77.2	74.2
Roller	80.0	73.0
Tractor	84.0	80.0
Dump Truck	76.5	72.5
Concrete Pump Truck	81.4	74.4
Welder	74.0	70.0
Crane	80.6	72.6
Dozer	81.7	77.7

Source: FHWA, Roadway Construction Noise Model (FHWA-HEP-05-054), dated January 2008.

As previously stated, the nearest noise-sensitive land uses consist of residences surrounding the site. The noise levels from construction equipment at 50 feet range from 70.0 dBA to 82.0 dBA. Thus, the noise levels from construction equipment could be experienced at these residences at levels exceeding 82.0 dBA.

The County does not promulgate numeric thresholds pertaining to the noise associated with construction but instead limits the time that construction can take place. Specifically, Section 41A-9, *Exemptions*, of this chapter exempts construction noise from numeric noise thresholds, provided construction activities do not take place between the following hours:

- Sunset to sunrise on weekdays and non-holidays;
- Friday commencing at 6:00 p.m. through and including 8:00 a.m. on Saturday, as well as not before 8:00 a.m. on holidays;
- Saturday commencing at 6:00 p.m. through and including 10:00 a.m. on Sunday; and,
- Sunday after the hour of 6:00 p.m.

It is typical to regulate construction noise in this manner since construction noise is temporary, short term, intermittent in nature, and would cease on completion of the Project. Additionally, construction would occur throughout Stirling City and would not be concentrated at one point. Therefore, noise generated during construction activities, as long as conducted within the permitted hours, would not exceed County noise standards.

Project Operations-Onsite Noise Sources

The Project proposes the rehabilitation of existing sewage collection facilities. The Proposed Project will not include the provision of new permanent stationary or mobile sources. Thus, it would not be a source of operational mobile or stationary noise sources.

Would the Project result in generation of excessive groundborne vibration or groundborne noise levels?

Project Construction

Excessive groundborne vibration impacts result from continuously occurring vibration levels. Increases in groundborne vibration levels attributable to the proposed Project would be primarily associated with short-term, construction-related activities. Construction on the Project Site would have the potential to result in varying degrees of temporary groundborne vibration, depending on the specific construction equipment used and the operations involved. Ground vibration generated by construction equipment spreads through the ground and diminishes in magnitude with increases in distance.

Construction-related ground vibration is normally associated with impact equipment such as pile drivers, jackhammers, and the operation of some heavy-duty construction equipment, such as dozers and trucks. It is noted that pile drivers would not be necessary during Project construction. Vibration decreases rapidly with distance and it is acknowledged that construction activities would occur throughout the Project Site and would not be concentrated at the point closest to sensitive receptors. Groundborne vibration levels associated with construction equipment are summarized in Table 2.

Table 2. Vibration Source Amplitudes for Construction Equipment

Equipment Type	Peak Particle Velocity at 20 Feet (inches per second)
Large Bulldozer	0.124
Caisson Drilling	0.124
Loaded Trucks	0.106
Rock Breaker	0.115
Jackhammer	0.049
Small Bulldozer/Tractor	0.004

Source: FTA 2018; Caltrans 2013b

The County does not regulate vibration associated with construction. However, a discussion of construction vibration is included for full disclosure purposes. For comparison purposes, the Caltrans's (2013) recommended standard of 0.2 inches per second peak particle velocity with respect to the

prevention of structural damage for residential buildings is used as a threshold. This is also the level at which vibrations may begin to annoy people in buildings.

It is acknowledged that construction activities would occur throughout the Project Site and would not be concentrated at the point closest to the nearest structure. The nearest structures of concern to the construction site are located approximately 20 feet away, adjacent to where the new drive isle and parking are proposed to be located. Based on the vibration levels presented in Table 2, ground vibration generated by heavy-duty equipment would not be anticipated to exceed approximately 0.124 inches per second peak particle velocity at 20 feet. Thus, nearby structures would not be negatively affected.

Project Operations

Project operations would not include the use of any stationary equipment that would result in excessive groundborne vibration levels.

For a project located within the vicinity of a private airstrip or an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project expose people residing or working in the project area to excessive noise levels?

The Project site is located approximately 14 miles from the nearest airstrip and is located outside of any airport land use plan. Since the site is outside any land use plan boundaries it is beyond the noise contours generated by airport operations. The Proposed Project will not expose people working on the Project to excess airport noise levels.

REFERENCES

Caltrans. 2013. *Transportation and Construction Vibration Guidance Manual*.

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