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December 9, 2022 00149.00032.020

Ms. Tiffany Lavan
City of San Diego
Public Utilities Department
9192 Topaz Way, MS 901A
San Diego, CA 92123

Subject: Air Quality and Greenhouse Gas Emissions Assessment for the City of San Diego Dam Maintenance Program

Dear Ms. Lavan:

HELIX Environmental Planning, Inc. (HELIX) has assessed air quality and greenhouse gas emissions impacts associated with the City of San Diego Dam Maintenance Program (Program). This letter summarizes the findings of the assessment.

PROGRAM BACKGROUND

The City Public Utilities Department (PUD) owns and manages 13 dams, spillways, and other associated infrastructure, including the approximately 13-mile Dulzura Conduit, located throughout San Diego County as part of the City's drinking water infrastructure. Each dam has a unique system of outlet works and spillway components to control the reservoir water levels and to safely release water during severe storm events or impending dam failure. Associated dam infrastructure includes, but is not limited to, groins, toes, saddle dams, spillways and auxiliary spillways, training and parapet walls, outlet works, storm drain headwalls that are associated with the outlet works, and appurtenant structures. These facilities are subject to the regulatory jurisdiction of the Division of Safety of Dams (DSOD), part of the California Department of Water Resources. The DSOD oversees dam safety in California with the goal of avoiding dam failure which could lead to potential loss of life and destruction of property. As part of the dam safety program, the DSOD completes detailed semi-annual inspections and provides an annual inspection report of the City's dams to identify maintenance activities such as vegetation removal, grading, dredging, and repairs to infrastructure and may request certain maintenance work to be performed to improve dam safety.

The proposed Program would cover the long-term maintenance of these facilities and would include maintenance activities that are routinely included in the DSOD annual inspection reports. The DSOD is in the process of providing a regulatory framework that could potentially penalize an agency through monetary fines should violations occur. The proposed Program provides the City oversight to address items in the DSOD's inspection reports and avoid potential violations. The Program describes the maintenance methods and overall potential impacts that are anticipated to occur by implementation of the Program. It also includes the protocols to address the impact of maintenance activities with respect to environmental resources.

PROGRAM DESCRIPTION

The Program includes the routine maintenance of 13 City-owned dams and associated infrastructure, including the approximately 13-mile Dulzura Conduit. Each dam has a unique system of outlet works and spillway components to control the reservoir water levels and to safely release water during severe storm events or impending dam failure. Associated dam infrastructure includes, but is not limited to, groins, toes, saddle dams, spillways and auxiliary spillways, training and parapet walls, outlet works, storm drain headwalls that are associated with the outlet works, and appurtenant structures. Routine maintenance activities are required to allow for inspection, meet dam safety standards, and prevent failure of critical infrastructure. Maintenance activities covered under the proposed Program include maintenance of access roads and pedestrian footpaths, maintenance of staging and material storage areas, trimming and clearing of vegetation, dredging, maintenance of outlet/intake towers and trash racks, removal of debris along spillways and other appurtenant structures to provide a clear path and remove obstructions, maintenance and repair of the dams and appurtenant structures to prevent deterioration that could lead to dam failure, concrete maintenance and repairs, maintenance and replacement of piezometers and survey monuments, and geotechnical investigations as described further below.

Access Road and Staging Area Maintenance

Under the proposed Program, existing access roads, access trails, pedestrian footpaths, and staging and material storage areas would continue to be maintained in a useable condition along the current path alignments and existing disturbed/developed footprints. No widening, expansion, relocation, or establishment of new access roads, access trails, footpaths, or staging areas are proposed as part of the Program. Routine maintenance activities include patching and minor surface repaving of paved access roads and staging areas; patching and minimal grading of gravel and dirt access roads and staging areas; filling of erosional voids, rills, and gullies caused by winter storms; and minor trimming of vegetation to remove overhanging branching and other encroaching vegetation. Minor trimming of vegetation would also occur along footpaths which are necessary to maintain pedestrian access to the toe of dams, dam leakage measuring structures, and weir and outlet work structures. Maintenance and repair activities along existing paved, gravel, and dirt access roads would be limited to the current road width, generally 10 feet wide, and established road rights-of-way, where present. Maintenance of pedestrian footpaths would be limited to minor trimming of vegetation along the path alignment; no soil disturbance or removal of vegetation would occur as part of footpath maintenance. Maintenance and repair activities within staging and material storage areas would be limited to the current disturbed and developed footprints.

Access to the dams and associated infrastructure to complete maintenance activities covered under this Program, and detailed below, would occur along established access roads and pedestrian footpaths. Any staging of equipment or materials required to complete activities would occur within existing staging and material storage areas, within disturbed and developed portions of the dam, or within existing developed lands on nearby City property at the reservoirs. These areas are maintained as parking and operational space for dam and reservoir maintenance staff. If direct access to outlet/intake towers from the dam is not available, crews, materials, and the necessary equipment to perform maintenance and repair activities, including dredging, would be transported to the outlet/intake towers utilizing a boat or barge launched from the reservoir's boat ramp.

Vegetation Clearing

Vegetation growing on and adjacent to the dams and associated infrastructure has potential to hinder site access and safety inspections, visually obstruct dam components, interfere with safe operations, damage critical infrastructure, and possibly lead to dam failure. Removal of vegetation and debris is critical to the functioning of the dams and associated infrastructure, and Dulzura Conduit, as vegetation could reduce design capacity and prevent proper inspection of infrastructure. Clearing of vegetation would continue to be conducted on a routine maintenance basis under the Program to keep the maintenance area free and clear of vegetation. This will avoid re-establishment of upland and wetland vegetation, as well as decrease the chances of introducing a new species into an existing maintenance area.

Vegetation clearing would be limited to the following activities and areas:

- Clearing of all vegetation located within 5 feet of Dulzura Conduit;
- Clearing of all vegetation located within 10 feet of the dams and associated infrastructure;
- Clearing of all marsh habitat (i.e., giant reed [*Arundo donax*], cattail [*Typha* spp.], bulrush [*Schoenoplectus* spp.], etc.) located within 10 feet of the dam;
- Removal of all trees located within 10 feet of the dams, saddle dams, parapet walls, and spillways;
- Removal of all eucalyptus (*Eucalyptus* spp.) trees located within 50 feet of the dam, saddle dams, parapet walls, and spillways;
- Clearing and maintenance of all vegetation within 10 feet of all weirs; headwalls; blow-off and outlet valves; inlet and outlet pipes; discharge, leakage, and seepage pipes and associated discharge paths; and
- Maintenance of slopes surrounding Black Mountain and Rancho Bernardo Dams so that no trees are permitted to establish. The slopes shall be maintained in their current condition so that only herbaceous vegetation and low-growing shrubs occur.

Clearing of vegetation on land surfaces would be limited to above ground level, and the roots of all cut vegetation will be left in place to prevent soil disturbance and reduce potential erosion. Clearing of trees and eucalyptus would be completed by cutting trees at the base and treating the stumps with herbicide. Aquatic vegetation, such as marsh habitat, would either be cut at the water surface and treated with an herbicide approved for aquatic use by the U.S. Environmental Protection Agency (USEPA) by a licensed applicator, or removed with the use of mechanical equipment where feasible. All vegetation clearing work would be conducted with hand tools such as pole saws, chain saws, and weed eaters. Felled trees and aquatic would be removed from the area with the use of mechanized equipment (such as a bobcat, backhoe, or excavator), where feasible, and transported to an appropriate waste management facility for disposal. Felled trees in areas inaccessible to mechanized equipment would be removed via helicopter.

Dredging

Accumulated lake bottom sediment covering dam infrastructure, such as lower saucer valve ports, would be removed through dredging to maintain operational function. Dredging would occur within a 50-foot radius of the outlet/intake tower base at Barrett, Chollas, El Capitan, Miramar, Morena, Murray, San Vicente, and Savage Dams, and within a 50-foot radius at the low-level outlet intake at Barrett, Hodges, and San Vicente Dams. The depth of dredging activities would be variable depending on site conditions.

There are two main dredging methods that are anticipated to be employed under the proposed Program: mechanical and hydraulic. Mechanical dredging typically involves a stationary, bucketed machine (such as a boom, clamshell, or backhoe) positioned on a barge that is lowered into the water to scoop up material. The dredged material is then raised above the water surface and deposited on a barge or other structure above the water surface. Hydraulic dredging utilizes a high-powered water pump to suction up material that is then pumped away from the dredge site. A dredging plan would be prepared and approved prior to the commencement of dredging activities at each proposed location. The dredging plan would describe the scope of work, amount of material to be removed, method of dredging, equipment, access roads and points, staging area(s), duration and schedule, and protocols to be implemented. Dredged material would be removed from the reservoir and either disposed of at an appropriate disposal facility or reused in a beneficial capacity (i.e., agricultural).

Outlet Tower & Trash Rack Maintenance

The Program includes maintenance and minor repairs to the outlet/intake towers to maintain and improve the operational safety of the towers. These activities include filling cored holes on the operating platform; repairing the valve rack; repairing concrete spalls; applying top seal to waterproof and protect concrete surfaces and seal hairline cracks; coating metal covers, access ladders, and handrails to prevent corrosion; repair and replacement of access ladders; replacement of access hatches (in-kind); replacement of the safety chains across rails at the landing (in-kind); replacement or refurbishment of fall arrests; coating of the roof structural steel; and strengthening the concrete roof slab with the application of a fabric reinforced matrix. Additionally, trash racks would be regularly cleared, maintained, and kept free of debris that may block intake and outlet valves and other critical dam infrastructure, hindering operational functionality.

Spillway Clearing

Accumulated debris such as dirt, rocks, boulders, and vegetation present on the spillways, spillway channels, and auxiliary spillways would be removed as part of the Program to maintain operational function and prevent damage to infrastructure. Debris would be removed by hand, where feasible, and heavy equipment including, but not limited to, a truck-mounted crane, rubber-wheeled front-end loader, track-mounted long arm excavator, track-mounted bobcat with jackhammer attachment, and dump trucks. Small equipment (such as a bobcat) would be lowered into the spillways and other appurtenant structures with a truck-mounted crane to move the debris to a point where it can be accessed by a long arm-track mounted excavator positioned at the top of the structure. Boulders would be broken up into manageable pieces with a hydraulic jackhammer to allow for removal. A track-mounted excavator would lift the debris from the spillway and appurtenant structures and place it in a dump truck to be hauled away and disposed of at a licensed landfill or stock-piled on-site within disturbed/developed areas of the dam. These activities would be contained within the un-vegetated spillways and appurtenant structures, existing access roads and trails, previously disturbed workspaces and staging areas, and disturbed and developed areas adjacent to the dams.

Removal of soil, debris, and vegetation along the El Capitan Dam spillway, lower dam spillway, and spillway channel will be conducted as part of the El Capitan Dam Spillway Vegetation Removal Project. Long-term maintenance of these areas will also be covered under the El Capitan Dam Spillway Vegetation Removal Project and are not included as part of the proposed Program.

Dam Maintenance and Repairs

Maintenance and repair of the dams and appurtenant structures would be completed as part of the Program to prevent deterioration and maintain the integrity and functionality of critical dam infrastructure. The 13 City-owned dams covered under this Program include four earthen dams (Chollas, El Capitan, Miramar, and Morena Dams), seven concrete dams (Barrett, Hodges, Murray, San Vicente, Savage, Sutherland, and Upper Otay Dams), and two concrete reservoirs (Black Mountain and Rancho Bernardo).

Maintenance of earthen dams would include filling of voids, gullies, and rills caused by erosion on the upstream and downstream faces of the dam, and minor grading and regular compaction of the dam face and toe of dam. Maintenance of concrete dams, reservoirs, and concreted appurtenant structures at earthen and concrete dams (i.e., saddle dams, parapet walls, spillways, etc.) would include repairs such as sealing of all joints and cracks with gaps with a flexible sealant to prevent infiltration of water and buildup of stagnation pressures; repairing all degraded concrete, spalls, and boulder impact areas within the spillway (channel floor and walls) and dam face and walls by cutting-out existing material then replacing and patching material to prevent further damage; repair of spalled concrete on all elements of the dam, especially where reinforcing steel is exposed; and smoothing vertically-displaced joints on concrete surfaces by surface grinding or other approved methods.

Additionally, auxiliary infrastructure located on or within the dams would be maintained, repaired, and or replaced, including perimeter fencing, piezometers and survey monuments, ladders, micrometers, electronic level sensors, and other instrumentation. All maintenance and repairs activities would be performed on existing structures with work activities limited to disturbed and developed portions of the dam.

Dulzura Conduit

Maintenance and repair of Dulzura Conduit is required to prevent flow impairment through the conduit and maintain design capacity. The Dulzura Conduit is an approximately 13-mile-long aqueduct that was constructed to divert water from Barrett Dam Reservoir to Lower Otay Reservoir through a series of canals, flumes, and tunnels. Water is released into the conduit through the Barret Dam outlet tower by a 30-inch drainpipe. The conduit has been updated as recently as 2011, with a majority of the conduit now constructed of concrete channels and steel pipes. The average depth of the concrete trench segments is approximately four and a half feet, with a bottom width of three feet, and a top width of approximately 6 feet. The flume is a combination of enclosed metal flumes measuring approximately 4 feet in interior diameter, and board-formed poured concrete. Existing access roads and trails are constructed of decomposed granite, gravel, or concrete. Pedestrian footpaths primarily consist of dirt paths, and in some cases small steel catwalks.

Maintenance activities along Dulzura Conduit involve the removal of landslide debris, rocks and boulders, and vegetation within the concrete conduit, and the repair of damaged or deteriorating sections of the existing conduit with in-kind materials. Repairs of the existing concrete conduit would be completed with shotcrete and include the installation of reinforcing mesh, ground wires, and compound curing. The shotcrete would be broom finished by hand. Activities also include chemical rock breaking of large boulders that are found to be blocking the conduit.

All inspection, repair, and maintenance activities along Dulzura Conduit would occur within the existing developed footprint of the conduit, pedestrian footpaths, and access roads and trails. The remote location of the conduit, rugged terrain, and limited vehicle access makes typical maintenance activities challenging. Maintenance and construction personnel would access the site through existing access roads, access trails, and pedestrian footpaths. Helicopters would airlift all supplies, equipment (i.e., mini-excavator, bobcat, etc.), and debris that cannot be hand carried to and from the repair sites. Helicopter landing, materials, and equipment staging areas would be located within existing developed lands on nearby City property at Barrett Reservoir. These areas are maintained as parking and operational space for dam and reservoir maintenance staff.

Geotechnical Investigations

Subsurface geotechnical investigation of the dams, foundations, and associated infrastructure would occur as part of periodic condition assessments under the proposed Program. Geotechnical investigations would include seismic stability analysis using modern techniques, penetration tests, and borings. The techniques used to perform the investigations would be limited to a small footprint within existing disturbed and developed areas associated with the dams and along access roads. No vegetation would be removed as part of the geotechnical investigation activities, and no native soil would be impacted, as excavations would be conducted within disturbed soils of previously installed infrastructure (i.e., rockfill and concrete). Any staging of equipment or materials would occur within disturbed and developed portions of the dam, or within existing developed lands on nearby City property at the reservoirs. These areas are maintained as parking and operational space for dam and reservoir maintenance staff.

CLIMATE AND METEOROLOGY

The climate in southern California, including the San Diego Air Basin (SDAB), is controlled largely by the large-scale meteorological condition that dominates the west coast of the Undated States: a seasonally semi-permanent high-pressure cell centered over the northeastern Pacific Ocean, called the Pacific high, which keeps most storms from affecting the California coast. Areas within 30 miles of the coast in the

San Diego region, including the Program facility sites, experience moderate temperatures and comfortable humidity.

Temperature inversion layers (inversions; layers of warmer air over colder air) affect air quality conditions significantly because they influence the mixing depth (i.e., the vertical depth in the atmosphere available for diluting air contaminants near the ground). The highest air pollutant concentrations in the SDAB generally occur during inversions. During the summer, air quality problems in the SDAB are created due to the interaction between the ocean surface and the lower layer of the atmosphere, creating a moist marine layer. An upper layer of warm air mass forms over the cool marine layer, preventing air pollutants from dispersing upward. Additionally, hydrocarbons and oxides of nitrogen (NO_X) react under the strong, abundant sunlight in the San Diego region, creating smog. Light, daytime winds, predominantly from the west, further aggravate the condition by driving the air pollutants inland, toward the foothills. During the fall and winter, air quality problems are created due to carbon monoxide (CO) and NO_X emissions. High NO_X levels usually occur during autumn or winter, on days with summer-like conditions.

AIR QUALITY REGULATORY FRAMEWORK

Criteria Pollutants

Ambient air quality is described in terms of compliance with state and national standards, and the levels of air pollutant concentrations considered safe, to protect the public health and welfare. These standards are designed to protect people most sensitive to respiratory distress, such as asthmatics, the elderly, very young children, people already weakened by other disease or illness, and persons engaged in strenuous work or exercise. The U.S. Environmental Protection Agency (USEPA), the federal agency that administrates the Federal Clean Air Act of 1970, as amended in 1990, has established national ambient air quality standards (NAAQS) for several air pollution constituents known as criteria pollutants, including: ozone (O_3); CO; coarse particulate matter (PM_{10}; particles 10 microns or less) and fine particulate matter ($PM_{2.5}$; particles 2.5 microns or less); sulfur dioxide (SO_2); and lead (Pb). As permitted by the Clean Air Act, California has adopted the more stringent California ambient air quality standards (CAAQS) and expanded the number of regulated air constituents. Ground-level ozone is not emitted directly into the environment but is generated from complex chemical and photochemical reactions between precursor pollutants, primarily reactive organic gases (ROGs; also known as volatile organic compounds [VOCs]), [1] and NO_X. PM_{10} and $PM_{2.5}$ are generated from a variety of sources, including road dust, diesel exhaust, fuel combustion, tire and brake wear, and windblown dust. In addition, PM_{10} and $PM_{2.5}$ can also be formed through chemical and photochemical reactions of precursor pollutants in the atmosphere.

Areas that do not meet the NAAQS or CAAQS for a particular pollutant are considered to be "nonattainment areas" for that pollutant. The air quality attainment status of the SDAB is shown in Table 1, *San Diego Air Basin Attainment Status*. Effective July 2, 2021, the SDAB was classified as a severe 15 nonattainment area for the 8-hour NAAQS for ozone (USEPA 2021). The SDAB is a

[1] The California Air Resources Board (CARB) defines and uses the term ROGs while the U.S. Environmental Protection Agency (USEPA) defines and uses the term VOCs. The compounds included in the lists of ROGs and VOCs and the methods of calculation are slightly different. However, for the purposes of estimating criteria pollutant precursor emissions, the two terms are often used interchangeably.

nonattainment area for the 1-hour ozone, 8-hour ozone, PM_{10}, and $PM_{2.5}$ CAAQS. The SDAB is an attainment area or unclassified for all other criteria pollutants (San Diego Air Pollution Control District [SDAPCD] 2020a).

Table 1
SAN DIEGO AIR BASIN ATTAINMENT STATUS

Pollutant	Federal Attainment Status	State of California Attainment Status
Ozone (1-hour)	No Federal Standard	Nonattainment
Ozone (8-hour)	Nonattainment	Nonattainment
Coarse Particulate Matter (PM_{10})	Unclassifiable[1]	Nonattainment
Fine Particulate Matter ($PM_{2.5}$)	Attainment	Nonattainment
Carbon Monoxide (CO)	Attainment	Attainment
Nitrogen Dioxide (NO_2)	Attainment	Attainment
Lead	Attainment	Attainment
Sulfur Dioxide (SO_2)	Attainment	Attainment
Sulfates	No Federal Standard	Attainment
Hydrogen Sulfide	No Federal Standard	Unclassified
Visibility Reducing Particles	No Federal Standard	Unclassified

Source: SDAPCD 2020a

[1] At the time of designation, if the available data does not support a designation of attainment or nonattainment, the area is designated as unclassifiable.

Attainment Plan

The SDAPCD and San Diego Association of Governments (SANDAG) are responsible for developing and implementing the clean air plan for attainment and maintenance of the ambient air quality standards in the SDAB. The regional air quality plan for the County is SDAPCD's 2020 Plan for Attaining the National Ambient Air Quality Standards for Ozone in San Diego County (Attainment Plan; SDAPCD 2020b). The Attainment Plan, which would be a revision to the SIP, outlines SDAPCD's plans and control measures designed to attain the NAAQS for ozone. These plans accommodate emissions from all sources, including natural sources, through implementation of control measures, where feasible, on stationary sources to attain the standards. Mobile sources are regulated by the USEPA and CARB, and the emissions and reduction strategies related to mobile sources are considered in the Attainment Plan and SIP.

Toxic Air Contaminants

Toxic air contaminants (TACs) are a diverse group of air pollutants that may cause or contribute to an increase in deaths or in serious illness, or that may pose a present or potential hazard to human health. TACs can cause long-term health effects such as cancer, birth defects, neurological damage, asthma, bronchitis, or genetic damage, or short-term acute effects such as eye watering, respiratory irritation (a cough), runny nose, throat pain, and headaches. TACs may be carcinogenic or noncarcinogenic based on the nature of the health effects associated with exposure to the pollutant. For carcinogenic TACs, there is no level of exposure that is considered safe, and impacts are evaluated in terms of overall relative risk expressed as excess cancer cases per one million exposed individuals. Noncarcinogenic TACs differ in that there is generally assumed to be a safe level of exposure below which no negative health impact is believed to occur. These levels are determined on a pollutant-by-pollutant basis.

Diesel engines emit a complex mixture of air pollutants, including both gaseous and solid material. The solid material in diesel exhaust is referred to as diesel particulate matter (DPM). Almost all DPM is 10 microns or less in diameter, and 90 percent of DPM is less than 2.5 microns in diameter (CARB 2021a). Because of their extremely small size, these particles can be inhaled and eventually trapped in the bronchial and alveolar regions of the lung. In 1998, CARB identified DPM as a TAC based on published evidence of a relationship between diesel exhaust exposure and lung cancer and other adverse health effects. DPM has a notable effect on California's population—it is estimated that about 70 percent of total known cancer risk related to air toxics in California is attributable to DPM (CARB 2021a).

Sensitive Receptors

CARB and the Office of Environmental Health Hazard Assessment (OEHHA) have identified the following groups of individuals as the most likely to be affected by air pollution: the elderly over 65, children under 14, infants (including in utero in the third trimester of pregnancy), and persons with cardiovascular and chronic respiratory diseases such as asthma, emphysema, and bronchitis (CARB 2005; OEHHA 2015). Some land uses are considered more sensitive to air pollution than others due to the types of population groups or activities involved and are referred to as sensitive receptors. Examples of these sensitive receptors are residences, schools, hospitals, and daycare centers.

The existing conditions at each dam location and along the Dulzura Conduit corridor range from urban to suburban to rural and open space. Dams located within or adjacent to urban or suburban areas include Chollas, Rancho Bernardo, Miramar, Upper Otay, Black Mountain, and Murray. Dams located in largely undeveloped or rural locations include Savage, Hodges, San Vicente, El Capitan, Sutherland, Morena, and Barrett. The areas surrounding the Dulzura Conduit are largely open space or undeveloped. The closest sensitive receptors to any of the facility maintenance activities would be at the Miramar dam, which has residences located approximately 100 feet from areas that may require vegetation clearing and access road maintenance.

GREENHOUSE GAS EMISSIONS REGULATORY FRAMEWORK

Greenhouse gases, as defined under California's Assembly Bill (AB) 32, include carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O), hydrofluorocarbons (HFC), perfluorocarbons (PFC), and sulfur hexafluoride (SF_6). AB 32, the California Global Warming Solutions Act of 2006, recognizes that California is a source of substantial amounts of GHG emissions. The statute states that:

> *Global warming poses a serious threat to the economic wellbeing, public health, natural resources, and the environment of California. The potential adverse impacts of global warming include the exacerbation of air quality problems, a reduction in the quality and supply of water to the state from the Sierra snowpack, a rise in sea levels resulting in the displacement of thousands of coastal businesses and residences, damage to marine ecosystems and the natural environment, and an increase in the incidences of infectious diseases, asthma, and other human health-related problems.*

To help avert these potential consequences, AB 32 established a State goal of reducing GHG emissions to 1990 levels by the year 2020, which is a reduction of approximately 16 percent from forecasted emission levels, with further reductions to follow. In addition, AB 32 required CARB to develop a Scoping Plan to help the State achieve the targeted GHG emission reductions. In 2015, Executive Order (EO) B-30-15 established a California GHG emission reduction target of 40 percent below 1990 levels by 2030. The EO aligns California's GHG emission reduction targets with those of leading international governments, including the 28 nation European Union. California is on track to meet or exceed the target of reducing GHG emissions to 1990 levels by 2020, with annual emissions in 2016 through 2019 below the 2020 target (CARB 2021b). As a follow-up to AB 32 and in response to EO-B-30-15, Senate Bill (SB) 32 was passed by the California legislature in 2016 to codify the EO's California GHG emission reduction target of 40 percent below 1990 levels by 2030. The most recent update to the Scoping Plan was adopted in December 2017 and establishes a proposed framework for California to meet the EO-B-30-15 reduction target (CARB 2017).

A Climate Action Plan (CAP) was adopted by the City Council in December 2015. The CAP quantifies existing GHG emissions as well as projected emissions for the years 2030 and 2035 resulting from activities within the City's jurisdiction. The CAP also identifies City target emissions levels, below which the Citywide GHG impacts would be less than significant. The CAP Plan and the accompanying certified Final Environmental Impact Report also identify and analyze the GHG emissions that would result from the business-as-usual scenario for the years 2030 and 2035. The CAP includes a monitoring and reporting program to ensure its progress toward achieving the specified GHG emissions reductions and specifies actions that, if implemented, would achieve the specified GHG emissions reductions targets. In 2015, the CAP was adopted in a public process following certification of Final Environmental Impact Report SCH No. 2015021053 (City of San Diego 2015). Subsequent to the adoption of the CAP, the City also established additional specific measures (CAP Consistency Checklist) that, if implemented on a project-by-project basis, would further ensure that the City as a whole achieves the specified GHG emissions reduction targets in the Climate Action Plan. In July 2022, the City Council adopted an update to the CAP (2022 CAP), in a public process following certification of the Second Addendum to Final Environmental Impact Report SCH No. 2015021053. As proposed in the 2022 CAP, in October 2022, the City Council approved an amendment to the Land Development Code which incorporated a revised CAP consistency checklist CAP (Consistency Regulations) which replaced the CAP Consistency Checklist as the measures that could be implemented on a project-by-project basis pursuant to CEQA Guidelines Section 15183.5(b)(1)(D). Projects for new development that are consistent with the CAP, as determined through compliance with the CAP Consistency Regulations, may rely on the CAP for the cumulative impacts analysis of GHG emissions. For public infrastructures projects, the City has developed guidance for assessing CAP consistency. The environmental analysis for public infrastructure projects should include a discussion of overall consistency with each of the strategies of the 2022 CAP: Strategy 1: Decarbonization of the Built Environment; Strategy 2: Access to Clean and Renewable Energy; Strategy 3: Mobility and Land Use; Strategy 4: Circular Economy and Clean Communities; Strategy 5: Resilient Infrastructure and Healthy Ecosystems; and Strategy 6: Emerging Climate Action (City of San Diego 2022).

METHODOLOGY AND ASSUMPTIONS

The Program maintenance activities for each included facility would occur at undetermined intervals based on the results of periodic inspections. For the purpose of this analysis, maintenance activities were assumed to occur once per year for each facility. The anticipated maintenance activities and duration of each activity is show in Table 2, *Facility Maintenance Activities*.

Table 2
FACILITY MAINTENANCE ACTIVITIES

Facility	Activity	Days per Year
Barrett	Access Road Maintenance	2
	Vegetation Clearing	3
	Dredging	3
	Maintenance/Repair	2
	Total	**10**
Black Mountain	Access Road Maintenance	2
	Vegetation Clearing	2
	Total	**4**
Chollas	Access Road Maintenance	2
	Vegetation Clearing	3
	Dredging	3
	Maintenance/Repair	2
	Total	**10**
El Capitan	Access Road Maintenance	2
	Vegetation Clearing	3
	Dredging	3
	Spillway Cleaning	2
	Maintenance/Repair	2
	Total	**12**
Hodges	Access Road Maintenance	2
	Vegetation Clearing	3
	Dredging	3
	Maintenance/Repair	2
	Total	**10**
Miramar	Access Road Maintenance	2
	Vegetation Clearing	3
	Dredging	3
	Spillway Cleaning	2
	Maintenance/Repair	2
	Total	**12**
Morena	Access Road Maintenance	2
	Vegetation Clearing	3
	Dredging	3
	Spillway Cleaning	2
	Maintenance/Repair	2
	Total	**12**
Murray	Access Road Maintenance	2
	Vegetation Clearing	3
	Dredging	3
	Spillway Cleaning	2
	Maintenance/Repair	2
	Total	**12**

Facility	Activity	Days per Year
Rancho Bernardo	Vegetation Clearing	2
	Total	**2**
San Vicente	Access Road Maintenance	2
	Vegetation Clearing	3
	Dredging	3
	Spillway Cleaning	2
	Maintenance/Repair	2
	Total	**12**
Savage	Access Road Maintenance	2
	Vegetation Clearing	3
	Dredging	3
	Spillway Cleaning	2
	Maintenance/Repair	2
	Total	**12**
Sutherland	Access Road Maintenance	2
	Vegetation Clearing	3
	Dredging	3
	Spillway Cleaning	2
	Maintenance/Repair	2
	Total	**12**
Upper Otay	Access Road Maintenance	2
	Vegetation Clearing	3
	Dredging	3
	Spillway Cleaning	2
	Maintenance/Repair	2
	Total	**12**
Dulzura Conduit[1]	Vegetation Clearing	20
	Debris Removal	20
	Maintenance/Repair	20
	Airlift	20
	Total	**20**

1 Activities for the Dulzura Conduit are assumed to occur concurrently.

The assumed equipment types and quantity used in the analysis are shown in Table 3, *Off-Road Equipment*. Because the specific models of equipment to be used were not known at the time of this analysis, the default specifications for typical off-road construction equipment, including engine horsepower and load factor were taken from the California Emissions Estimator Model (CalEEMod), as described in the *CalEEMod User's Guide*, Appendix D (California Air Pollution Control Officers Association [CAPCOA] 2021). The engine load factor for hand equipment (e.g., chainsaws, pole saws, trimmers) was taken from the USEPA *Median Life, Annual Activity, and Load Factor Values for Nonroad Engine Emissions Modeling* (USEPA 2002). For the purposes of this analysis, all equipment was assumed to operate 8 hours per day except for cranes and the helicopter, which were assumed to operate for 2 hours per day. To be conservative in estimating the highest potential maximum daily emissions, each facility was analyzed assuming all equipment would be operating concurrently on the same day. Dredging was assumed to use an excavator operating from the shore, or on a barge. The excavator arm would either be equipped with a bucket or a hydraulic powered suction pump.

Table 3
OFF-ROAD EQUIPMENT

Activity	Equipment	Quantity
Access Road Maintenance	Skid-Steer Loader or Mini-Excavator	1
	Bulldozer	1
	Backhoe	1
Vegetation Clearing	Chainsaw	3
	Pole saw	3
	Trimmer	3
Dredging	Excavator	1
Spillway Cleaning	Crane	1
	Rubber-Tired Loader	1
	Excavator	1
	Skid-Steer Loader or Mini-Excavator	1
Maintenance/Repair	Skid-Steer Loader or Mini-Excavator	1
	Backhoe	1
	Excavator	1
Debris Removal	Skid-Steer Loader or Mini-Excavator	1
Conduit Maintenance/Repair	Skid-Steer Loader or Mini-Excavator	1
	Shotcrete Pump	1
Airlift	Helicopter (Bell 407)	1

Emissions for off-road equipment use was calculated using emissions factors from the CARB OFFROAD2017 version 1.0.1 emissions inventory (CARB 2021c). Helicopter emissions were calculated using emissions factors from the USEPA AP 42 Compilation of Air Emissions Factors for gas turbine engines powered by oil distillates (USEPA 2000).

The calculation of on-road emissions assumed a typical work crew of 10 resulting in 20 average daily trips and 10 average daily truck trips hauling equipment and material to the facility sites and removing debris. The CalEEMod default trip distances for San Diego County were used: 16.8 miles for worker trips and 20 miles for hauling trips (CAPCOA 2021). The fleet mix was assumed to be cars and light trucks for workers and heavy trucks for hauling. Emissions were calculated using the CARB EMFAC2021 version 1.0.1 emissions inventory (CARB 2021c).

SIGNIFICANCE CRITERIA

Air Quality

Thresholds used to evaluate potential air quality and odor impacts are based on applicable criteria in the State's CEQA Guidelines Appendix G, the City's CEQA Significance Determination Thresholds (2016), and applicable air district screening-level thresholds described below. A significant air quality and/or odor impact could occur if the Program would:

1. Conflict with or obstruct the implementation of the San Diego Attainment Plan or applicable portions of the SIP;

2. Result in a cumulatively considerable net increase of any criteria pollutant for which the Program region is non-attainment under an applicable federal or state ambient air quality standard;

3. Expose sensitive receptors (including, but not limited to, residences, schools, hospitals, resident care facilities, or day-care centers) to substantial pollutant concentrations; or

4. Create objectionable odors affecting a substantial number of people.

To determine whether the Program would (a) result in emissions that would violate any air quality standard or contribute substantially to an existing or projected air quality violation, or (b) result in a cumulatively considerable net increase of PM_{10}, $PM_{2.5}$, or the ozone precursors NO_X and VOCs, emissions were evaluated based on the quantitative emission thresholds established by the SDAPCD. As part of its air quality permitting process, the SDAPCD has established thresholds in Rule 20.2 for the preparation of Air Quality Impact Assessments (AQIAs; SDAPCD 2019). In the absence of a significance threshold for $PM_{2.5}$ from the SDAPCD or the City, the SCAQMD's screening threshold of 55 pounds per day or 10 tons per year was applied to this analysis (SCAQMD 2019).

For CEQA purposes, these screening criteria were used as numeric methods to determine if the Program would result in a significant impact to air quality or an adverse effect on human health. The screening thresholds are shown in Table 4, *Screening-level Thresholds for Air Quality Impact Analysis*.

Table 4
SCREENING-LEVEL THRESHOLDS FOR AIR QUALITY IMPACT ANALYSIS

Pollutant	Threshold
Construction Emissions (Pounds/Day)	
Respirable Particulate Matter (PM_{10})	100
Fine Particulate Matter ($PM_{2.5}$)	55
Oxides of Nitrogen (NO_X)	250
Oxides of Sulfur (SO_X)	250
Carbon Monoxide (CO)	550
Volatile Organic Compounds (VOCs)	137
Toxic Air Contaminant Health Risk	
Excess Cancer Risk	1 in 1 million 10 in 1 million with T-BACT
Non-Cancer Hazard	1.0

Source: SDAPCD 2019
T-BACT = Toxics-Best Available Control Technology

SDAPCD Rule 51 (Nuisance) prohibits emissions from any source whatsoever in such quantities of air contaminants or other material, which cause injury, detriment, nuisance, or annoyance to the public health or damage to property (SDAPCD 1976). It is generally accepted that the considerable number of persons requirement in Rule 51 is normally satisfied when 10 different individuals/households have made separate complaints within 90 days. Odor complaints from a "considerable" number of persons or businesses in the area would be considered to be a significant, adverse odor impact.

Greenhouse Gas Emissions

Thresholds used to evaluate potential air quality and odor impacts are based on applicable criteria in the State's CEQA Guidelines Appendix G. A significant GHG emissions impact could occur if the Program would:

1. Generate GHG emissions, either directly or indirectly, that may have a significant impact on the environment?

2. Conflict with an applicable plan, policy, or regulation adopted for the purpose of reducing the emissions of GHGs?

AIR QUALITY IMPACT ANALYSIS

(1) Conflict with or obstruct implementation of the applicable air quality plan?

Less than Significant Impact. A project would be inconsistent with the Attainment Plan if it is inconsistent with the population and employment growth assumptions within the General Plan or if the Program's emissions would exceed the applicable thresholds, as analyzed in checklist question (2), below.

As discussed in checklist question (2), below, the Program's maintenance activities would not result in pollutant emissions in excess of applicable thresholds. Because emissions would be below the applicable thresholds, and because the Program would only involve ongoing maintenance of existing facilities and would not result in population or employment increases, the Program would not conflict with or obstruct implementation of the Attainment Plan for the SDAB and impacts would be less than significant.

(2) Result in a cumulatively considerable net increase of any criteria pollutant for which the Program region is non-attainment under an applicable federal or state ambient air quality standard?

Less than Significant Impact. The Program's maintenance activity emissions were estimated using equipment assumptions and emissions factors, as described above. The emissions generated from maintenance activities would include:

- Dust (including PM_{10} and $PM_{2.5}$) primarily from fugitive sources such as soil disturbance and vehicle travel over unpaved surfaces; and

- Combustion emissions of air pollutants (including ROG, NO_X, PM_{10}, $PM_{2.5}$, CO, and SO_X), primarily from: operation of heavy off-road equipment; operation of gasoline powered hand equipment; on-road worker commute vehicle traveling to and from the Program sites; trucks hauling equipment, material, and debris to and from the Program site; and operation of a helicopter during maintenance of the Dulzura Conduit.

The results of the calculations for Program maintenance activities are shown in Table 5, *Maximum Daily Emissions*. The data are presented as the maximum anticipated daily emissions for comparison with the SDAPCD thresholds, the model output is included as Attachment A to this letter. As shown in Table 5, the maximum daily emissions would occur during maintenance activities for the Dulzura Conduit. The Program's emissions would not exceed SDAPCD thresholds and would not result in a cumulatively considerable net increase of any criteria pollutant. The impact would be less than significant.

Table 5
MAXIMUM DAILY EMISSIONS

Facility	VOC[1]	NO_X[1]	CO[1]	SO_X[1]	PM_{10}[1]	$PM_{2.5}$[1]
Barrett	20.0	6.7	54.1	<0.1	0.4	0.3
Black Mountain	19.8	4.3	50.3	<0.1	0.4	0.3
Chollas	20.0	6.7	54.1	<0.1	0.2	0.2
El Capitan	20.2	9.1	56.1	<0.1	0.4	0.3
Hodges	20.0	6.7	54.1	<0.1	0.4	0.4
Miramar	20.2	9.1	56.1	<0.1	0.4	0.3
Morena	20.3	9.8	57.4	<0.1	0.4	0.4
Murray	20.3	9.8	57.4	<0.1	0.5	0.4
Rancho Bernardo	13.0	0.4	32.1	<0.1	0.5	0.4
San Vicente	20.2	9.1	56.1	<0.1	0.1	0.0
Savage	20.3	9.8	57.4	<0.1	0.4	0.4
Sutherland	20.2	9.1	56.1	<0.1	0.5	0.4
Upper Otay	20.2	9.1	56.1	<0.1	0.4	0.4
Dulzura Conduit	19.5	11.5	49.1	<0.1	0.4	0.4
Maximum Daily Emissions	**20.3**	**11.5**	**57.4**	**<0.1**	**0.5**	**0.4**
SDAPCD Thresholds	*137*	*250*	*550*	*250*	*100*	*67*
Exceed Thresholds?	***No***	***No***	***No***	***No***	***No***	***No***

Source: Calculations using emission factors from CARB emissions inventory and USEPA AP-42 (calculation data is provided in Attachment A).
[1] Pollutant Emissions (pounds per day).
VOC = volatile organic compound; NO_X = nitrogen oxides; CO = carbon monoxide; SO_X = sulfur oxides;
PM_{10} = particulate matter 10 microns or less in diameter; $PM_{2.5}$ = particulate matter 2.5 microns or less in diameter;
SDAPCD = San Diego County Air Pollution Control District

(3) Expose sensitive receptors to substantial pollutant concentrations?

Less than Significant Impact. Program maintenance activities would result in emissions of DPM. The amount to which the receptors could be exposed, which is a function of concentration and duration of exposure, is the primary factor used to determine health risk. Current models and methodologies for conducting cancer health risk assessments are associated with longer-term exposure periods (typically 30 years for individual residents) and are best suited for evaluation of long duration TAC emissions with predictable schedules and locations. These assessment models and methodologies do not correlate well with the temporary and highly variable nature of maintenance activities.

Typical annual maintenance activities at each facility are anticipated to last less than two weeks. The use of heavy diesel-powered equipment during trenching along the roadway would only occur near any individual residence for a few days. Due to the variable and sporadic nature of the maintenance activities, and the anticipated short annual duration, TAC emissions from the Program's maintenance activities would not expose sensitive receptors to substantial pollutant concentrations.

(4) Result in other emissions (such as those leading to odors) adversely affecting a substantial number of people?

Less than Significant Impact. The Program could produce odors during maintenance activities resulting from heavy diesel equipment exhaust; however, standard best management practices to minimize equipment idling and maintain equipment would minimize the odor emissions and their associated impacts. Any odors emitted during maintenance activities would be temporary, short-term, and intermittent in nature, and would cease upon the facility maintenance. Therefore, odor impacts from Program maintenance activities would be less than significant due to the duration of exposure.

GREENHOUSE GAS EMISSIONS IMPACT ANALYSIS

(1) Generate GHG emissions, either directly or indirectly, that may have a significant impact on the environment?

Less than Significant Impact. As discussed above, determination of the significance of the Program's GHG emissions is accomplished by an analysis of consistency with the 2022 CAP. Estimated Program GHG emissions are presented here for informational purposes. Operation of off-road vehicles and equipment, on-road vehicles, aircraft, portable equipment, and small equipment would result in emissions of GHGs from engine exhaust. Table 6, *Annual Operational Emissions*, presents the summary of GHGs emissions for the Program. Emission calculations are provided in Attachment A.

Table 6
ANNUAL OPERATIONAL EMISSIONS

Facility	CO_2[1]	CH_4[1]	N_2O[1]	CO_2e[1]
Barrett	0.9	<0.1	<0.1	0.9
Black Mountain	0.6	<0.1	<0.1	0.6
Chollas	1.3	<0.1	<0.1	1.3
El Capitan	1.7	<0.1	<0.1	1.7
Hodges	1.4	<0.1	<0.1	1.4
Miramar	1.7	<0.1	<0.1	1.7
Morena	1.7	<0.1	<0.1	1.7
Murray	1.7	<0.1	<0.1	1.7
Rancho Bernardo	0.2	<0.1	<0.1	0.2
San Vicente	1.7	<0.1	<0.1	1.7
Savage	1.7	<0.1	<0.1	1.7
Sutherland	1.7	<0.1	<0.1	1.7
Upper Otay	1.7	<0.1	<0.1	1.7
Dulzura Conduit	4.1	<0.1	<0.1	4.1
Total Annual Emissions	**22.0**	**<0.1**	**<0.1**	**22.0**

Source: Calculations using emission factors from CARB emissions inventory and USEPA AP-42 (calculation data is provided in Attachment A).

[1] GHG Emissions (metric tons per year).

GHG = greenhouse gas; CO_2 = carbon dioxide; CH_4 = methane; N_2O = nitrous oxide; CO_2e = carbon dioxide equivalents

As discussed in impact (2), below, the Program would be consistent with the strategies in the City's 2022 CAP. Therefore, the implementation of the Program would not generate GHG emissions, either directly or indirectly, that may have a significant impact on the environment, and the impact would be less than significant.

(2) *Conflict with an applicable plan, policy, or regulation adopted for the purpose of reducing the emissions of GHGs?*

Less than Significant Impact. The Program would provide ongoing maintenance to existing municipal facilities. The Program would not generate growth in population or employment or require the alteration of an existing land use designation through amendments to general plans or changes to zoning. Following from the City Planning Department for assessing 2022 CAP consistency for public infrastructure projects, overall consistency with each of the strategies of the 2022 CAP is provided below:

Strategy 1: Decarbonization of the Built Environment: The City has adopted a goal to achieve zero emissions municipal buildings and operations by 2035. The Program is maintenance to existing dams and associated infrastructure. This maintenance is required for ongoing operation of existing facilities with no expansion of use or modification of the facilities. The Program would implement Best Management Practices for construction activities as set forth in the Greenbook (for public projects) that further energy efficiency. The Greenbook, which is also known as the Standard Specifications for Public Works Construction, has a section on work site maintenance that includes measures for pollution control and equipment maintenance. Maintaining construction equipment in proper working condition according to manufacturer's specifications, as required by the Greenbook, is one way to ensure energy efficiency. The Greenbook also includes construction operations measures that would limit pollution including air emissions. All City contract documents require that the contractor conform to the Greenbook and the City's supplement, the Whitebook. Additionally, California regulations limit construction equipment and vehicle idling by requiring that equipment be shut off when not in use and that idling not exceed five minutes [California Code of Regulations, Title 13, sections 2449(d)(3) and 2485]. Signs must be posted at entrances to work sites stating this requirement. The California Air Resources Board (CARB) enforces idling limitations and compliance with diesel fleet regulations. CARB also issues certificates of compliance for off-road diesel-powered equipment. Therefore, the Program would not conflict with the City's ability to implement the actions identified in the CAP related to decarbonization of the built environment, including City requirements for building electrification, distributed energy generation, and energy storage.

Strategy 2: Access to Clean and Renewable Energy: Strategy 2 transitions City wide energy use for the built environment and for transportation away from fossil fuels and toward clean and renewable sources. The Program would not include construction of new buildings, modifications to existing buildings, or any transportation system components. The Program is required maintenance of existing City-owned infrastructure. Maintenance of the City's dams and associated infrastructure supports continued use of existing local water supplies and will prevent mandated drawdowns of the reservoir level and level restrictions implemented by the State for safety that reduce local water storage and usage. Utilization of local water supplies like those stored at City dams reduces energy associated with importing water and contributes to the City's GHG reduction goals. Therefore, the Program would not conflict with the City's ability to implement the actions identified in the CAP related to clean and renewable energy.

Strategy 3: Mobility and Land Use: Strategy 3 involves prioritizing infrastructure project that support sustainable mode choices such as walking, bicycling and transit use, and developing strategic land use planning to reduce citywide vehicle emissions. The Program involves maintenance activities at existing facilities owned and managed by the PUD. No bicycle, pedestrian, or transit facilities would be impacted by the Program. Because the Program involves maintenance of existing City-owned infrastructure, there is no proposed change in land use or measures that would reduce vehicle miles traveled as there is no new development proposed as part of the Program. The Program is consistent with this CAP strategy and does not conflict with the City's ability to implement the actions related to mobility and land use.

Strategy 4: Circular Economy & Clean Communities: Strategy 4 is focused on reducing solid waste through recycling, composting, reduction, and reuse. The Program waste would include soils and vegetation removed from the City facilities which would be reused as fill or aggregate material on site for access roads or other operational needs or recycled for use at other PUD facilities. The Program would be required to submit and implement a waste management plan and dispose of any vegetation and debris that cannot be reused or recycled at the Miramar Landfill and Miramar Greenery consistent with the City's Construction and Demolition Debris Diversion Ordinance and the City's Whitebook Standards Specifications for Public Works Construction. The Program would not affect solid waste generation resulting from operation of any of the facilities. Therefore, the Program would not conflict with the City's ability to implement the actions identified in the CAP related to circular economy and clean communities.

Strategy 5: Resilient Infrastructure and Healthy Ecosystems: Strategy 5 relates to climate resiliency and includes the goal of increasing tree canopy coverage. The action under this goal includes consideration of a Citywide Urban Tree Planting Program, which would incorporate water conservation measures and prioritization of drought-tolerant and native trees and plantings in areas with recycled water. The Program does not conflict with the City's ability to implement the goals under this strategy. The Program would not result in the removal of any trees that are considered part of the urban tree canopy. Impacts to sensitive habitat, which could include the removal of trees, would be mitigated through the allocation of credits and a PUD approved site. Program mitigation furthers the City's climate resiliency goals by offsetting Program impacts to habitat at a higher ratio than what was impacted. Mitigation sites are maintained in preservation in perpetuity under agreements with various wildlife agencies and cannot be developed at a later point in time. Therefore, the Program would not conflict with the City's ability to implement the actions identified in the CAP related to resilient infrastructure and healthy ecosystems.

Strategy 6: Emerging Climate Action: This broad strategy looks to identify, support, and collaborate on research and programs for further reductions in GHG emissions. The Program is maintenance to existing dams an associated infrastructure. This maintenance is required for ongoing operation of existing facilities with no expansion of use or modification of the facilities. The Program would not conflict with the City's ability to implement the actions identified in the CAP related to emerging climate action.

As discussed above, the Program would not conflict with any the 2022 CAP's six GHG reduction strategies. Therefore, the Program would not conflict with an applicable plan, policy, or regulation adopted for the purpose of reducing the emissions of GHGs, including the City's 2022 CAP. The impact would be less than significant.

SUMMARY

As described above, emissions of criteria pollutants would be below SDAPCD thresholds, and the Program would be consistent with the Attainment Plan. Sensitive receptors would not be exposed to substantial concentrations of TACs or odors. Impacts to air quality would be less than significant and no mitigation measures would be required. The Program would not conflict with GHG reduction plans, including the City's 2022 CAP, a qualified GHG reduction plan for the purposes of determining the significance of the Program's GHG emissions. Impacts related to GHG emissions would be less than significant and no mitigation measures would be required.

Sincerely,

Martin D. Rolph

Martin Rolph
Air Quality Specialist

Victor Ortiz
Senior Air Quality Specialist

Attachments:

Figure 1:	Regional Location
Figures 2a-2m:	Aerial Photographs
Figure 3:	Aerial Photograph – Dulzura Conduit
Attachment A:	Emission Calculations

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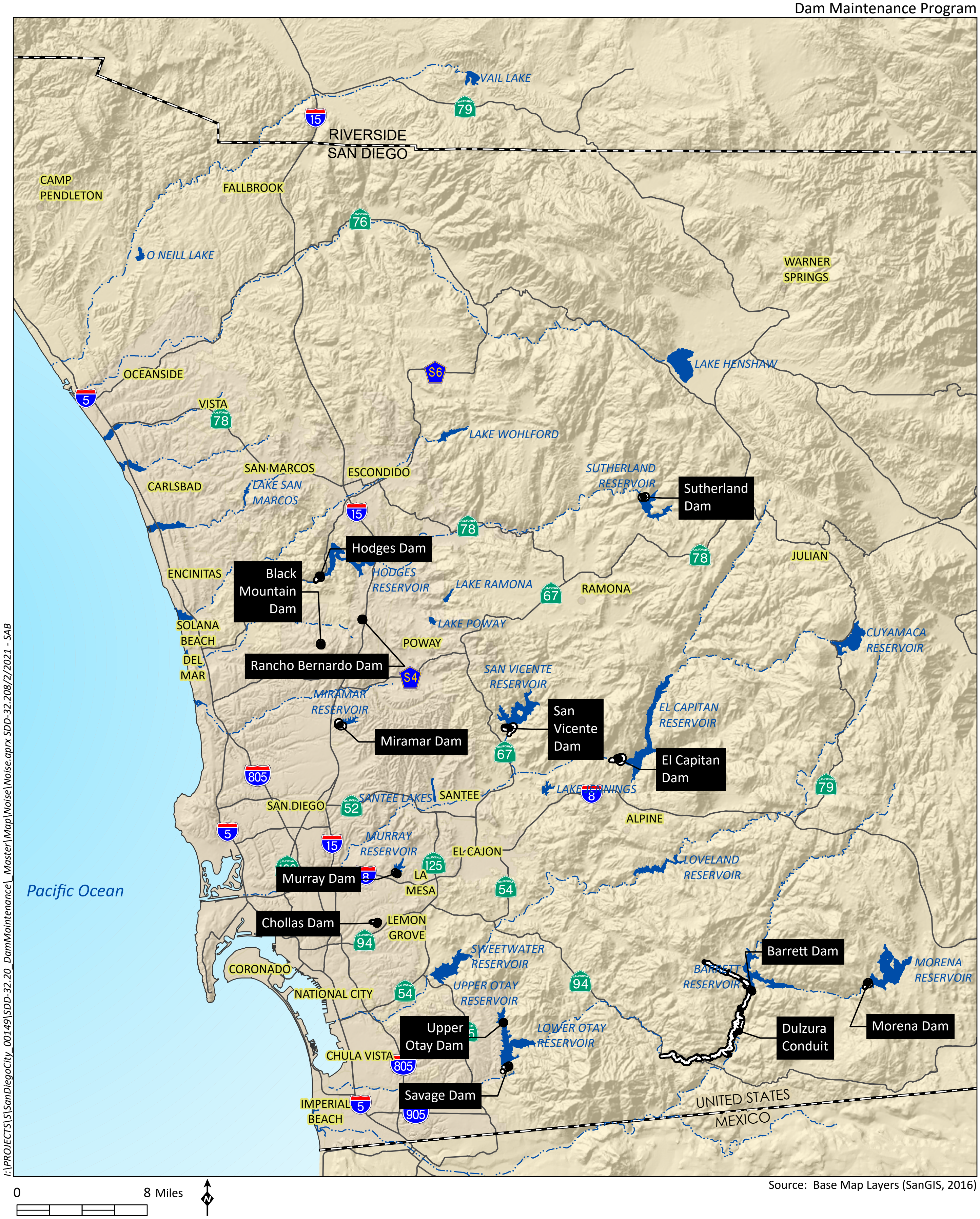
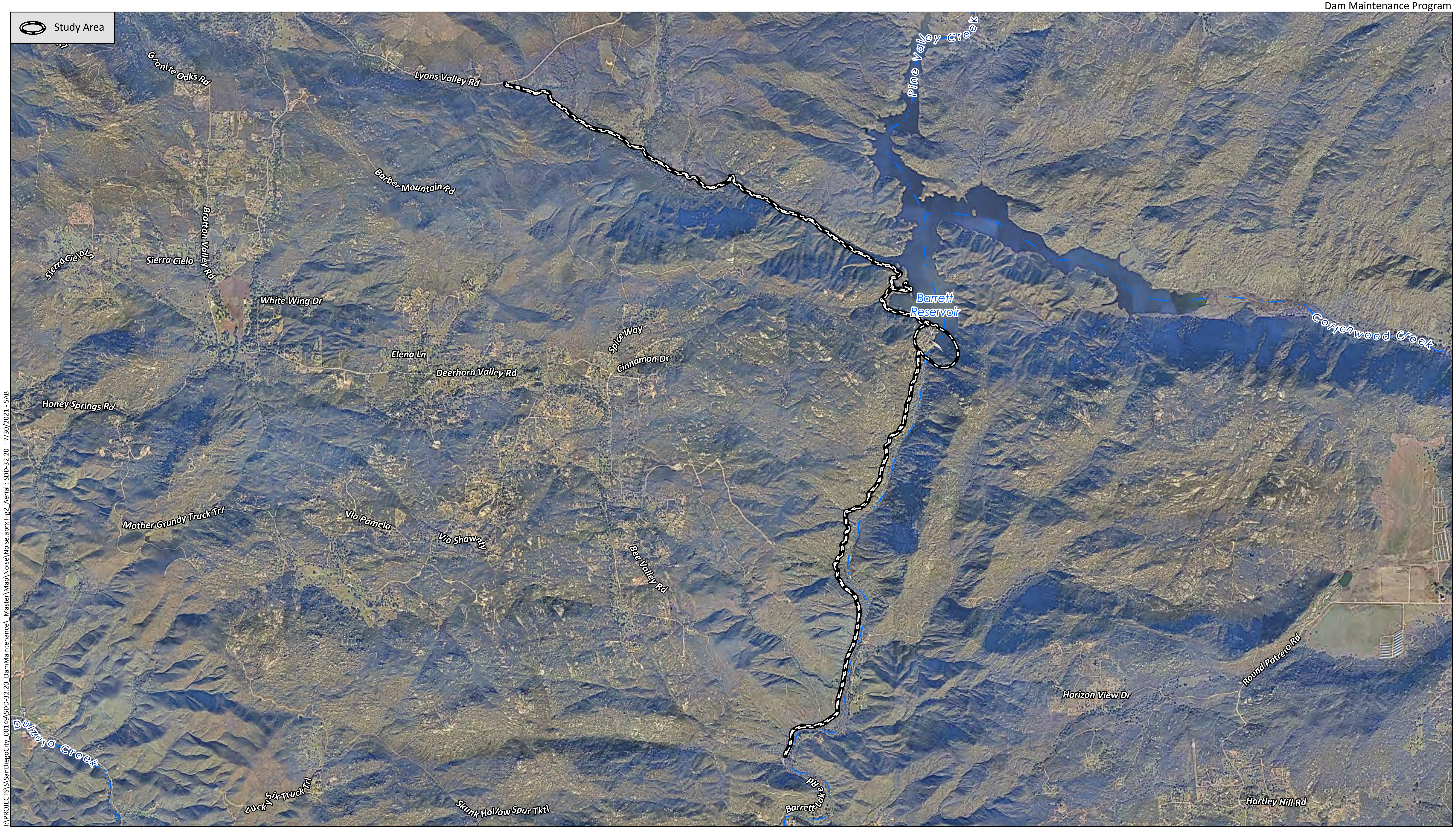


Source: Base Map Layers (SanGIS, 2016)

HELIX Environmental Planning

Regional Location

Figure 1



I:\PROJECTS\S\SanDiegoCity_00149\SDD-32.20_DamMaintenance_Master\Map\Noise\Noise.aprx Fig2_Aerial : SDD-32.20 : 7/30/2021 - SAB

0 3,000 Feet

Source: Aerial (NearMap, 2019)

HELIX
Environmental Planning

Aerial Photograph - Barrett Dam & Access Roads

Figure 2a

Source: Aerial (NearMap, 2019)

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HELIX Environmental Planning

Aerial Photograph - Black Mountain Dam

Figure 2b

Source: Aerial (NearMap, 2019)

HELIX Environmental Planning

Aerial Photograph - Chollas Dam

Figure 2c

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Source: Aerial (NearMap, 2019)

HELIX
Environmental Planning

Aerial Photograph - El Capitan Dam

Figure 2d

Source: Aerial (NearMap, 2019)

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HELIX Environmental Planning

Aerial Photograph - Hodges Dam

Figure 2e

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0 300 Feet

Source: Aerial (NearMap, 2019)

HELIX
Environmental Planning

Aerial Photograph - Miramar Dam

Figure 2f

HELIX
Environmental Planning

Aerial Photograph - Morena Dam

Figure 2g

Source: Aerial (NearMap, 2019)

HELIX Environmental Planning

Aerial Photograph - Murray Dam

Figure 2h

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Source: Aerial (NearMap, 2019)

HELIX
Environmental Planning

Aerial Photograph - Rancho Bernardo Dam

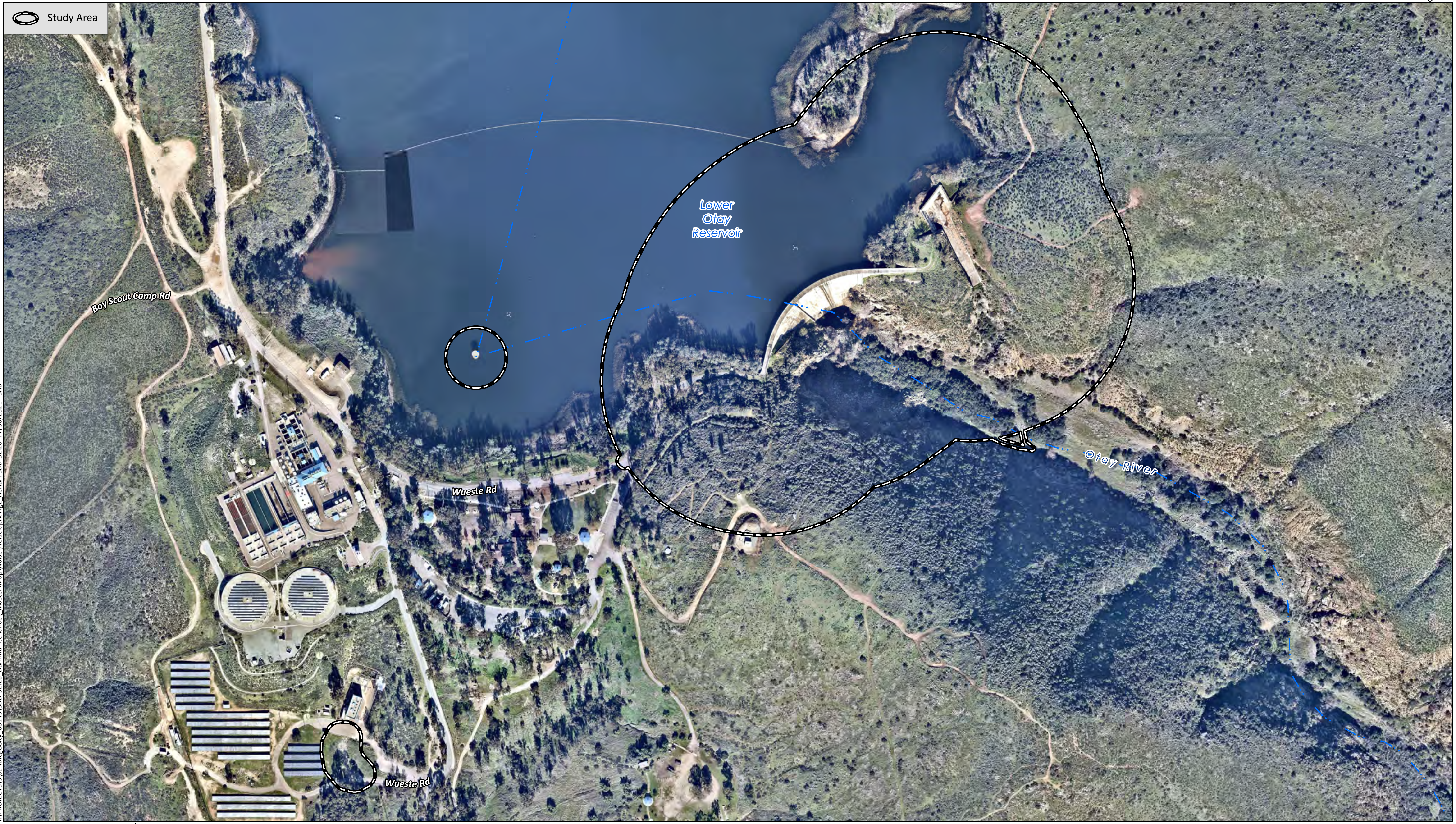
Figure 2i

Source: Aerial (NearMap, 2019)

HELIX Environmental Planning

Aerial Photograph - San Vicente Dam

Figure 2j



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0 300 Feet

Source: Aerial (NearMap, 2019)

HELIX
Environmental Planning

Aerial Photograph - Savage Dam

Figure 2k

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Source: Aerial (NearMap, 2019)

HELIX Environmental Planning

Aerial Photograph - Sutherland Dam

Figure 2l

Source: Aerial (NearMap, 2019)

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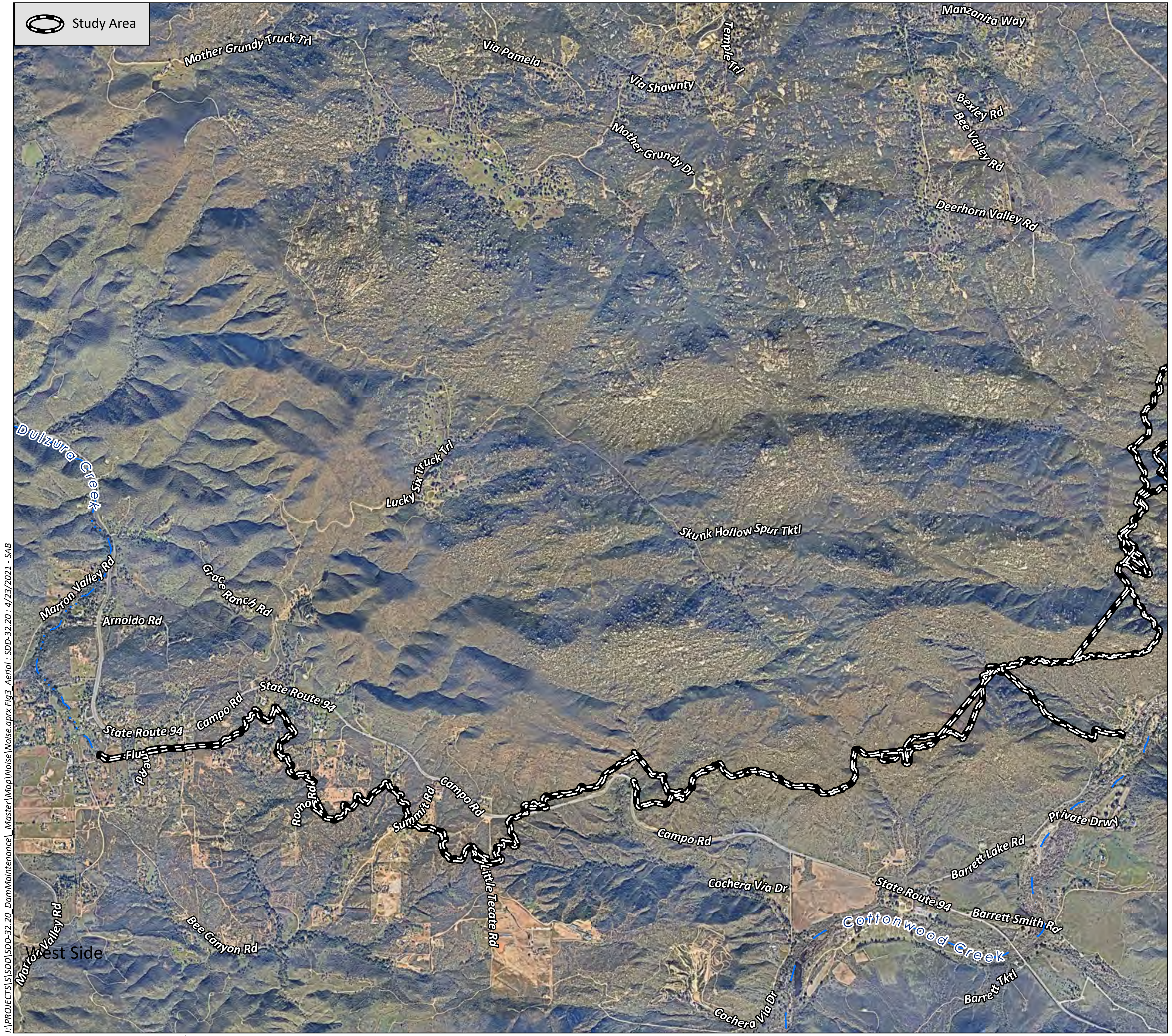
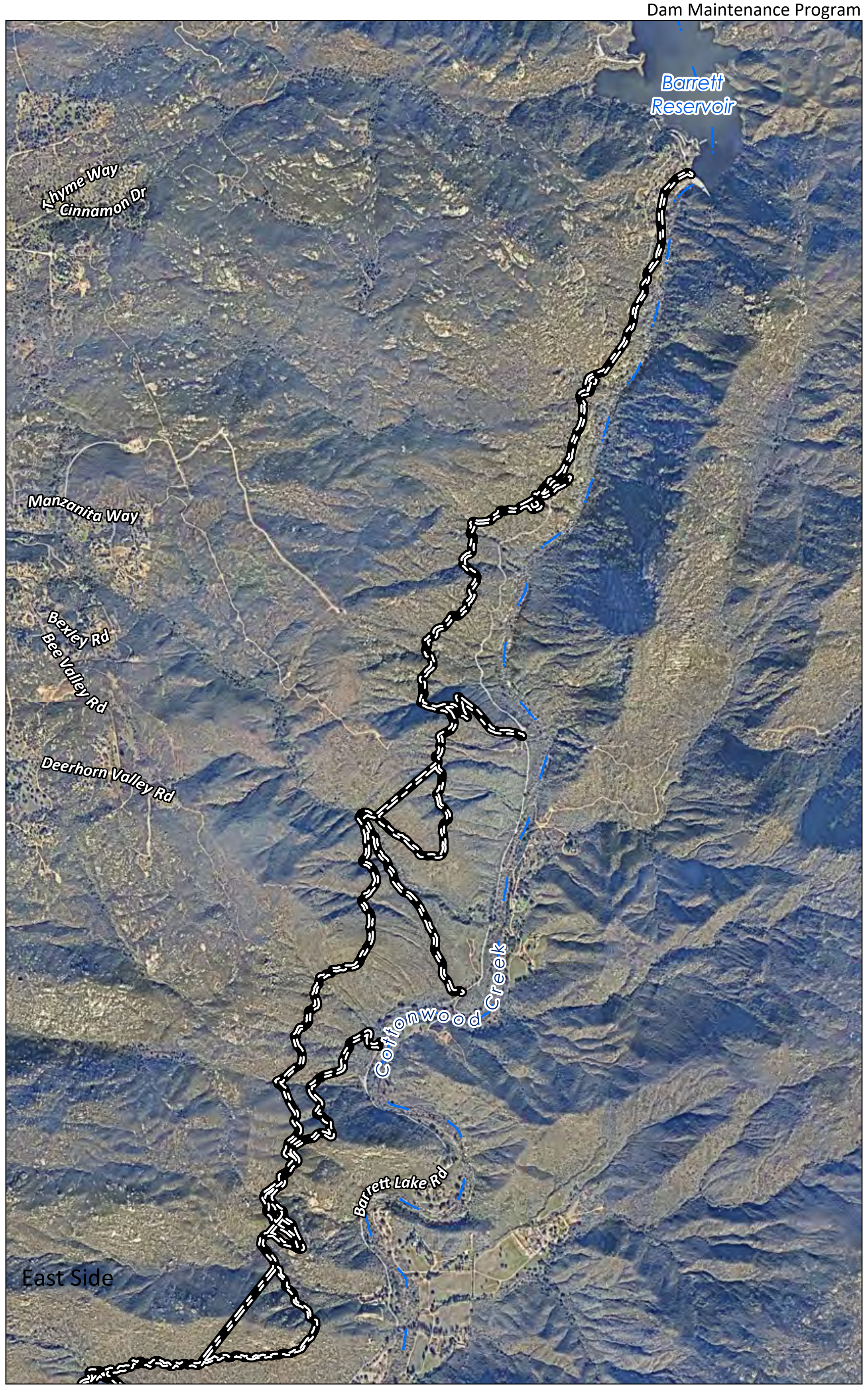
HELIX
Environmental Planning

Aerial Photograph - Upper Otay Dam

Figure 2m





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0 2,500 Feet

Source: Aerial (NearMap, 2019)

HELIX Environmental Planning

Aerial Photograph - Dulzura Conduit

Figure 3

Attachment A

Emission Calculations

Program Totals

Facility	ROG (lb/day)	NOX (lb/day)	CO (lb/day)	SOX (lb/day)	PM10 (lb/day)	PM2.5 (lb/day)		CO2 (MT/yr)	CH4 (MT/yr)	N20 (MT/yr)	CO2e (MT/yr)
Barrett	20.0	6.7	54.1	0.0	0.4	0.3		0.9	3.9E-06	3.7E-06	0.9
Black Mountain	19.8	4.3	50.3	0.0	0.2	0.2		0.6	2.2E-06	2.1E-06	0.6
Chollas	20.0	6.7	54.1	0.0	0.4	0.3		1.3	5.5E-06	5.2E-06	1.3
El Capitan	20.2	9.1	56.1	0.0	0.4	0.4		1.7	6.7E-06	6.3E-06	1.7
Hodges	20.0	6.7	54.1	0.0	0.4	0.3		1.4	5.5E-06	5.2E-06	1.4
Miramar	20.2	9.1	56.1	0.0	0.4	0.4		1.7	6.7E-06	6.3E-06	1.7
Morena	20.3	9.8	57.4	0.0	0.5	0.4		1.7	6.7E-06	6.3E-06	1.7
Murray	20.3	9.8	57.4	0.0	0.5	0.4		1.7	6.7E-06	6.3E-06	1.7
Rancho Bernardo	13.0	0.4	32.1	0.0	0.1	0.0		0.2	1.1E-06	1.0E-06	0.2
San Vicente	20.2	9.1	56.1	0.0	0.4	0.4		1.7	6.7E-06	6.3E-06	1.7
Savage	20.3	9.8	57.4	0.0	0.5	0.4		1.7	6.7E-06	6.3E-06	1.7
Sutherland	20.2	9.1	56.1	0.0	0.4	0.4		1.7	6.7E-06	6.3E-06	1.7
Upper Otay	20.2	9.1	56.1	0.0	0.4	0.4		1.7	6.7E-06	6.3E-06	1.7
Dulzura Conduit	19.5	11.5	49.1	0.4	0.3	0.2		4.1	1.1E-05	1.0E-05	4.1
Maximum Daily	**20.3**	**11.5**	**57.4**	**0.4**	**0.5**	**0.4**	**Annual Total**	**22.0**	**8.3E-05**	**7.8E-05**	**22.0**

Off-Road Equipment

Facility	Activity	Equipment	horsepower	Load Factor	Number	Hours per Day	Days	ROG (lb/day)	NOX (lb/day)	CO (lb/day)	SOX (lb/day)	PM10 (lb/day)	PM2.5 (lb/day)		CO2 (MT/yr)
Barrett	Access Road Maintenance	Skid-Steer Loader	65	0.3685	1	8	2	0.025406051	0.33822838	0.508189579	0.000759177	0.012366575	0.011377249		0.083500086
		Bulldozer	212	0.4288	1	8	2	0.243343658	2.890586008	1.34730302	0.003346485	0.116300594	0.106996546		0.000108714
		Backhoe	97	0.37	1	8	2	0.057524706	0.593214951	0.816813994	0.001141029	0.03117197	0.028678212		2.91384E-05
	Vegetation Clearing	Chainsaw	5	0.7	3	8	3	11.23188489	0.242145232	27.06908319	0.003013327	0.038334237	0.028963645		8.82853E-05
		Polesaw	1	0.7	3	8	3	2.246376979	0.048429046	5.413816638	0.000602665	0.007666847	0.005792729		8.82853E-06
		Trimmer	2	0.91	3	8	3	5.840580144	0.125915521	14.07592326	0.00156693	0.019933803	0.015061096		2.29542E-05
	Dredging	Excavator	158	0.3819	1	8	3	0.078371367	0.687326767	1.25023908	0.001982066	0.033386942	0.030715986		4.68133E-05
	Maintenance/Repair	Skid-Steer Loader	65	0.3685	1	8	2	0.025406051	0.33822838	0.508189579	0.000759177	0.012366575	0.011377249		1.15598E-05
		Backhoe	97	0.37	1	8	2	0.057524706	0.593214951	0.816813994	0.001141029	0.03117197	0.028678212		2.91384E-05
		Excavator	158	0.3819	1	8	2	0.078371367	0.687326767	1.25023908	0.001982066	0.033386942	0.030715986		3.12089E-05
							Total	**19.9**	**6.5**	**53.1**	**0.0**	**0.3**	**0.3**		**0.1**
Black Mountain	Access Road Maintenance	Skid-Steer Loader	65	0.3685	1	8	2	0.025406051	0.33822838	0.508189579	0.000759177	0.012366575	0.011377249		0.083500086
		Bulldozer	212	0.4288	1	8	2	0.243343658	2.890586008	1.34730302	0.003346485	0.116300594	0.106996546		0.000108714
		Backhoe	97	0.37	1	8	2	0.057524706	0.593214951	0.816813994	0.001141029	0.03117197	0.028678212		2.91384E-05
	Vegetation Clearing	Chainsaw	5	0.7	3	8	2	11.23188489	0.242145232	27.06908319	0.003013327	0.038334237	0.028963645		5.88569E-05
		Polesaw	1	0.7	3	8	2	2.246376979	0.048429046	5.413816638	0.000602665	0.007666847	0.005792729		5.88569E-06
		Trimmer	2	0.91	3	8	2	5.840580144	0.125915521	14.07592326	0.00156693	0.019933803	0.015061096		1.53028E-05
							Total	**19.6**	**4.2**	**49.2**	**0.0**	**0.2**	**0.2**		**0.1**
Chollas	Access Road Maintenance	Skid-Steer Loader	65	0.3685	1	8	2	0.025406051	0.33822838	0.508189579	0.000759177	0.012366575	0.011377249		0.083500086
		Bulldozer	212	0.4288	1	8	2	0.243343658	2.890586008	1.34730302	0.003346485	0.116300594	0.106996546		0.000108714
		Backhoe	97	0.37	1	8	2	0.057524706	0.593214951	0.816813994	0.001141029	0.03117197	0.028678212		2.91384E-05
	Vegetation Clearing	Chainsaw	5	0.7	3	8	3	11.23188489	0.242145232	27.06908319	0.003013327	0.038334237	0.028963645		8.82853E-05
		Polesaw	1	0.7	3	8	3	2.246376979	0.048429046	5.413816638	0.000602665	0.007666847	0.005792729		8.82853E-06
		Trimmer	2	0.91	3	8	3	5.840580144	0.125915521	14.07592326	0.00156693	0.019933803	0.015061096		2.29542E-05
	Dredging	Excavator	158	0.3819	1	8	3	0.078371367	0.687326767	1.25023908	0.001982066	0.033386942	0.030715986		4.68133E-05
	Maintenance/Repair	Skid-Steer Loader	65	0.3685	1	8	2	0.025406051	0.33822838	0.508189579	0.000759177	0.012366575	0.011377249		1.15598E-05
		Backhoe	97	0.37	1	8	2	0.057524706	0.593214951	0.816813994	0.001141029	0.03117197	0.028678212		2.91384E-05
		Excavator	158	0.3819	1	8	2	0.078371367	0.687326767	1.25023908	0.001982066	0.033386942	0.030715986		3.12089E-05
							Total	**19.9**	**6.5**	**53.1**	**0.0**	**0.3**	**0.3**		**0.1**
El Capitan	Access Road Maintenance	Skid-Steer Loader	65	0.3685	1	8	2	0.025406051	0.33822838	0.508189579	0.000759177	0.012366575	0.011377249		0.083500086
		Bulldozer	212	0.4288	1	8	2	0.243343658	2.890586008	1.34730302	0.003346485	0.116300594	0.106996546		0.000108714
		Backhoe	97	0.37	1	8	2	0.057524706	0.593214951	0.816813994	0.001141029	0.03117197	0.028678212		2.91384E-05
	Vegetation Clearing	Chainsaw	5	0.7	3	8	2	11.23188489	0.242145232	27.06908319	0.003013327	0.038334237	0.028963645		5.88569E-05
		Polesaw	1	0.7	3	8	2	2.246376979	0.048429046	5.413816638	0.000602665	0.007666847	0.005792729		5.88569E-06
		Trimmer	2	0.91	3	8	2	5.840580144	0.125915521	14.07592326	0.00156693	0.019933803	0.015061096		1.53028E-05
	Dredging	Excavator	158	0.3819	1	8	3	0.078371367	0.687326767	1.25023908	0.001982066	0.033386942	0.030715986		4.68133E-05
	Spillway Cleaning	Crane	231	0.2881	1	2	2	0.02780563	0.315771447	0.152520691	0.000411456	0.013081162	0.012034669		1.22278E-05
		Rubber-Tired Loader	203	0.3618	1	8	2	0.10547282	1.086169413	0.118758033	0.002277971	0.036625972	0.033695894		3.42366E-05
		Excavator	158	0.3819	1	8	2	0.078371367	0.687326767	1.25023908	0.001982066	0.033386942	0.030715986		3.12089E-05
		Skid-Steer Loader	65	0.3685	1	8	2	0.025406051	0.33822838	0.508189579	0.000759177	0.012366575	0.011377249		0.083500086
	Maintenance/Repair	Skid-Steer Loader	65	0.3685	1	8	2	0.025406051	0.33822838	0.508189579	0.000759177	0.012366575	0.011377249		0.083500086
		Backhoe	97	0.37	1	8	2	0.057524706	0.593214951	0.816813994	0.001141029	0.03117197	0.028678212		2.91384E-05
		Excavator	158	0.3819	1	8	2	0.078371367	0.687326767	1.25023908	0.001982066	0.033386942	0.030715986		3.12089E-05
							Total	**20.1**	**9.0**	**55.1**	**0.0**	**0.4**	**0.4**		**0.3**
Hodges	Access Road Maintenance	Skid-Steer Loader	65	0.3685	1	8	2	0.025406051	0.33822838	0.508189579	0.000759177	0.012366575	0.011377249		0.083500086
		Bulldozer	212	0.4288	1	8	2	0.243343658	2.890586008	1.34730302	0.003346485	0.116300594	0.106996546		0.000108714
		Backhoe	97	0.37	1	8	2	0.057524706	0.593214951	0.816813994	0.001141029	0.03117197	0.028678212		2.91384E-05
	Vegetation Clearing	Chainsaw	5	0.7	3	8	3	11.23188489	0.242145232	27.06908319	0.003013327	0.038334237	0.028963645		8.82853E-05
		Polesaw	1	0.7	3	8	3	2.246376979	0.048429046	5.413816638	0.000602665	0.007666847	0.005792729		8.82853E-06
		Trimmer	2	0.91	3	8	3	5.840580144	0.125915521	14.07592326	0.00156693	0.019933803	0.015061096		2.29542E-05
	Dredging	Excavator	158	0.3819	1	8	3	0.078371367	0.687326767	1.25023908	0.001982066	0.033386942	0.030715986		4.68133E-05
	Maintenance/Repair	Skid-Steer Loader	65	0.3685	1	8	2	0.025406051	0.33822838	0.508189579	0.000759177	0.012366575	0.011377249		0.083500086
		Backhoe	97	0.37	1	8	2	0.057524706	0.593214951	0.816813994	0.001141029	0.03117197	0.028678212		2.91384E-05
		Excavator	158	0.3819	1	8	2	0.078371367	0.687326767	1.25023908	0.001982066	0.033386942	0.030715986		3.12089E-05
							Total	**19.9**	**6.5**	**53.1**	**0.0**	**0.3**	**0.3**		**0.2**

Miramar	Access Road Maintenance	Skid-Steer Loader	65	0.3685	1	8	2	0.025406051	0.33822838	0.508189579	0.000759177	0.012366575	0.011377249		0.083500086
		Bulldozer	212	0.4288	1	8	2	0.243343658	2.890586008	1.34730302	0.003346485	0.116300594	0.106996546		0.000108714
		Backhoe	97	0.37	1	8	2	0.057524706	0.593214951	0.816813994	0.001141029	0.03117197	0.028678212		2.91384E-05
	Vegetation Clearing	Chainsaw	5	0.7	3	8	3	11.23188489	0.242145232	27.06908319	0.003013327	0.038334237	0.028963645		8.82853E-05
		Polesaw	1	0.7	3	8	3	2.246376979	0.048429046	5.413816638	0.000602665	0.007666847	0.005792729		8.82853E-06
		Trimmer	2	0.91	3	8	3	5.840580144	0.125915521	14.07592326	0.00156693	0.019933803	0.015061096		2.29542E-05
	Dredging	Excavator	158	0.3819	1	8	3	0.078371367	0.687326767	1.25023908	0.001982066	0.033386942	0.030715986		4.68133E-05
	Spillway Cleaning	Crane	231	0.2881	1	2	2	0.02780563	0.315771447	0.152520691	0.000411456	0.013081162	0.012034669		1.22278E-05
		Rubber-Tired Loader	203	0.3618	1	8	2	0.10547282	1.086169413	0.118758033	0.002277971	0.036625972	0.033695894		3.42366E-05
		Excavator	158	0.3819	1	8	2	0.078371367	0.687326767	1.25023908	0.001982066	0.033386942	0.030715986		3.12089E-05
		Skid-Steer Loader	65	0.3685	1	8	2	0.025406051	0.33822838	0.508189579	0.000759177	0.012366575	0.011377249		0.083500086
	Maintenance/Repair	Skid-Steer Loader	65	0.3685	1	8	2	0.025406051	0.33822838	0.508189579	0.000759177	0.012366575	0.011377249		0.083500086
		Backhoe	97	0.37	1	8	2	0.057524706	0.593214951	0.816813994	0.001141029	0.03117197	0.028678212		2.91384E-05
		Excavator	158	0.3819	1	8	2	0.078371367	0.687326767	1.25023908	0.001982066	0.033386942	0.030715986		3.12089E-05
							Total	**20.1**	**9.0**	**55.1**	**0.0**	**0.4**	**0.4**		**0.3**
Morena	Access Road Maintenance	Skid-Steer Loader	65	0.3685	1	8	2	0.025406051	0.33822838	0.508189579	0.000759177	0.012366575	0.011377249		0.083500086
		Bulldozer	212	0.4288	1	8	2	0.243343658	2.890586008	1.34730302	0.003346485	0.116300594	0.106996546		0.000108714
		Backhoe	97	0.37	1	8	2	0.057524706	0.593214951	0.816813994	0.001141029	0.03117197	0.028678212		2.91384E-05
	Vegetation Clearing	Chainsaw	5	0.7	3	8	3	11.23188489	0.242145232	27.06908319	0.003013327	0.038334237	0.028963645		8.82853E-05
		Polesaw	1	0.7	3	8	3	2.246376979	0.048429046	5.413816638	0.000602665	0.007666847	0.005792729		8.82853E-06
		Trimmer	2	0.91	3	8	3	5.840580144	0.125915521	14.07592326	0.00156693	0.019933803	0.015061096		2.29542E-05
	Dredging	Excavator	158	0.3819	1	8	3	0.078371367	0.687326767	1.25023908	0.001982066	0.033386942	0.030715986		4.68133E-05
	Spillway Cleaning	Crane	231	0.2881	1	2	2	0.02780563	0.315771447	0.152520691	0.000411456	0.013081162	0.012034669		1.22278E-05
		Rubber-Tired Loader	203	0.3618	1	8	2	0.10547282	1.086169413	0.118758033	0.002277971	0.036625972	0.033695894		3.42366E-05
		Excavator	158	0.3819	1	8	2	0.156742734	1.374653534	2.500478161	0.003964133	0.066773883	0.061431972		3.12089E-05
		Skid-Steer Loader	65	0.3685	1	8	2	0.025406051	0.33822838	0.508189579	0.000759177	0.012366575	0.011377249		0.083500086
	Maintenance/Repair	Skid-Steer Loader	65	0.3685	1	8	2	0.025406051	0.33822838	0.508189579	0.000759177	0.012366575	0.011377249		0.083500086
		Backhoe	97	0.37	1	8	2	0.057524706	0.593214951	0.816813994	0.001141029	0.03117197	0.028678212		2.91384E-05
		Excavator	158	0.3819	1	8	2	0.078371367	0.687326767	1.25023908	0.001982066	0.033386942	0.030715986		3.12089E-05
							Total	**20.2**	**9.7**	**56.3**	**0.0**	**0.5**	**0.4**		**0.3**
Murray	Access Road Maintenance	Skid-Steer Loader	65	0.3685	1	8	2	0.025406051	0.33822838	0.508189579	0.000759177	0.012366575	0.011377249		0.083500086
		Bulldozer	212	0.4288	1	8	2	0.243343658	2.890586008	1.34730302	0.003346485	0.116300594	0.106996546		0.000108714
		Backhoe	97	0.37	1	8	2	0.057524706	0.593214951	0.816813994	0.001141029	0.03117197	0.028678212		2.91384E-05
	Vegetation Clearing	Chainsaw	5	0.7	3	8	3	11.23188489	0.242145232	27.06908319	0.003013327	0.038334237	0.028963645		8.82853E-05
		Polesaw	1	0.7	3	8	3	2.246376979	0.048429046	5.413816638	0.000602665	0.007666847	0.005792729		8.82853E-06
		Trimmer	2	0.91	3	8	3	5.840580144	0.125915521	14.07592326	0.00156693	0.019933803	0.015061096		2.29542E-05
	Dredging	Excavator	158	0.3819	1	8	3	0.078371367	0.687326767	1.25023908	0.001982066	0.033386942	0.030715986		4.68133E-05
	Spillway Cleaning	Crane	231	0.2881	1	2	2	0.02780563	0.315771447	0.152520691	0.000411456	0.013081162	0.012034669		1.22278E-05
		Rubber-Tired Loader	203	0.3618	1	8	2	0.10547282	1.086169413	0.118758033	0.002277971	0.036625972	0.033695894		3.42366E-05
		Excavator	158	0.3819	1	8	2	0.156742734	1.374653534	2.500478161	0.003964133	0.066773883	0.061431972		3.12089E-05
		Skid-Steer Loader	65	0.3685	1	8	2	0.025406051	0.33822838	0.508189579	0.000759177	0.012366575	0.011377249		0.083500086
	Maintenance/Repair	Skid-Steer Loader	65	0.3685	1	8	2	0.025406051	0.33822838	0.508189579	0.000759177	0.012366575	0.011377249		0.083500086
		Backhoe	97	0.37	1	8	2	0.057524706	0.593214951	0.816813994	0.001141029	0.03117197	0.028678212		2.91384E-05
		Excavator	158	0.3819	1	8	2	0.078371367	0.687326767	1.25023908	0.001982066	0.033386942	0.030715986		3.12089E-05
							Total	**20.2**	**9.7**	**56.3**	**0.0**	**0.5**	**0.4**		**0.3**
Rancho Bernardo	Vegetation Clearing	Chainsaw	5	0.7	2	8	2	7.487923262	0.161430155	18.04605546	0.002008884	0.025556158	0.019309097		3.92379E-05
		Polesaw	1	0.7	2	8	2	1.497584652	0.032286031	3.609211092	0.000401777	0.005111232	0.003861819		3.92379E-06
		Trimmer	2	0.91	2	8	2	3.893720096	0.083943681	9.38394884	0.00104462	0.013289202	0.01004073		1.02019E-05
							Total	**12.9**	**0.3**	**31.0**	**0.0**	**0.0**	**0.0**		**0.0**
San Vicente	Access Road Maintenance	Skid-Steer Loader	65	0.3685	1	8	2	0.025406051	0.33822838	0.508189579	0.000759177	0.012366575	0.011377249		0.083500086
		Bulldozer	212	0.4288	1	8	2	0.243343658	2.890586008	1.34730302	0.003346485	0.116300594	0.106996546		0.000108714
		Backhoe	97	0.37	1	8	2	0.057524706	0.593214951	0.816813994	0.001141029	0.03117197	0.028678212		2.91384E-05
	Vegetation Clearing	Chainsaw	5	0.7	3	8	3	11.23188489	0.242145232	27.06908319	0.003013327	0.038334237	0.028963645		8.82853E-05
		Polesaw	1	0.7	3	8	3	2.246376979	0.048429046	5.413816638	0.000602665	0.007666847	0.005792729		8.82853E-06
		Trimmer	2	0.91	3	8	3	5.840580144	0.125915521	14.07592326	0.00156693	0.019933803	0.015061096		2.29542E-05
	Dredging	Excavator	158	0.3819	1	8	3	0.078371367	0.687326767	1.25023908	0.001982066	0.033386942	0.030715986		4.68133E-05
	Spillway Cleaning	Crane	231	0.2881	1	2	2	0.02780563	0.315771447	0.152520691	0.000411456	0.013081162	0.012034669		1.22278E-05
		Rubber-Tired Loader	203	0.3618	1	8	2	0.10547282	1.086169413	0.118758033	0.002277971	0.036625972	0.033695894		3.42366E-05
		Excavator	158	0.3819	1	8	2	0.078371367	0.687326767	1.25023908	0.001982066	0.033386942	0.030715986		3.12089E-05

		Skid-Steer Loader	65	0.3685	1	8	2	0.025406051	0.33822838	0.508189579	0.000759177	0.012366575	0.011377249		0.083500086
	Maintenance/Repair	Skid-Steer Loader	65	0.3685	1	8	2	0.025406051	0.33822838	0.508189579	0.000759177	0.012366575	0.011377249		0.083500086
		Backhoe	97	0.37	1	8	2	0.057524706	0.593214951	0.816813994	0.001141029	0.03117197	0.028678212		2.91384E-05
		Excavator	158	0.3819	1	8	2	0.078371367	0.687326767	1.25023908	0.001982066	0.033386942	0.030715986		3.12089E-05
							Total	**20.1**	**9.0**	**55.1**	**0.0**	**0.4**	**0.4**		**0.3**
Savage	Access Road Maintenance	Skid-Steer Loader	65	0.3685	1	8	2	0.025406051	0.33822838	0.508189579	0.000759177	0.012366575	0.011377249		0.083500086
		Bulldozer	212	0.4288	1	8	2	0.243343658	2.890586008	1.34730302	0.003346485	0.116300594	0.106996546		0.000108714
		Backhoe	97	0.37	1	8	2	0.057524706	0.593214951	0.816813994	0.001141029	0.03117197	0.028678212		2.91384E-05
	Vegetation Clearing	Chainsaw	5	0.7	3	8	3	11.23188489	0.242145232	27.06908319	0.003013327	0.038334237	0.028963645		8.82853E-05
		Polesaw	1	0.7	3	8	3	2.246376979	0.048429046	5.413816638	0.000602665	0.007666847	0.005792729		8.82853E-06
		Trimmer	2	0.91	3	8	3	5.840580144	0.125915521	14.07592326	0.00156693	0.019933803	0.015061096		2.29542E-05
	Dredging	Excavator	158	0.3819	1	8	3	0.078371367	0.687326767	1.25023908	0.001982066	0.033386942	0.030715986		4.68133E-05
	Spillway Cleaning	Crane	231	0.2881	1	2	2	0.02780563	0.315771447	0.152520691	0.000411456	0.013081162	0.012034669		1.22278E-05
		Rubber-Tired Loader	203	0.3618	1	8	2	0.10547282	1.086169413	0.118758033	0.002277971	0.036625972	0.033695894		3.42366E-05
		Excavator	158	0.3819	1	8	2	0.156742734	1.374653534	2.500478161	0.003964133	0.066773883	0.061431972		3.12089E-05
		Skid-Steer Loader	65	0.3685	1	8	2	0.025406051	0.33822838	0.508189579	0.000759177	0.012366575	0.011377249		0.083500086
	Maintenance/Repair	Skid-Steer Loader	65	0.3685	1	8	2	0.025406051	0.33822838	0.508189579	0.000759177	0.012366575	0.011377249		0.083500086
		Backhoe	97	0.37	1	8	2	0.057524706	0.593214951	0.816813994	0.001141029	0.03117197	0.028678212		2.91384E-05
		Excavator	158	0.3819	1	8	2	0.078371367	0.687326767	1.25023908	0.001982066	0.033386942	0.030715986		3.12089E-05
							Total	**20.2**	**9.7**	**56.3**	**0.0**	**0.5**	**0.4**		**0.3**
Sutherland	Access Road Maintenance	Skid-Steer Loader	65	0.3685	1	8	2	0.025406051	0.33822838	0.508189579	0.000759177	0.012366575	0.011377249		0.083500086
		Bulldozer	212	0.4288	1	8	2	0.243343658	2.890586008	1.34730302	0.003346485	0.116300594	0.106996546		0.000108714
		Backhoe	97	0.37	1	8	2	0.057524706	0.593214951	0.816813994	0.001141029	0.03117197	0.028678212		2.91384E-05
	Vegetation Clearing	Chainsaw	5	0.7	3	8	3	11.23188489	0.242145232	27.06908319	0.003013327	0.038334237	0.028963645		8.82853E-05
		Polesaw	1	0.7	3	8	3	2.246376979	0.048429046	5.413816638	0.000602665	0.007666847	0.005792729		8.82853E-06
		Trimmer	2	0.91	3	8	3	5.840580144	0.125915521	14.07592326	0.00156693	0.019933803	0.015061096		2.29542E-05
	Spillway Cleaning	Crane	231	0.2881	1	2	2	0.02780563	0.315771447	0.152520691	0.000411456	0.013081162	0.012034669		1.22278E-05
		Rubber-Tired Loader	203	0.3618	1	8	2	0.10547282	1.086169413	0.118758033	0.002277971	0.036625972	0.033695894		3.42366E-05
		Excavator	158	0.3819	1	8	2	0.156742734	1.374653534	2.500478161	0.003964133	0.066773883	0.061431972		3.12089E-05
		Skid-Steer Loader	65	0.3685	1	8	2	0.025406051	0.33822838	0.508189579	0.000759177	0.012366575	0.011377249		0.083500086
	Maintenance/Repair	Skid-Steer Loader	65	0.3685	1	8	2	0.025406051	0.33822838	0.508189579	0.000759177	0.012366575	0.011377249		0.083500086
		Backhoe	97	0.37	1	8	2	0.057524706	0.593214951	0.816813994	0.001141029	0.03117197	0.028678212		2.91384E-05
		Excavator	158	0.3819	1	8	2	0.078371367	0.687326767	1.25023908	0.001982066	0.033386942	0.030715986		3.12089E-05
							Total	**20.1**	**9.0**	**55.1**	**0.0**	**0.4**	**0.4**		**0.3**
Upper Otay	Access Road Maintenance	Skid-Steer Loader	65	0.3685	1	8	2	0.025406051	0.33822838	0.508189579	0.000759177	0.012366575	0.011377249		0.083500086
		Bulldozer	212	0.4288	1	8	2	0.243343658	2.890586008	1.34730302	0.003346485	0.116300594	0.106996546		0.000108714
		Backhoe	97	0.37	1	8	2	0.057524706	0.593214951	0.816813994	0.001141029	0.03117197	0.028678212		2.91384E-05
	Vegetation Clearing	Chainsaw	5	0.7	3	8	3	11.23188489	0.242145232	27.06908319	0.003013327	0.038334237	0.028963645		8.82853E-05
		Polesaw	1	0.7	3	8	3	2.246376979	0.048429046	5.413816638	0.000602665	0.007666847	0.005792729		8.82853E-06
		Trimmer	2	0.91	3	8	3	5.840580144	0.125915521	14.07592326	0.00156693	0.019933803	0.015061096		2.29542E-05
	Spillway Cleaning	Crane	231	0.2881	1	2	2	0.02780563	0.315771447	0.152520691	0.000411456	0.013081162	0.012034669		1.22278E-05
		Rubber-Tired Loader	203	0.3618	1	8	2	0.10547282	1.086169413	0.118758033	0.002277971	0.036625972	0.033695894		3.42366E-05
		Excavator	158	0.3819	1	8	2	0.156742734	1.374653534	2.500478161	0.003964133	0.066773883	0.061431972		3.12089E-05
		Skid-Steer Loader	65	0.3685	1	8	2	0.025406051	0.33822838	0.508189579	0.000759177	0.012366575	0.011377249		0.083500086
	Maintenance/Repair	Skid-Steer Loader	65	0.3685	1	8	2	0.025406051	0.33822838	0.508189579	0.000759177	0.012366575	0.011377249		0.083500086
		Backhoe	97	0.37	1	8	2	0.057524706	0.593214951	0.816813994	0.001141029	0.03117197	0.028678212		2.91384E-05
		Excavator	158	0.3819	1	8	2	0.078371367	0.687326767	1.25023908	0.001982066	0.033386942	0.030715986		3.12089E-05
							Total	**20.1**	**9.0**	**55.1**	**0.0**	**0.4**	**0.4**		**0.3**
Dulzura Conduit	Vegetation Clearing	Chainsaw	5	0.7	3	8	20	11.23188489	0.242145232	27.06908319	0.003013327	0.038334237	0.028963645		0.000588569
		Polesaw	1	0.7	3	8	20	2.246376979	0.048429046	5.413816638	0.000602665	0.007666847	0.005792729		5.88569E-05
		Trimmer	2	0.91	3	8	20	5.840580144	0.125915521	14.07592326	0.00156693	0.019933803	0.015061096		0.000153028
	Debris Removal	Skid-Steer Loader	65	0.3685	1	8	20	0.025406051	0.33822838	0.508189579	0.000759177	0.012366575	0.011377249		0.835000858
	Maintenance/Repair	Skid-Steer Loader	65	0.3685	1	8	20	0.025406051	0.33822838	0.508189579	0.000759177	0.012366575	0.011377249		0.835000858
		Shotcrete Pump	40	0.74	1	8	20	0.023751786	0.017199105	0.514101154	0.000761894	0.007249633	0.006669663		6.77669E-05
			gallons/hr												
	Airlift	Helicopter (Bell 407)	43.2		1	2	20	0.004782240	10.264320000	0.038491200	0.384912000	0.139968000	0.139968000		0
							Total	**19.40**	**11.37**	**48.13**	**0.39**	**0.24**	**0.22**		**1.67**
														Total Annual	**4.10**

On-Road Trips

Facility	Worker Trips/Day	Worker Trip Length (miles)	Hauling Trips/Day	Haul Trip Length (miles)	Days/ Year	ROG (lb/day)	NOX (lb/day)	CO (lb/day)	SOX (lb/day)	PM10 (lb/day)	PM2.5 (lb/day)		CO2 (MT/yr)	CH4 (MT/yr)	N20 (MT/yr)	CO2e (MT/yr)
Barrett	20	16.8	10	20	7	0.1091	0.1105	1.0215	0.0026	0.0147	0.0056		0.8388	3.88E-06	3.67E-06	0.8400
Black Mountain	20	16.8	10	20	4	0.1091	0.1105	1.0215	0.0026	0.0147	0.0056		0.4793	2.22E-06	2.09E-06	0.4800
Chollas	20	16.8	10	20	10	0.1091	0.1105	1.0215	0.0026	0.0147	0.0056		1.1983	5.54E-06	5.24E-06	1.2000
El Capitan	20	16.8	10	20	12	0.1091	0.1105	1.0215	0.0026	0.0147	0.0056		1.4380	6.65E-06	6.28E-06	1.4400
Hodges	20	16.8	10	20	10	0.1091	0.1105	1.0215	0.0026	0.0147	0.0056		1.1983	5.54E-06	5.24E-06	1.2000
Miramar	20	16.8	10	20	12	0.1091	0.1105	1.0215	0.0026	0.0147	0.0056		1.4380	6.65E-06	6.28E-06	1.4400
Morena	20	16.8	10	20	12	0.1091	0.1105	1.0215	0.0026	0.0147	0.0056		1.4380	6.65E-06	6.28E-06	1.4400
Murray	20	16.8	10	20	12	0.1091	0.1105	1.0215	0.0026	0.0147	0.0056		1.4380	6.65E-06	6.28E-06	1.4400
Rancho Bernardo	20	16.8	10	20	2	0.1091	0.1105	1.0215	0.0026	0.0147	0.0056		0.2397	1.11E-06	1.05E-06	0.2400
San Vicente	20	16.8	10	20	12	0.1091	0.1105	1.0215	0.0026	0.0147	0.0056		1.4380	6.65E-06	6.28E-06	1.4400
Savage	20	16.8	10	20	12	0.1091	0.1105	1.0215	0.0026	0.0147	0.0056		1.4380	6.65E-06	6.28E-06	1.4400
Sutherland	20	16.8	10	20	12	0.1091	0.1105	1.0215	0.0026	0.0147	0.0056		1.4380	6.65E-06	6.28E-06	1.4400
Upper Otay	20	16.8	10	20	12	0.1091	0.1105	1.0215	0.0026	0.0147	0.0056		1.4380	6.65E-06	6.28E-06	1.4400
Dulzura Conduit	20	16.8	10	20	20	0.1091	0.1105	1.0215	0.0026	0.0147	0.0056		2.3966	1.11E-05	1.05E-05	2.4000
				Maximum Daily		**0.1**	**0.1**	**1.0**	**0.0**	**0.0**	**0.0**	**Annual Total**	**17.8547**	**0.0001**	**0.0001**	**17.8800**

Model Output: OFFROAD2017 (v1.0.1) Emissions Inventory
Region Type: Statewide
Region: California
Calendar Year: 2022
Scenario: All Adopted Rules - Exhaust
Vehicle Classification: OFFROAD2017 Equipment Types
Units: tons/day for Emissions, gallons/year for Fuel, hours/year for Activity, Horsepower-hours/year for Horsepower-hours

Region	Calendar Y	Vehicle Category	Model Year	Horsepowe	Fuel	ROG_tpd	CO_tpd	NOx_tpd	CO2_tpd	PM10_tpd	PM2.5_tpd	SOx_tpd	NH3_tpd	Fuel Consumption	Total_Activity_hpy	Total_Population	Horsepower_Hours_hhpy
Statewide	2022	OFF - Logging - Chainsaws	Aggregate	25	Gasoline	1.1839744	2.8534036	0.025525	7.7125227	0.00404088	0.0030531	0.000318	0.000233	665380.4	807982.25	3918.89	6463858

Model Output: OFFROAD2017 (v1.0.1) Emissions Inventory
Region Type: County
Region: San Diego
Calendar Year: 2022
Scenario: All Adopted Rules - Exhaust
Vehicle Classification: OFFROAD2017 Equipment Types
Units: tons/day for Emissions, gallons/year for Fuel, hours/year for Activity, Horsepower-hours/year for Horsepower-hours

Region	Calendar Y	Vehicle Category	Model Year	Horsepowe	Fuel	ROG_tpd	CO_tpd	NOx_tpd	CO2_tpd	PM10_tpd	PM2.5_tpd	SOx_tpd	NH3_tpd	Fuel Consumption	Total_Activity_hpy	Total_Population	Horsepower_Hours_hhpy
San Diego	2022	ConstMin - Cranes	Aggregate	300	Diesel	0.0025258	0.0138548	0.0286844	4.0494196	0.00118828	0.0010932	3.74E-05	3.31E-05	131378.9585	40011.22729	84.87894237	8826350.232
San Diego	2022	ConstMin - Crawler Tractors	Aggregate	300	Diesel	0.0037288	0.0206451	0.0442932	5.5563872	0.00178211	0.0016395	5.13E-05	4.54E-05	180270.8624	39590.14669	88.71576988	8134953.244
San Diego	2022	ConstMin - Excavators	Aggregate	175	Diesel	0.0043971	0.0701457	0.038563	12.039866	0.0018732	0.0017233	0.000111	9.83E-05	390620.2023	135389.4493	228.8872094	19770957.54
San Diego	2022	ConstMin - Skid Steer Loaders	Aggregate	75	Diesel	0.0030297	0.060603	0.0403346	9.8003413	0.00147475	0.0013568	9.05E-05	8E-05	317961.2814	236408.5786	661.9539216	16681372.26
San Diego	2022	ConstMin - Tractors/Loaders/Backhoes	Aggregate	100	Diesel	0.027474	0.3901132	0.2833215	59.016931	0.01488784	0.0136968	0.000545	0.000482	1914739.316	1203674.54	1922.371008	100104539.9
San Diego	2022	ConstMin - Rubber Tired Loaders	Aggregate	300	Diesel	0.0123049	0.0674952	0.1267174	28.777631	0.00427295	0.0039311	0.000266	0.000235	933658.5383	239776.1444	224.9101437	50039882.29
San Diego	2022	Portable Equipment - Non-Rental Pump	Aggregate	75	Diesel	9.774E-05	0.0021156	0.0016597	0.3393754	2.9833E-05	2.745E-05	3.14E-06	2.77E-06	11010.65958	10208.50096	32.50107411	711352.2057

AP-42 Chapter 3.1 Tables 3.1-1 and 3.1-2a - Distillate Oil-Fired Turbines, Pounds per gallon Jet A fuel burned

Bell 407 Helicopter	0.00006	0.00045	0.11880	5.400	0.002	0.002	0.004

Source: EMFAC2021 (v1.0.1) Emissions Inventory
Region Type: County
Region: San Diego
Calendar Year: 2022
Season: Annual
Vehicle Classification: EMFAC2007 Categories
Units: miles/year for CVMT and EVMT, trips/year for Trips, kWh/year for Energy Consumption, tons/year for Emissions, 1000 gallons/year for Fuel Consumption

Region	Calendar Y	Vehicle Cat	Model Year	Speed	Fuel	Population	Total VMT	CVMT	EVMT	Trips	Energy Consumption	NOx_RUNEX	NOx_TOTEX	PM2.5_TOTAL	PM10_TOTAL	CO2_TOTEX	CH4_TOTEX	N2O_TOTEX	ROG_TOTAL	CO_TOTEX	SOx_TOTEX	Fuel Consumption
San Diego	2022	LDA	Aggregate	Aggregate	Gasoline	1200745.49	16188216861	1.619E+10	0	1.939E+09	0	876.704404	1460.380972	115.1674462	310.7103205	5672142.04	224.064127	165.05222	2401.41932	22173.7239	56.07489878	598120.2912
San Diego	2022	LDA	Aggregate	Aggregate	Diesel	6495.422	71385405.15	71385405	0	9732901.7	0	16.76797151	16.76797151	1.776145089	2.694195913	20276.9289	0.14369501	3.1946384	3.09366895	41.0779318	0.192134206	1811.330022
San Diego	2022	LDA	Aggregate	Aggregate	Electricity	46339.9103	727696479.8	0	727696480	80597614	280950901.3	0	0	2.830426724	9.920414777	0	0	0	0	0	0	0
San Diego	2022	LDA	Aggregate	Aggregate	Plug-in Hybrid	26391.5953	433345250.6	225107612	208237638	37867849	62893973.24	1.790999767	6.501630467	2.127442818	6.230032042	78005.1141	2.01716115	1.19783607	15.75694	175.157484	0.771159969	8225.541822
San Diego	2022	LDT1	Aggregate	Aggregate	Gasoline	138289.527	1614009175	1.614E+09	0	209696907	0	356.0532754	468.1042405	14.99177074	36.9038674	681631.967	51.6786411	34.2002571	654.518101	5232.22616	6.738625949	71877.23925
San Diego	2022	LDT1	Aggregate	Aggregate	Diesel	74.6506335	387986.2159	387986.22	0	76868.604	0	0.664016735	0.664016735	0.118866783	0.129630621	193.324266	0.00686175	0.03045832	0.14772935	0.81180778	0.001831846	17.26958009
San Diego	2022	LDT1	Aggregate	Aggregate	Electricity	174.798842	2295009.102	0	2295009.1	286902.42	886062.9308	0	0	0.008951528	0.031358227	0	0	0	0	0	0	0
San Diego	2022	LDT1	Aggregate	Aggregate	Plug-in Hybrid	49.0526983	876198.7304	419422.46	456776.27	70383.019	137960.0492	0.003337006	0.012092413	0.003880129	0.012155626	145.81555	0.00375242	0.00222968	0.02416012	0.32611307	0.001441535	15.37606758
San Diego	2022	LDT2	Aggregate	Aggregate	Gasoline	556991.831	7570797858	7.571E+09	0	902061772	0	763.3310395	1147.224855	58.61978892	158.2395072	3340175.52	128.073826	100.709081	1228.84665	12471.3265	33.02103555	352217.3349
San Diego	2022	LDT2	Aggregate	Aggregate	Diesel	1975.91029	28759933.32	28759933	0	3291856.6	0	1.97657867	1.97657867	0.367696445	0.746952792	11168.1953	0.04119677	1.75955372	0.8869421	8.36249757	0.105824327	997.6504656
San Diego	2022	LDT2	Aggregate	Aggregate	Electricity	1225.20766	16194014.6	0	16194015	2193198.1	6252226.199	0	0	0.062892578	0.220495012	0	0	0	0	0	0	0
San Diego	2022	LDT2	Aggregate	Aggregate	Plug-in Hybrid	2426.91947	42043840.33	20832609	21211231	3482253.3	6406423.981	0.165748275	0.598928656	0.19600712	0.59356543	7266.07493	0.18584558	0.11052964	1.24179756	16.1788307	0.071832548	766.1985222
						Sum	**26696008011.74**					**2017.457**	**3102.231**	**196.271**	**526.432**	**9811004.981**	**406.215**	**306.257**	**4305.935**	**40119.191**	**96.979**	**1034048.232**
											Pounds per VMT	**1.5114E-04**	**2.3241E-04**	**1.4704E-05**	**3.9439E-05**	**7.3502E-01**	**3.0433E-05**	**2.2944E-05**	**3.2259E-04**	**3.0056E-03**	**7.2654E-06**	**7.7468E-02**
San Diego	2022	HHDT	Aggregate	Aggregate	Gasoline	13.5615592	188923.1389	188923.14	0	88728.074	0	2.178959206	2.202586526	0.0096853	0.027082423	535.370438	0.07193253	0.05816902	0.61660975	19.7211007	0.005292682	56.4541438
San Diego	2022	HHDT	Aggregate	Aggregate	Diesel	14038.0134	565285789.1	565285789	0	65110507	0	1579.296666	2113.12948	40.7517884	90.64826513	1113184.34	2.10665804	175.382647	45.3557698	440.961844	10.54119007	99440.31652
San Diego	2022	HHDT	Aggregate	Aggregate	Natural Gas	932.354451	19174702.91	19174703	0	1834392.8	0	47.29513523	50.0251522	1.52769823	4.449755945	35166.861	63.0697651	7.16899467	2.65751799	314.176494	0	4064.752771
						Sum	**584649415.12**					**1628.771**	**2165.357**	**42.289**	**95.125**	**1148886.576**	**65.248**	**182.610**	**48.630**	**774.859**	**10.546**	**103561.523**
											Pounds per VMT	**1.2202E-04**	**1.6222E-04**	**3.1682E-06**	**7.1265E-06**	**8.6072E-02**	**4.8882E-06**	**1.3681E-05**	**3.6432E-06**	**5.8051E-05**	**7.9012E-07**	**7.7586E-03**