APPENDIX 1

List of Pools

AGRICULTURAL POOL

CALENDAR YEAR 2020

Member	Alternate	Association	Agency
Feenstra, Robert, Chair		Dairy	Ag Concepts
Pierson, Jeff, Vice-Chair		Crops	Unitex
LaBrucherie, Jr., Ron		Crops	
	Filippi, Gino	Crops	
	Hofer, Paul	Crops	
Vanden Heuvel, Geoffrey		Dairy	
deBoom, Nathan		Dairy	Ag Concepts
Huitsing, John		Dairy	Milk Producers Council
DeHaan, Henry		Dairy	Henry DeHaan Dairy
Pietersma, Ron		Dairy	Pietersma & Company
Page, Bob		County	County of San Bernardino
	Silva, Andrew	County	County of San Bernardino
Boyd, Carol		State	State of California, CIM
Hall, Pete		State	State of California, CIM
Medrano, Jimmy		State	State of California, CIM
	Levin, Marilyn	State	State of California, DOJ
	Golden-Krasner, Noah	State	State of California, DOJ
	Ahmed, Tamer	State	State of California, CIM
	Bettencourt, Terry	State	State of California, CIM
	Cain, Larry	State	State of California, CIM

NON-AGRICULTURAL POOL
CALENDAR YEAR 2020

Member	Alternate	Association	Agency
Geye, Brian, Chair		Non-Ag	California Speedway Corporation
	Wilkings, Ray	Non-Ag	California Speedway Corporation
Bowcock, Bob, Vice-Chair		Non-Ag	CalMat Co.
	Sage, Kevin	Non-Ag	CalMat Co.
Dooley, Dennis		Non-Ag	Southern Service Company
	Urena, William	Non-Ag	Southern Service Company
Penrice, David		Non-Ag	Aqua Capital Management LP
Haddad, Ramsey		Non-Ag	California Steel Industries, Inc.
	Brundage, Kathleen	Non-Ag	California Steel Industries, Inc.
		Non-Ag	CCG Ontario, LLC
Stone, Shaun		Non-Ag	City of Ontario (Non-Ag)
	Quach, Christopher	Non-Ag	City of Ontario (Non-Ag)
	Romero, Jeanina	Non-Ag	City of Ontario (Non-Ag)
Page, Bob		Non-Ag	County of San Bernardino (Non-Ag)
	Silva, Andrew	Non-Ag	County of San Bernardino (Non-Ag)
Kolodziej, Edward		Non-Ag	General Electric Company
	Paul Deutsch	Non-Ag	General Electric Company
Costaglio, Natalie		Non-Ag	Hamner Park Associates, a California Limited Partnership
	Adler, Michael	Non-Ag	Hamner Park Associates, a California Limited Partnership
Jew, Van		Non-Ag	Monte Vista Water District (Non-Ag)
	Scott-Coe, Justin	Non-Ag	Monte Vista Water District (Non-Ag)
Edwards, Jeffrey		Non-Ag	GenOn California South, LP
	DiCiolli, Tom	Non-Ag	GenOn California South, LP
LeValley, David		Non-Ag	Praxair, Inc.
	Galindo, Jose	Non-Ag	Praxair, Inc.
Riboli, Steve		Non-Ag	Riboli Family and San Antonio Winery, Inc.
Cruikshank, Tom		Non-Ag	Space Center Mira Loma, Inc.
	Harold, Lauren	Non-Ag	Space Center Mira Loma, Inc.
Mendoza, Alberto		Non-Ag	TAMCO
	Heredia, Cinthia	Non-Ag	TAMCO
	Feitoza, Joao	Non-Ag	TAMCO
	Rothman, Larry	Non-Ag	TAMCO
		Non-Ag	West Venture Development Company

APPROPRIATIVE POOL COMMITTEE
CALENDAR YEAR 2020

Member	Alternate	Association	Agency
Bosler, John, Chair		Appropriative	Cucamonga Valley Water District
	Espinoza, Eduardo	Appropriative	Cucamonga Valley Water District
	Krishnan, Praseetha	Appropriative	Cucamonga Valley Water District
Fealy, Cris, Vice-Chair		Appropriative	Fontana Water Company
	Tarango, Eric	Appropriative	Fontana Water Company
Sage, Kevin		Appropriative	Nestlé Waters North America (Arrowhead Water Company)
	Bowcock, Bob	Appropriative	Nestlé Waters North America (Arrowhead Water Company)
Sage, Kevin		Appropriative	CalMat Co.
	Bowcock, Bob,	Appropriative	CalMat Co.
Crosley, Dave		Appropriative	City of Chino
	Coker, Amanda	Appropriative	City of Chino
	Jakher, Amer	Appropriative	City of Chino
	Castro, Vivian	Appropriative	City of Chino
Craig, Ron		Appropriative	City of Chino Hills
	Wiley, Mark	Appropriative	City of Chino Hills
Hays, Chuck		Appropriative	City of Fontana
	Kramer, Keith	Appropriative	City of Fontana
Blais, Chad		Appropriative	City of Norco
	Nelson, Sam	Appropriative	City of Norco
Burton, Scott		Appropriative	City of Ontario
	Gienger, Katie	Appropriative	City of Ontario
	Jones, Courtney	Appropriative	City of Ontario
Diggs, Chris		Appropriative	City of Pomona
Hoerning, Rosemary		Appropriative	City of Upland
	Ledbetter, Steven	Appropriative	City of Upland
Page, Bob		Appropriative	County of San Bernardino
	Silva, Andrew	Appropriative	County of San Bernardino
Swift, Josh		Appropriative	Fontana Union Water Company
	Zielke, Seth	Appropriative	Fontana Union Water Company
Lewis, Ben		Appropriative	Golden State Water Company
	Moore, Toby	Appropriative	Golden State Water Company
Berch, Chris		Appropriative	Jurupa Community Services District
	Popelar, Steven	Appropriative	Jurupa Community Services District
Andrews, Steven		Appropriative	Marygold Mutual Water Company
	Brokaw, Justin	Appropriative	Marygold Mutual Water Company
Jew, Van		Appropriative	Monte Vista Water District
	Scott-Coe, Justin	Appropriative	Monte Vista Water District
Jew, Van		Appropriative	*Monte Vista Irrigation Company
	Scott-Coe, Justin	Appropriative	*Monte Vista Irrigation Company
Bowcock, Bob		Appropriative	NCL Co., LLC
	Sage, Kevin	Appropriative	NCL Co., LLC
Kamansky, Geoffrey		Appropriative	Niagara Bottling Company
	Granger, Janelle	Appropriative	Niagara Bottling Company
Fealy, Cris		Appropriative	Nicholson Trust
	Swift, Josh	Appropriative	Nicholson Trust
Layton, Teri		Appropriative	San Antonio Water Company
	Lee, Brian	Appropriative	San Antonio Water Company
Gershon, Sam		Appropriative	Santa Ana River Water Company
	Lopez, John	Appropriative	Santa Ana River Water Company
Hoerning, Rosemary		Appropriative	*West End Consolidated Water Co.
	Ledbetter, Steven	Appropriative	*West End Consolidated Water Co.
Mansell, Clarence		Appropriative	West Valley Water District
	Loukeh, Nadia	Appropriative	West Valley Water District
	Chan, Joanne	Appropriative	West Valley Water District

**Minor Reps*

APPENDIX 2

Air Quality Impact Analysis

2020 Optimum Basin Management Program Update

Air Quality Impact Analysis

Chino Basin Watermaster

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MARCH 20, 2020

13305-03 AQ Report

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LIST OF EXHIBITS

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LIST OF ABBREVIATED TERMS

%	Percent
°F	Degrees Fahrenheit
(1)	Reference
μg/m^3	Microgram per Cubic Meter
AB 2595	California Clean Air Act
af	Acre-Feet
AQIA	Air Quality Impact Analysis
AQMD	Air Quality Management District
AQMP	Air Quality Management Plan
ASR	Aquifer Storage and Recovery
BACM	Best Available Control Measures
BAAQMD	Bay Area Air Quality Management District
C_2H_3Cl	Vinyl Chloride
CAA	Federal Clean Air Act
CAAQS	California Ambient Air Quality Standards
CalEEMod	California Emissions Estimator Model
CalEPA	California Environmental Protection Agency
CALGreen	California Green Building Standards Code
CAPCOA	California Air Pollution Control Officers Association
CARB	California Air Resources Board
CCR	California Code of Regulations
CEC	California Energy Commission
CEQA	California Environmental Quality Act
CO	Carbon Monoxide
COHb	carboxyhemoglobin
EMFAC	EMissions FACtor Model
EPA	Environmental Protection Agency
GHG	Greenhouse Gas
H_2S	Hydrogen Sulfide
HI	Hazard Index
hp	Horsepower
IEUA	Inland Empire Utilities Agency
lbs/day	Pounds Per Day
LF	Linear Feet
LST	Localized Significance Threshold
LST METHODOLOGY	Final Localized Significance Threshold Methodology

MAR	Managed Aquifer Recharge
MICR	Maximum Individual Cancer Risk
MM	Mitigation Measures
mph	Miles Per Hour
MS4	Municipal Separate Storm Sewer System
MWELO	California Department of Water Resources' Model Water Efficient
N_2	Nitrogen
N_2O	Nitrous Oxide
NAAQS	National Ambient Air Quality Standards
NO	Nitric Oxide
NO_2	Nitrogen Dioxide
NO_X	Nitrogen Oxides
O_2	Oxygen
O_3	Ozone
O_2 Deficiency	Chronic Hypoxemia
OBMPU	Optimum Basin Management Program Update
Pb	Lead
PM_{10}	Particulate Matter 10 microns in diameter or less
$PM_{2.5}$	Particulate Matter 2.5 microns in diameter or less
ppm	Parts Per Million
Project	2020 Optimum Basin Management Program Update
ROG	Reactive Organic Gases
RTP/SCS	Regional Transportation Plan/ Sustainable Communities Strategy
Rule 403	Fugitive Dust
Rule 1113	Architectural Coating
SCAB	South Coast Air Basin
SCAG	Southern California Association of Governments
SCAQMD	South Coast Air Quality Management District
SO_2	Sulfur Dioxide
SO_4	Sulfates
SO_X	Sulfur Oxides
SRA	Source Receptor Area
Title 24	California Building Code
TITLE I	Non-Attainment Provisions
TITLE II	Mobile Sources Provisions
C_2H_3Cl	Vinyl Chloride

VOC	Volatile Organic Compounds
vph	Vehicles Per Hour
WFA	Water Facilities Authority

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EXECUTIVE SUMMARY

ES.1 SUMMARY OF FINDINGS

The results of this *2020 Optimum Basin Management Program Update* (2020 OBMPU) *Air Quality Impact Analysis* (AQIA) are summarized below based on the significance criteria in Section 3 of this report consistent with Appendix G of the California Environmental Quality Act (CEQA) Guidelines (1). Table ES-1 shows the findings of significance for each potential air quality impact under CEQA before and after any required mitigation measures (MM) described below.

TABLE ES-1: SUMMARY OF CEQA SIGNIFICANCE FINDINGS

Analysis	Report Section	Significance Findings	
		Unmitigated	Mitigated
Regional Construction Emissions	3.4	*Potentially Significant*	*Less Than Significant*
Localized Construction Emissions	3.7	*Potentially Significant*	*Less Than Significant*
Regional Operational Emissions	3.5	*Less Than Significant*	*n/a*
Localized Operational Emissions	3.8	*Less Than Significant*	*n/a*
CO "Hot Spot" Analysis	3.9	*Less Than Significant*	*n/a*
Air Quality Management Plan	3.10	*Potentially Significant*	*Less Than Significant*
Sensitive Receptors	3.11	*Less Than Significant*	*n/a*
Odors	3.12	*Less Than Significant*	*n/a*
Cumulative Impacts	3.13	*Potentially Significant*	*Less Than Significant*

ES.2 STANDARD REGULATORY REQUIREMENTS/BEST AVAILABLE CONTROL MEASURES

Measures listed below (or equivalent language) shall appear on all Project grading plans, construction specifications and bid documents, and the Cities' shall ensure such language is incorporated prior to issuance of any development permits. South Coast Air Quality Management District (SCAQMD) Rules that are currently applicable during construction activity for this Project include but are not limited to Rule 403 (Fugitive Dust) (2) and Rule 1113 (Architectural Coatings) (3). It should be noted that these Best Available Control Measures (BACMs) are not mitigation as they are standard regulatory requirements. As such, credit for Rule 403 and Rule 1113 have been taken

BACM AQ-1

The contractor shall adhere to applicable measures contained in Table 1 of Rule 403 including, but not limited to (2):

- All clearing, grading, earth-moving, or excavation activities shall cease when winds exceed 25 miles per hour (mph) per SCAQMD guidelines in order to limit fugitive dust emissions.
- The contractor shall ensure that all disturbed unpaved roads and disturbed areas within the Project are watered at least three (3) times daily during dry weather. Watering, with complete coverage of disturbed areas, shall occur at least three times a day, preferably in the mid-morning, afternoon, and after work is done for the day.
- The contractor shall ensure that traffic speeds on unpaved roads and Project site areas are limited to 15 mph or less.

ES.3 CONSTRUCTION-SOURCE MITIGATION MEASURES

MM AQ-1

When using construction equipment greater than 150 horsepower (>150 hp), the Construction Contractor shall ensure that off-road diesel construction equipment complies with the Environmental Protection Agency (EPA)/California Air Resources Board (CARB) Tier 4 emissions standards or equivalent and shall ensure that all construction equipment is tuned and maintained in accordance with the manufacturer’s specifications.

MM AQ-2

All actively graded areas within the Project site shall be watered at 2.1-hour watering intervals (e.g., 4 times per day) or a movable sprinkler system shall be in place to ensure minimum soil moisture of 12 percent (%) in maintained for actively graded areas. Moisture content can be verified with use of a moisture probe by the grading contractor.

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1 INTRODUCTION

This report presents the results of the AQIA prepared by Urban Crossroads, Inc., for the proposed 2020 OBMPU (Project). The purpose of this AQIA is to evaluate the potential impacts to air quality associated with construction and operation of the proposed Project and, if warranted, recommend measures to mitigate impacts considered potentially significant in comparison to thresholds established by the SCAQMD.

1.1 SITE LOCATION

The proposed 2020 OBMPU Project is generally located within the portions of the San Bernardino, Riverside, and Los Angeles counties, as shown on Exhibit 1-A.

1.2 PROJECT DESCRIPTION

The OBMPU consists of construction and operation of the various facilities which are separated into four project categories: 1) Project Category 1: Well Development and Monitoring Devices; 2) Project Category 2: Conveyance Facilities and Ancillary Facilities; 3) Project Category 3: Storage Basins, Recharge Facilities, and Storage Bands; and, 4) Project Category 4: Desalters and Water Treatment Facilities.

PROJECT CATEGORY 1: WELL DEVELOPMENT AND MONITORING DEVICES

This Project Category includes the development of aquifer storage and recovery (ASR), injection, pumping, groundwater level monitoring, and groundwater quality wells, associated well housing, as well as monitoring devices such as flow meters and extensometers. The proposed wells and monitoring devices will be installed throughout the Chino Basin.

Well development includes: 60 ASR wells, 10 wells relocated, 8 new wells to expand desalter capacity, modification of up to 5 wells, destruction and replacement of 5 wells for a total of 78 pumping wells. This category also includes the development of 100 monitoring wells, for a total of 178 wells, which serve the varying purposes listed above and outlined below. The monitoring devices proposed as part of the OBMPU include 300 flow meters and 3 extensometers.

PROJECT CATEGORY 2: CONVEYANCE FACILITIES AND ANCILLARY FACILITIES

This category includes the construction of 550,000 linear feet (LF) of new pipelines, booster pump stations, reservoirs and minor appurtenances whose number, locations and capacities are presently unknown. The proposed conveyance facilities and ancillary facilities would be implemented throughout the entire Chino Basin.

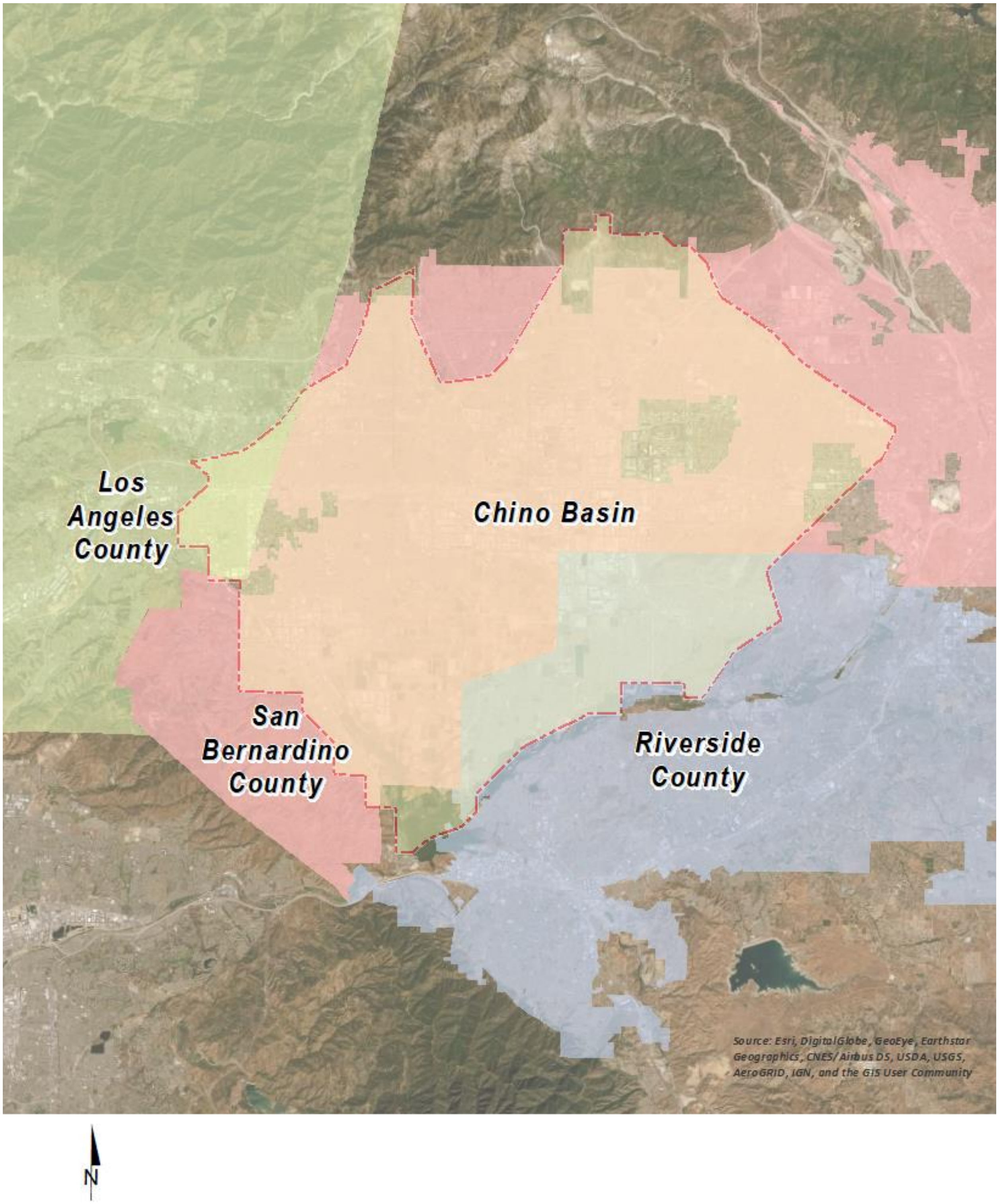
PROJECT CATEGORY 3: STORAGE BASINS, RECHARGE FACILITIES, AND STORAGE BANDS

This Project Category includes the construction of 310 acres of new storage basins—several locations for which are within existing facilities, improvements to existing storage basin(s), 200 acres of flood managed aquifer recharge (MAR) facilities, new municipal separate storm sewer system (MS4) compliance facilities, and expansion of the maximum storage space (safe storage capacity) to be used within the Chino Basin from 600,000 acre-feet (af) (through June 30, 2021) to between 700,000 af and 1,000,000 af going forward with various impacts that may result for each 100,000 af within this range of storage. The specific locations of the storage basins are described in the Project Description above; however, the locations of the flood MAR facilities and MS4 compliant projects are presently unknown.

PROJECT CATEGORY 4: DESALTERS AND WATER TREATMENT FACILITIES

The projects proposed under this category are: upgrades at Inland Empire Utilities Agency's (IEUA) existing Treatment Plants, a new advanced water treatment plant (discussed in IEUA's 2017 FMP PEIR), improvements to the Water Facilities Authority (WFA) Agua de Lejos Treatment Plant, upgrades to the Chino Desalters, new groundwater treatment facilities at or near well sites and at regionally located sites, and improvements to existing groundwater treatment facilities.

EXHIBIT 1-A: PROJECT LOCATION MAP



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2 AIR QUALITY SETTING

This section provides an overview of the existing air quality conditions in the Project area and region.

2.1 SOUTH COAST AIR BASIN

The Project site is located in the South Coast Air Basin (SCAB) within the jurisdiction of SCAQMD (4). The SCAQMD was created by the 1977 Lewis-Presley Air Quality Management Act, which merged four county air pollution control bodies into one regional district. Under the Act, the SCAQMD is responsible for bringing air quality in areas under its jurisdiction into conformity with federal and state air quality standards. As previously stated, the Project site is located within the SCAB, a 6,745-square mile subregion of the SCAQMD, which includes portions of Los Angeles, Riverside, and San Bernardino Counties, and all of Orange County.

The SCAB is bounded by the Pacific Ocean to the west and the San Gabriel, San Bernardino, and San Jacinto Mountains to the north and east. The Los Angeles County portion of the Mojave Desert Air Basin is bounded by the San Gabriel Mountains to the south and west, the Los Angeles / Kern County border to the north, and the Los Angeles / San Bernardino County border to the east. The Riverside County portion of the Salton Sea Air Basin is bounded by the San Jacinto Mountains in the west and spans eastward up to the Palo Verde Valley.

2.2 REGIONAL CLIMATE

The regional climate has a substantial influence on air quality in the SCAB. In addition, the temperature, wind, humidity, precipitation, and amount of sunshine influence the air quality.

The annual average temperatures throughout the SCAB vary from the low to middle 60s degrees Fahrenheit (°F). Due to a decreased marine influence, the eastern portion of the SCAB shows greater variability in average annual minimum and maximum temperatures. January is the coldest month throughout the SCAB, with average minimum temperatures of 47°F in downtown Los Angeles and 36°F in San Bernardino. All portions of the SCAB have recorded maximum temperatures above 100°F.

Although the climate of the SCAB can be characterized as semi-arid, the air near the land surface is quite moist on most days because of the presence of a marine layer. This shallow layer of sea air is an important modifier of SCAB climate. Humidity restricts visibility in the SCAB, and the conversion of sulfur dioxide (SO_2) to sulfates (SO_4) is heightened in air with high relative humidity. The marine layer provides an environment for that conversion process, especially during the spring and summer months. The annual average relative humidity within the SCAB is 71% along the coast and 59% inland. Since the ocean effect is dominant, periods of heavy early morning fog are frequent and low stratus clouds are a characteristic feature. These effects decrease with distance from the coast.

More than 90% of the SCAB's rainfall occurs from November through April. The annual average rainfall varies from approximately nine inches in Riverside to fourteen inches in downtown Los

Angeles. Monthly and yearly rainfall totals are extremely variable. Summer rainfall usually consists of widely scattered thunderstorms near the coast and slightly heavier shower activity in the eastern portion of the SCAB with frequency being higher near the coast.

Due to its generally clear weather, about three-quarters of available sunshine is received in the SCAB. The remaining one-quarter is absorbed by clouds. The ultraviolet portion of this abundant radiation is a key factor in photochemical reactions. On the shortest day of the year there are approximately 10 hours of possible sunshine, and on the longest day of the year there are approximately 14½ hours of possible sunshine.

The importance of wind to air pollution is considerable. The direction and speed of the wind determines the horizontal dispersion and transport of the air pollutants. During the late autumn to early spring rainy season, the SCAB is subjected to wind flows associated with the traveling storms moving through the region from the northwest. This period also brings five to ten periods of strong, dry offshore winds, locally termed "Santa Anas" each year. During the dry season, which coincides with the months of maximum photochemical smog concentrations, the wind flow is bimodal, typified by a daytime onshore sea breeze and a nighttime offshore drainage wind. Summer wind flows are created by the pressure differences between the relatively cold ocean and the unevenly heated and cooled land surfaces that modify the general northwesterly wind circulation over southern California. Nighttime drainage begins with the radiational cooling of the mountain slopes. Heavy, cool air descends the slopes and flows through the mountain passes and canyons as it follows the lowering terrain toward the ocean. Another characteristic wind regime in the SCAB is the "Catalina Eddy," a low level cyclonic (counterclockwise) flow centered over Santa Catalina Island which results in an offshore flow to the southwest. On most spring and summer days, some indication of an eddy is apparent in coastal sections.

In the SCAB, there are two distinct temperature inversion structures that control vertical mixing of air pollution. During the summer, warm high-pressure descending (subsiding) air is undercut by a shallow layer of cool marine air. The boundary between these two layers of air is a persistent marine subsidence/inversion. This boundary prevents vertical mixing which effectively acts as an impervious lid to pollutants over the entire SCAB. The mixing height for the inversion structure is normally situated 1,000 to 1,500 feet above mean sea level.

A second inversion-type forms in conjunction with the drainage of cool air off the surrounding mountains at night followed by the seaward drift of this pool of cool air. The top of this layer forms a sharp boundary with the warmer air aloft and creates nocturnal radiation inversions. These inversions occur primarily in the winter, when nights are longer and onshore flow is weakest. They are typically only a few hundred feet above mean sea level. These inversions effectively trap pollutants, such as nitrogen oxides (NO_X) and carbon monoxide (CO) from vehicles, as the pool of cool air drifts seaward. Winter is therefore a period of high levels of primary pollutants along the coastline.

2.3 WIND PATTERNS AND PROJECT LOCATION

The distinctive climate of the Project area and the SCAB is determined by its terrain and geographical location. The SCAB is located in a coastal plain with connecting broad valleys and low hills, bounded by the Pacific Ocean in the southwest quadrant with high mountains forming the remainder of the perimeter.

Wind patterns across the south coastal region are characterized by westerly and southwesterly onshore winds during the day and easterly or northeasterly breezes at night. Winds are characteristically light although the speed is somewhat greater during the dry summer months than during the rainy winter season.

2.4 CRITERIA POLLUTANTS

Criteria pollutants are pollutants that are regulated through the development of human health based and/or environmentally based criteria for setting permissible levels. Criteria pollutants, their typical sources, and health effects are identified below (5):

TABLE 2-1: CRITERIA POLLUTANTS

Criteria Pollutant	Description	Sources	Health Effects
CO	CO is a colorless, odorless gas produced by the incomplete combustion of carbon-containing fuels, such as gasoline or wood. CO concentrations tend to be the highest during the winter morning, when little to no wind and surface-based inversions trap the pollutant at ground levels. Because CO is emitted directly from internal combustion engines, unlike ozone (O_3), motor vehicles operating at slow speeds are the primary source of CO in the SCAB. The highest ambient CO concentrations are generally found near congested transportation corridors and intersections.	Any source that burns fuel such as automobiles, trucks, heavy construction equipment, farming equipment and residential heating.	Individuals with a deficient blood supply to the heart are the most susceptible to the adverse effects of CO exposure. The effects observed include earlier onset of chest pain with exercise, and electrocardiograph changes indicative of decreased oxygen (O_2) supply to the heart. Inhaled CO has no direct toxic effect on the lungs but exerts its effect on tissues by interfering with O_2 transport and competing with O_2 to combine with hemoglobin present in the blood to form carboxyhemoglobin (COHb). Hence, conditions with an increased demand for O_2 supply can be adversely affected by exposure to CO. Individuals most at risk include fetuses, patients with diseases involving heart and blood vessels, and patients with chronic hypoxemia (O_2 deficiency) as seen at high altitudes.

Criteria Pollutant	Description	Sources	Health Effects
SO_2	SO_2 is a colorless, extremely irritating gas or liquid. It enters the atmosphere as a pollutant mainly as a result of burning high sulfur-content fuel oils and coal and from chemical processes occurring at chemical plants and refineries. When SO_2 oxidizes in the atmosphere, it forms SO_4. Collectively, these pollutants are referred to as sulfur oxides (SO_X).	Coal or oil burning power plants and industries, refineries, diesel engines	A few minutes of exposure to low levels of SO_2 can result in airway constriction in some asthmatics, all of whom are sensitive to its effects. In asthmatics, increase in resistance to air flow, as well as reduction in breathing capacity leading to severe breathing difficulties, are observed after acute exposure to SO_2. In contrast, healthy individuals do not exhibit similar acute responses even after exposure to higher concentrations of SO_2. Animal studies suggest that despite SO_2 being a respiratory irritant, it does not cause substantial lung injury at ambient concentrations. However, very high levels of exposure can cause lung edema (fluid accumulation), lung tissue damage, and sloughing off of cells lining the respiratory tract. Some population-based studies indicate that the mortality and morbidity effects associated with fine particles show a similar association with ambient SO_2 levels. In these studies, efforts to separate the effects of SO_2 from those of fine particles have not been successful. It is not clear whether the two pollutants act synergistically, or one pollutant alone is the predominant factor.

Criteria Pollutant	Description	Sources	Health Effects
NO_X	NO_X consist of nitric oxide (NO), nitrogen dioxide (NO_2) and nitrous oxide (N_2O) and are formed when nitrogen (N_2) combines with O_2. Their lifespan in the atmosphere ranges from one to seven days for NO and N_2O, to 170 years for nitrous oxide. NO_X is typically created during combustion processes and are major contributors to smog formation and acid deposition. NO_2 is a criteria air pollutant and may result in numerous adverse health effects; it absorbs blue light, resulting in a brownish-red cast to the atmosphere and reduced visibility. Of the seven types of nitrogen oxide compounds, NO_2 is the most abundant in the atmosphere. As ambient concentrations of NO_2 are related to traffic density, commuters in heavy traffic may be exposed to higher concentrations of NO_2 than those indicated by regional monitoring station.	Any source that burns fuel such as automobiles, trucks, heavy construction equipment, farming equipment and residential heating.	Population-based studies suggest that an increase in acute respiratory illness, including infections and respiratory symptoms in children (not infants), is associated with long-term exposure to NO_2 at levels found in homes with gas stoves, which are higher than ambient levels found in Southern California. Increase in resistance to air flow and airway contraction is observed after short-term exposure to NO_2 in healthy subjects. Larger decreases in lung functions are observed in individuals with asthma or chronic obstructive pulmonary disease (e.g., chronic bronchitis, emphysema) than in healthy individuals, indicating a greater susceptibility of these sub-groups. In animals, exposure to levels of NO_2 considerably higher than ambient concentrations result in increased susceptibility to infections, possibly due to the observed changes in cells involved in maintaining immune functions. The severity of lung tissue damage associated with high levels of O_3 exposure increases when animals are exposed to a combination of O_3 and NO_2.
O_3	O_3 is a highly reactive and unstable gas that is formed when VOCs and NO_X, both byproducts of internal combustion engine exhaust, undergo slow photochemical reactions in the presence of sunlight. O_3 concentrations are generally	Formed when reactive organic gases (ROG) and NO_X react in the presence of sunlight. ROG sources	Individuals exercising outdoors, children, and people with preexisting lung disease, such as asthma and chronic pulmonary lung disease, are considered to be the most susceptible sub-groups for O_3 effects. Short-

Criteria Pollutant	Description	Sources	Health Effects
	highest during the summer months when direct sunlight, light wind, and warm temperature conditions are favorable to the formation of this pollutant.	include any source that burns fuels, (e.g., gasoline, natural gas, wood, oil) solvents, petroleum processing and storage and pesticides.	term exposure (lasting for a few hours) to O_3 at levels typically observed in Southern California can result in breathing pattern changes, reduction of breathing capacity, increased susceptibility to infections, inflammation of the lung tissue, and some immunological changes. Elevated O_3 levels are associated with increased school absences. In recent years, a correlation between elevated ambient O_3 levels and increases in daily hospital admission rates, as well as mortality, has also been reported. An increased risk for asthma has been found in children who participate in multiple outdoor sports and live in communities with high O_3 levels. O_3 exposure under exercising conditions is known to increase the severity of the responses described above. Animal studies suggest that exposure to a combination of pollutants that includes O_3 may be more toxic than exposure to O_3 alone. Although lung volume and resistance changes observed after a single exposure diminish with repeated exposures, biochemical and cellular changes appear to persist, which can lead to subsequent lung structural changes.
Particulate Matter	PM_{10}: A major air pollutant consisting of tiny solid or liquid particles of soot, dust, smoke, fumes, and aerosols. Particulate matter pollution is a major cause of reduce visibility (haze) which is	Sources of PM_{10} include road dust, windblown dust and construction. Also formed from other pollutants (acid	A consistent correlation between elevated ambient fine particulate matter (PM_{10} and $PM_{2.5}$) levels and an increase in mortality rates, respiratory infections,

Criteria Pollutant	Description	Sources	Health Effects
	caused by the scattering of light and consequently the significant reduction air clarity. The size of the particles (10 microns or smaller, about 0.0004 inches or less) allows them to easily enter the lungs where they may be deposited, resulting in adverse health effects. Additionally, it should be noted that PM_{10} is considered a criteria air pollutant. $PM_{2.5}$: A similar air pollutant to PM_{10} consisting of tiny solid or liquid particles which are 2.5 microns or smaller (which is often referred to as fine particles). These particles are formed in the atmosphere from primary gaseous emissions that include SO_4 formed from SO_2 release from power plants and industrial facilities and nitrates that are formed from NO_X release from power plants, automobiles and other types of combustion sources. The chemical composition of fine particles highly depends on location, time of year, and weather conditions. $PM_{2.5}$ is a criteria air pollutant.	rain, NO_X, SO_X, organics). Incomplete combustion of any fuel. $PM_{2.5}$ comes from fuel combustion in motor vehicles, equipment and industrial sources, residential and agricultural burning. Also formed from reaction of other pollutants (acid rain, NO_X, SO_X, organics).	number and severity of asthma attacks and the number of hospital admissions has been observed in different parts of the United States and various areas around the world. In recent years, some studies have reported an association between long-term exposure to air pollution dominated by fine particles and increased mortality, reduction in lifespan, and an increased mortality from lung cancer. Daily fluctuations in $PM_{2.5}$ concentration levels have also been related to hospital admissions for acute respiratory conditions in children, to school and kindergarten absences, to a decrease in respiratory lung volumes in normal children, and to increased medication use in children and adults with asthma. Recent studies show lung function growth in children is reduced with long term exposure to particulate matter. The elderly, people with pre-existing respiratory or cardiovascular disease, and children appear to be more susceptible to the effects of high levels of PM_{10} and $PM_{2.5}$.
VOC	VOCs are hydrocarbon compounds (any compound containing various combinations of hydrogen and carbon atoms) that exist in the ambient air. VOCs contribute to the formation of smog through atmospheric photochemical reactions and/or may be toxic. Compounds of carbon (also known as organic compounds) have different levels	Organic chemicals are widely used as ingredients in household products. Paints, varnishes and wax all contain organic solvents, as do many cleaning, disinfecting, cosmetic,	Breathing VOCs can irritate the eyes, nose and throat, can cause difficulty breathing and nausea, and can damage the central nervous system as well as other organs. Some VOCs can cause cancer. Not all VOCs have all these health effects, though many have several.

Criteria Pollutant	Description	Sources	Health Effects
	of reactivity; that is, they do not react at the same speed or do not form O_3 to the same extent when exposed to photochemical processes. VOCs often have an odor, and some examples include gasoline, alcohol, and the solvents used in paints. Exceptions to the VOC designation include CO, carbon dioxide, carbonic acid, metallic carbides or carbonates, and ammonium carbonate. VOCs are a criteria pollutant since they are a precursor to O_3, which is a criteria pollutant. The terms VOC and ROG (see below) interchangeably.	degreasing and hobby products. Fuels are made up of organic chemicals. All of these products can release organic compounds while you are using them, and, to some degree, when they are stored.	
ROG	Similar to VOC, ROGs are also precursors in forming O_3 and consist of compounds containing methane, ethane, propane, butane, and longer chain hydrocarbons, which are typically the result of some type of combustion/decomposition process. Smog is formed when ROG and NO_X react in the presence of sunlight. ROGs are a criteria pollutant since they are a precursor to O_3, which is a criteria pollutant. The terms ROG and VOC (see previous) interchangeably.	Sources similar to VOCs.	Health effects similar to VOCs.
Lead (Pb)	Pb is a heavy metal that is highly persistent in the environment and is considered a criteria pollutant. In the past, the primary source of Pb in the air was emissions from vehicles burning leaded gasoline. The major sources of Pb emissions are ore and metals processing, particularly Pb smelters, and piston-engine aircraft operating on leaded aviation gasoline. Other stationary sources include waste incinerators, utilities, and	Metal smelters, resource recovery, leaded gasoline, deterioration of Pb paint.	Fetuses, infants, and children are more sensitive than others to the adverse effects of Pb exposure. Exposure to low levels of Pb can adversely affect the development and function of the central nervous system, leading to learning disorders, distractibility, inability to follow simple commands, and lower intelligence quotient. In adults, increased Pb levels are

Criteria Pollutant	Description	Sources	Health Effects
	lead-acid battery manufacturers. It should be noted that the Project does not include operational activities such as metal processing or Pb acid battery manufacturing. As such, the Project is not anticipated to generate a quantifiable amount of Pb emissions.		associated with increased blood pressure. Pb poisoning can cause anemia, lethargy, seizures, and death; although it appears that there are no direct effects of Pb on the respiratory system. Pb can be stored in the bone from early age environmental exposure, and elevated blood Pb levels can occur due to breakdown of bone tissue during pregnancy, hyperthyroidism (increased secretion of hormones from the thyroid gland) and osteoporosis (breakdown of bony tissue). Fetuses and breast-fed babies can be exposed to higher levels of Pb because of previous environmental Pb exposure of their mothers.
Odor	Odor means the perception experienced by a person when one or more chemical substances in the air come into contact with the human olfactory nerves (6).	Odors can come from many sources including animals, human activities, industry, natures, and vehicles.	Offensive odors can potentially affect human health in several ways. First, odorant compounds can irritate the eye, nose, and throat, which can reduce respiratory volume. Second, studies have shown that the VOCs that cause odors can stimulate sensory nerves to cause neurochemical changes that might influence health, for instance, by compromising the immune system. Finally, unpleasant odors can trigger memories or attitudes linked to unpleasant odors, causing cognitive and emotional effects such as stress.

2.5 EXISTING AIR QUALITY

Existing air quality is measured at established SCAQMD air quality monitoring stations. Monitored air quality is evaluated in the context of ambient air quality standards. These standards are the levels of air quality that are considered safe, with an adequate margin of safety, to protect the public health and welfare. National Ambient Air Quality Standards (NAAQS) and California Ambient Air Quality Standards (CAAQS) currently in effect are shown in Table 2-2 (7).

The determination of whether a region's air quality is healthful or unhealthful is determined by comparing contaminant levels in ambient air samples to the state and federal standards. At the time of this AQIA, the most recent state and federal standards were updated by CARB on May ,4 2016 and are presented in Table 2-2. The air quality in a region is considered to be in attainment by the state if the measured ambient air pollutant levels for O_3, CO (except 8-hour Lake Tahoe), SO_2 (1 and 24 hour), NO_2, PM_{10}, and $PM_{2.5}$ are not to be exceeded. All others are not to be equaled or exceeded. It should be noted that the three-year period is presented for informational purposes and is not the basis for how the State assigns attainment status. Attainment status for a pollutant means that the SCAQMD meets the standards set by the EPA or the California EPA (CalEPA). Conversely, nonattainment means that an area has monitored air quality that does not meet the NAAQS or CAAQS standards. In order to improve air quality in nonattainment areas, a State Implementation Plan (SIP) is drafted by CARB. The SIP outlines the measures that the state will take to improve air quality. Once nonattainment areas meet the standards and additional redesignation requirements, the EPA will designate the area as a maintenance area (8).

TABLE 2-2: AMBIENT AIR QUALITY STANDARDS (1 OF 2)

Ambient Air Quality Standards

Pollutant	Averaging Time	California Standards [1]		National Standards [2]		
		Concentration [3]	Method [4]	Primary [3,5]	Secondary [3,6]	Method [7]
Ozone (O_3)[8]	1 Hour	0.09 ppm (180 µg/m^3)	Ultraviolet Photometry	—	Same as Primary Standard	Ultraviolet Photometry
	8 Hour	0.070 ppm (137 µg/m^3)		0.070 ppm (137 µg/m^3)		
Respirable Particulate Matter (PM10)[9]	24 Hour	50 µg/m^3	Gravimetric or Beta Attenuation	150 µg/m^3	Same as Primary Standard	Inertial Separation and Gravimetric Analysis
	Annual Arithmetic Mean	20 µg/m^3		—		
Fine Particulate Matter (PM2.5)[9]	24 Hour	—	—	35 µg/m^3	Same as Primary Standard	Inertial Separation and Gravimetric Analysis
	Annual Arithmetic Mean	12 µg/m^3	Gravimetric or Beta Attenuation	12.0 µg/m^3	15 µg/m^3	
Carbon Monoxide (CO)	1 Hour	20 ppm (23 mg/m^3)	Non-Dispersive Infrared Photometry (NDIR)	35 ppm (40 mg/m^3)	—	Non-Dispersive Infrared Photometry (NDIR)
	8 Hour	9.0 ppm (10 mg/m^3)		9 ppm (10 mg/m^3)	—	
	8 Hour (Lake Tahoe)	6 ppm (7 mg/m^3)		—	—	
Nitrogen Dioxide (NO_2)[10]	1 Hour	0.18 ppm (339 µg/m^3)	Gas Phase Chemiluminescence	100 ppb (188 µg/m^3)	—	Gas Phase Chemiluminescence
	Annual Arithmetic Mean	0.030 ppm (57 µg/m^3)		0.053 ppm (100 µg/m^3)	Same as Primary Standard	
Sulfur Dioxide (SO_2)[11]	1 Hour	0.25 ppm (655 µg/m^3)	Ultraviolet Fluorescence	75 ppb (196 µg/m^3)	—	Ultraviolet Flourescence; Spectrophotometry (Pararosaniline Method)
	3 Hour	—		—	0.5 ppm (1300 µg/m^3)	
	24 Hour	0.04 ppm (105 µg/m^3)		0.14 ppm (for certain areas)[11]	—	
	Annual Arithmetic Mean	—		0.030 ppm (for certain areas)[11]	—	
Lead[12,13]	30 Day Average	1.5 µg/m^3	Atomic Absorption	—	—	High Volume Sampler and Atomic Absorption
	Calendar Quarter	—		1.5 µg/m^3 (for certain areas)[12]	Same as Primary Standard	
	Rolling 3-Month Average	—		0.15 µg/m^3		
Visibility Reducing Particles[14]	8 Hour	See footnote 14	Beta Attenuation and Transmittance through Filter Tape	No National Standards		
Sulfates	24 Hour	25 µg/m^3	Ion Chromatography			
Hydrogen Sulfide	1 Hour	0.03 ppm (42 µg/m^3)	Ultraviolet Fluorescence			
Vinyl Chloride[12]	24 Hour	0.01 ppm (26 µg/m^3)	Gas Chromatography			

See footnotes on next page ...

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TABLE 2-2: AMBIENT AIR QUALITY STANDARDS (2 OF 2)

1. California standards for ozone, carbon monoxide (except 8-hour Lake Tahoe), sulfur dioxide (1 and 24 hour), nitrogen dioxide, and particulate matter (PM10, PM2.5, and visibility reducing particles), are values that are not to be exceeded. All others are not to be equaled or exceeded. California ambient air quality standards are listed in the Table of Standards in Section 70200 of Title 17 of the California Code of Regulations.
2. National standards (other than ozone, particulate matter, and those based on annual arithmetic mean) are not to be exceeded more than once a year. The ozone standard is attained when the fourth highest 8-hour concentration measured at each site in a year, averaged over three years, is equal to or less than the standard. For PM10, the 24 hour standard is attained when the expected number of days per calendar year with a 24-hour average concentration above 150 $\mu g/m^3$ is equal to or less than one. For PM2.5, the 24 hour standard is attained when 98 percent of the daily concentrations, averaged over three years, are equal to or less than the standard. Contact the U.S. EPA for further clarification and current national policies.
3. Concentration expressed first in units in which it was promulgated. Equivalent units given in parentheses are based upon a reference temperature of 25°C and a reference pressure of 760 torr. Most measurements of air quality are to be corrected to a reference temperature of 25°C and a reference pressure of 760 torr; ppm in this table refers to ppm by volume, or micromoles of pollutant per mole of gas.
4. Any equivalent measurement method which can be shown to the satisfaction of the ARB to give equivalent results at or near the level of the air quality standard may be used.
5. National Primary Standards: The levels of air quality necessary, with an adequate margin of safety to protect the public health.
6. National Secondary Standards: The levels of air quality necessary to protect the public welfare from any known or anticipated adverse effects of a pollutant.
7. Reference method as described by the U.S. EPA. An "equivalent method" of measurement may be used but must have a "consistent relationship to the reference method" and must be approved by the U.S. EPA.
8. On October 1, 2015, the national 8-hour ozone primary and secondary standards were lowered from 0.075 to 0.070 ppm.
9. On December 14, 2012, the national annual PM2.5 primary standard was lowered from 15 $\mu g/m^3$ to 12.0 $\mu g/m^3$. The existing national 24-hour PM2.5 standards (primary and secondary) were retained at 35 $\mu g/m^3$, as was the annual secondary standard of 15 $\mu g/m^3$. The existing 24-hour PM10 standards (primary and secondary) of 150 $\mu g/m^3$ also were retained. The form of the annual primary and secondary standards is the annual mean, averaged over 3 years.
10. To attain the 1-hour national standard, the 3-year average of the annual 98th percentile of the 1-hour daily maximum concentrations at each site must not exceed 100 ppb. Note that the national 1-hour standard is in units of parts per billion (ppb). California standards are in units of parts per million (ppm). To directly compare the national 1-hour standard to the California standards the units can be converted from ppb to ppm. In this case, the national standard of 100 ppb is identical to 0.100 ppm.
11. On June 2, 2010, a new 1-hour SO_2 standard was established and the existing 24-hour and annual primary standards were revoked. To attain the 1-hour national standard, the 3-year average of the annual 99th percentile of the 1-hour daily maximum concentrations at each site must not exceed 75 ppb. The 1971 SO_2 national standards (24-hour and annual) remain in effect until one year after an area is designated for the 2010 standard, except that in areas designated nonattainment for the 1971 standards, the 1971 standards remain in effect until implementation plans to attain or maintain the 2010 standards are approved.

    Note that the 1-hour national standard is in units of parts per billion (ppb). California standards are in units of parts per million (ppm). To directly compare the 1-hour national standard to the California standard the units can be converted to ppm. In this case, the national standard of 75 ppb is identical to 0.075 ppm.
12. The ARB has identified lead and vinyl chloride as 'toxic air contaminants' with no threshold level of exposure for adverse health effects determined. These actions allow for the implementation of control measures at levels below the ambient concentrations specified for these pollutants.
13. The national standard for lead was revised on October 15, 2008 to a rolling 3-month average. The 1978 lead standard (1.5 $\mu g/m^3$ as a quarterly average) remains in effect until one year after an area is designated for the 2008 standard, except that in areas designated nonattainment for the 1978 standard, the 1978 standard remains in effect until implementation plans to attain or maintain the 2008 standard are approved.
14. In 1989, the ARB converted both the general statewide 10-mile visibility standard and the Lake Tahoe 30-mile visibility standard to instrumental equivalents, which are "extinction of 0.23 per kilometer" and "extinction of 0.07 per kilometer" for the statewide and Lake Tahoe Air Basin standards, respectively.

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2.6 REGIONAL AIR QUALITY

Air pollution contributes to a wide variety of adverse health effects. The EPA has established NAAQS for six of the most common air pollutants: CO, Pb, O_3, particulate matter (PM_{10} and $PM_{2.5}$), NO_2, and SO_2 which are known as criteria pollutants. The SCAQMD monitors levels of various criteria pollutants at 37 permanent monitoring stations and 5 single-pollutant source Pb air monitoring sites throughout the air district (9). On February 21, 2019, CARB posted the 2018 amendments to the state and national area designations. See Table 2-3 for attainment designations for the SCAB (10). Appendix 2.1 provides geographic representation of the state and federal attainment status for applicable criteria pollutants within the SCAB.

TABLE 2-3: ATTAINMENT STATUS OF CRITERIA POLLUTANTS IN THE SCAB

Criteria Pollutant	State Designation	Federal Designation
O_3 – 1-hour standard	Nonattainment	--
O_3 – 8-hour standard	Nonattainment	Nonattainment
PM_{10}	Nonattainment	Attainment
$PM_{2.5}$	Nonattainment	Nonattainment
CO	Attainment	Unclassifiable/Attainment
NO_2	Attainment	Unclassifiable/Attainment
SO_2	Unclassifiable/Attainment	Unclassifiable/Attainment
Pb[1]	Attainment	Unclassifiable/Attainment

Note: See Appendix 2.1 for a detailed map of State/National Area Designations within the SCAB
"-" = The national 1-hour O_3 standard was revoked effective June 15, 2005

2.7 LOCAL AIR QUALITY

The Project site is located within multiple Source Receptor Areas (SRA) (11). The SRAs include the Pomona/Walnut Valley (SRA 10), Corona/Norco Area (SRA 22), Metropolitan Riverside County 1 (SRA 23), Northwest San Bernardino Valley (SRA 32), I-10 Near Road (SRA 33), CA-60 Near Road (SRA 33), and the Central San Bernardino Valley 1 (SRA 34).

The most recent three (3) years of data available is shown on Table 2-4 and identifies the number of days ambient air quality standards were exceeded for the study area, which is considered to be representative of the local air quality at the Project site. Data for O_3, CO, NO_2, PM_{10}, and $PM_{2.5}$ for 2016 through 2018 was obtained from the SCAQMD Air Quality Data Tables (12). Additionally, data for SO_2 has been omitted as attainment is regularly met in the SCAB and few monitoring stations measure SO_2 concentrations.

[1] The Federal nonattainment designation for lead is only applicable towards the Los Angeles County portion of the SCAB.

TABLE 2-4: PROJECT AREA AIR QUALITY MONITORING SUMMARY 2016-2018[2]

Pollutant	Standard	Year		
		2016	2017	2018
O_3				
Maximum Federal 1-Hour Concentration (ppm)		0.156	0.150	0.133
Maximum Federal 8-Hour Concentration (ppm)		0.116	0.127	0.111
Number of Days Exceeding State 1-Hour Standard	> 0.09 ppm	53	66	25
Number of Days Exceeding Federal/State 8-Hour Standard	> 0.070 ppm	89	87	52
CO				
Maximum Federal 1-Hour Concentration	> 35 ppm	1.7	2.0	2.2
Maximum Federal 8-Hour Concentration	> 20 ppm	1.3	1.6	2.0
NO_2				
Maximum Federal 1-Hour Concentration	> 0.100 ppm	0.093	0.093	0.068
Annual Federal Standard Design Value		0.029	0.032	0.019
PM_{10}				
Maximum Federal 24-Hour Concentration (μg/m^3)	> 150 μg/m^3	94	138	129
Annual Federal Arithmetic Mean (μg/m^3)		38.1	41.6	30.2
Number of Days Exceeding Federal 24-Hour Standard	> 150 μg/m^3	0	0	0
Number of Days Exceeding State 24-Hour Standard	> 50 μg/m^3	15	103	25
$PM_{2.5}$				
Maximum Federal 24-Hour Concentration (μg/m^3)	> 35 μg/m^3	44.14	50.30	50.70
Annual Federal Arithmetic Mean (μg/m^3)	> 12 μg/m^3	14.73	12.18	12.41
Number of Days Exceeding Federal 24-Hour Standard	> 35 μg/m^3	6	6	2

ppm = Parts Per Million
Source: Data for O_3, CO, NO_2, PM_{10}, and $PM_{2.5}$ was obtained from SCAQMD Air Quality Data Tables.

2.8 REGULATORY BACKGROUND

2.8.1 FEDERAL REGULATIONS

The EPA is responsible for setting and enforcing the NAAQS for O_3, CO, NO_X, SO_2, PM_{10}, and Pb (13). The EPA has jurisdiction over emissions sources that are under the authority of the federal government including aircraft, locomotives, and emissions sources outside state waters (Outer Continental Shelf). The EPA also establishes emission standards for vehicles sold in states other than California. Automobiles sold in California must meet the stricter emission requirements of the CARB.

The Federal Clean Air Act (CAA) was first enacted in 1955 and has been amended numerous times in subsequent years (1963, 1965, 1967, 1970, 1977, and 1990). The CAA establishes the federal

[2] As the Project is located within multiple quadrants, the higher value for O_3, CO, NO_2, PM_{10}, and $PM_{2.5}$ will be presented in Table 2-4.

air quality standards, the NAAQS, and specifies future dates for achieving compliance (14). The CAA also mandates that states submit and implement SIPs for local areas not meeting these standards. These plans must include pollution control measures that demonstrate how the standards will be met.

The 1990 amendments to the CAA that identify specific emission reduction goals for areas not meeting the NAAQS require a demonstration of reasonable further progress toward attainment and incorporate additional sanctions for failure to attain or to meet interim milestones. The sections of the CAA most directly applicable to the development of the Project site include Title I (Non-Attainment Provisions) and Title II (Mobile Source Provisions) (15) (16). Title I provisions were established with the goal of attaining the NAAQS for the following criteria pollutants O_3, NO_2, SO_2, PM_{10}, CO, $PM_{2.5}$, and Pb. The NAAQS were amended in July 1997 to include an additional standard for O_3 and to adopt a NAAQS for $PM_{2.5}$. Table 2-3 (previously presented) provides the NAAQS within the SCAB.

Mobile source emissions are regulated in accordance with Title II provisions. These provisions require the use of cleaner burning gasoline and other cleaner burning fuels such as methanol and natural gas. Automobile manufacturers are also required to reduce tailpipe emissions of hydrocarbons and NO_X. NO_X is a collective term that includes all forms of NO_X which are emitted as byproducts of the combustion process.

2.8.2 CALIFORNIA REGULATIONS

CARB

The CARB, which became part of the CalEPA in 1991, is responsible for ensuring implementation of the California Clean Air Act (AB 2595), responding to the federal CAA, and for regulating emissions from consumer products and motor vehicles. AB 2595 mandates achievement of the maximum degree of emissions reductions possible from vehicular and other mobile sources in order to attain the state ambient air quality standards by the earliest practical date. The CARB established the CAAQS for all pollutants for which the federal government has NAAQS and, in addition, establishes standards for SO_4, visibility, hydrogen sulfide (H_2S), and vinyl chloride (C_2H_3Cl). However, at this time, H_2S and C_2H_3Cl are not measured at any monitoring stations in the SCAB because they are not considered to be a regional air quality problem. Generally, the CAAQS are more stringent than the NAAQS (17) (13).

Local air quality management districts, such as the SCAQMD, regulate air emissions from stationary sources such as commercial and industrial facilities. All air pollution control districts have been formally designated as attainment or non-attainment for each CAAQS.

Serious non-attainment areas are required to prepare Air Quality Management Plans (AQMP) that include specified emission reduction strategies in an effort to meet clean air goals. These plans are required to include:

- Application of Best Available Retrofit Control Technology to existing sources;
- Developing control programs for area sources (e.g., architectural coatings and solvents) and indirect sources (e.g. motor vehicle use generated by residential and commercial development);

- A District permitting system designed to allow no net increase in emissions from any new or modified permitted sources of emissions;
- Implementing reasonably available transportation control measures and assuring a substantial reduction in growth rate of vehicle trips and miles traveled;
- Significant use of low emissions vehicles by fleet operators;
- Sufficient control strategies to achieve a 5% or more annual reduction in emissions or 15% or more in a period of three years for ROGs, NO_X, CO and PM_{10}. However, air basins may use alternative emission reduction strategy that achieves a reduction of less than 5% per year under certain circumstances.

TITLE 24 ENERGY EFFICIENCY STANDARDS AND CALIFORNIA GREEN BUILDING STANDARDS

California Code of Regulations (CCR) Title 24 Part 6: California's Energy Efficiency Standards for Residential and Nonresidential Buildings, was first adopted in 1978 in response to a legislative mandate to reduce California's energy consumption. The standards are updated periodically to allow consideration and possible incorporation of new energy efficient technologies and methods. CCR, Title 24, Part 11: California Green Building Standards Code (CALGreen) is a comprehensive and uniform regulatory code for all residential, commercial, and school buildings that went in effect on January 1, 2011, and is administered by the California Building Standards Commission. CALGreen is updated on a regular basis, with the most recent approved update consisting of the 2019 California Green Building Code Standards that will be effective January 1, 2020. Local jurisdictions are permitted to adopt more stringent requirements, as state law provides methods for local enhancements. CALGreen recognizes that many jurisdictions have developed existing construction and demolition ordinances and defers to them as the ruling guidance provided, they establish a minimum 65% diversion requirement. The code also provides exemptions for areas not served by construction and demolition recycling infrastructure. The State Building Code provides the minimum standard that buildings must meet in order to be certified for occupancy, which is generally enforced by the local building official.

Energy efficient buildings require less electricity; therefore, increased energy efficiency reduces fossil fuel consumption and decreases greenhouse gas (GHG) emissions. The 2019 version of Title 24 was adopted by the California Energy Commission (CEC) and became effective on January 1, 2020.

The 2019 Title 24 standards will result in less energy use, thereby reducing air pollutant emissions associated with energy consumption in the SCAB and across the State of California. For example, the 2019 Title 24 standards will require solar photovoltaic systems for new homes, establish requirements for newly constructed healthcare facilities, encourage demand responsive technologies for residential buildings, and update indoor and outdoor lighting requirements for nonresidential buildings. The CEC anticipates that single-family homes built with the 2019 standards will use approximately 7% less energy compared to the residential homes built under the 2016 standards. Additionally, after implementation of solar photovoltaic systems, homes built under the 2019 standards will use about 53% less energy than homes built under the 2016 standards. Nonresidential buildings (such as the Project) will use approximately 30% less energy due to lighting upgrade requirements (18).

Because the Project will be constructed after January 1,2019, the 2019 CALGreen standards are applicable to the Project and require, among other items (19):

- Short-term bicycle parking. If the new project or an additional alteration is anticipated to generate visitor traffic, provide permanently anchored bicycle racks within 200 feet of the visitors' entrance, readily visible to passers-by, for 5% of new visitor motorized vehicle parking spaces being added, with a minimum of one two-bike capacity rack (5.106.4.1.1).
- Long-term bicycle parking. For new buildings with tenant spaces that have 10 or more tenant-occupants, provide secure bicycle parking for 5% of the tenant-occupant vehicular parking spaces with a minimum of one bicycle parking facility (5.106.4.1.2).
- Designated parking. In new projects or additions to alterations that add 10 or more vehicular parking spaces, provide designated parking for any combination of low-emitting, fuel-efficient and carpool/van pool vehicles as shown in Table 5.106.5.2 (5.106.5.2).
- Construction waste management. Recycle and/or salvage for reuse a minimum of 65% of the nonhazardous construction and demolition waste in accordance with Section 5.408.1.1. 5.405.1.2, or 5.408.1.3; or meet a local construction and demolition waste management ordinance, whichever is more stringent (5.408.1).
- Excavated soil and land clearing debris. 100% of trees, stumps, rocks and associated vegetation and soils resulting primarily from land clearing shall be reused or recycled. For a phased project, such material may be stockpiled on site until the storage site is developed (5.408.3).
- Recycling by Occupants. Provide readily accessible areas that serve the entire building and are identified for the depositing, storage and collection of non-hazardous materials for recycling, including (at a minimum) paper, corrugated cardboard, glass, plastics, organic waste, and metals or meet a lawfully enacted local recycling ordinance, if more restrictive (5.410.1).
- Water conserving plumbing fixtures and fittings. Plumbing fixtures (water closets and urinals) and fittings (faucets and showerheads) shall comply with the following:
  - Water Closets. The effective flush volume of all water closets shall not exceed 1.28 gallons per flush (5.303.3.1)
  - Urinals. The effective flush volume of wall-mounted urinals shall not exceed 0.125 gallons per flush (5.303.3.2.1). The effective flush volume of floor-mounted or other urinals shall not exceed 0.5 gallons per flush (5.303.3.2.2).
  - Showerheads. Single showerheads shall have a minimum flow rate of not more than 1.8 gallons per minute and 80 psi (5.303.3.3.1). When a shower is served by more than one showerhead, the combine flow rate of all showerheads and/or other shower outlets controlled by a single valve shall not exceed 1.8 gallons per minute at 80 psi (5.303.3.3.2).
  - Faucets and fountains. Nonresidential lavatory faucets shall have a maximum flow rate of note more than 0.5 gallons per minute at 60 psi (5.303.3.4.1). Kitchen faucets shall have a maximum flow rate of not more than 1.8 gallons per minute of 60 psi (5.303.3.4.2). Wash fountains shall have a maximum flow rate of not more than 1.8 gallons per minute (5.303.3.4.3). Metering faucets shall not deliver more than 0.20 gallons per cycle (5.303.3.4.4). Metering faucets for wash fountains shall have a maximum flow rate not more than 0.20 gallons per cycle (5.303.3.4.5).

- Outdoor portable water use in landscaped areas. Nonresidential developments shall comply with a local water efficient landscape ordinance or the current California Department of Water Resources' Model Water Efficient (MWELO), whichever is more stringent (5.304.1).
- Water meters. Separate submeters or metering devices shall be installed for new buildings or additions in excess of 50,000 sf or for excess consumption where any tenant within a new building or within an addition that is project to consume more than 1,000 gal/day (5.303.1.1 and 5.303.1.2).
- Outdoor water use in rehabilitated landscape projects equal or greater than 2,500 sf. Rehabilitated landscape projects with an aggregate landscape area equal to or greater than 2,500 sf requiring a building or landscape permit (5.304.3).
- Commissioning. For new buildings 10,000 sf and over, building commissioning shall be included in the design and construction processes of the building project to verify that the building systems and components meet the owner's or owner representative's project requirements (5.410.2).

2.8.3 AIR QUALITY MANAGEMENT PLANNING

Currently, the NAAQS and CAAQS are exceeded in most parts of the SCAB. In response, the SCAQMD has adopted a series of AQMPs to meet the state and federal ambient air quality standards (20). AQMPs are updated regularly in order to more effectively reduce emissions, accommodate growth, and to minimize any negative fiscal impacts of air pollution control on the economy. A detailed discussion on the AQMP and Project consistency with the AQMP is provided in Section 3.10.

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3 PROJECT AIR QUALITY IMPACT

3.1 INTRODUCTION

The Project has been evaluated to determine if it will violate an air quality standard, contribute to an existing or projected air quality violation, or determine if it will result in a cumulatively considerable net increase of a criteria pollutant for which the SCAB is non-attainment under an applicable NAAQS and CAAQS. Additionally, the Project has been evaluated to determine consistency with the applicable AQMP, exposure of sensitive receptors to substantial pollutant concentrations, and the impacts of odors. The significance of these potential impacts is described in the following section.

3.2 STANDARDS OF SIGNIFICANCE

The criteria used to determine the significance of potential Project-related air quality impacts are taken from the Initial Study Checklist in Appendix G of the State CEQA Guidelines (14 CCR §§15000, et seq.). Based on these thresholds, a project would result in a significant impact related to air quality if it would (1):

- Conflict with or obstruct implementation of the applicable air quality plan.
- Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is in non-attainment under an applicable federal or state ambient air quality standard.
- Expose sensitive receptors to substantial pollutant concentrations.
- Result in other emissions (such as those leading to odors) adversely affecting a substantial number of people. affecting a substantial number of people.

The SCAQMD has also developed regional significance thresholds for other regulated pollutants, as summarized at Table 3-1 (21). The SCAQMD's CEQA Air Quality Significance Thresholds (April 2019) indicate that any projects in the SCAB with daily emissions that exceed any of the indicated thresholds should be considered as having an individually and cumulatively significant air quality impact.

TABLE 3-1: MAXIMUM DAILY REGIONAL EMISSIONS THRESHOLDS

Pollutant	Construction Regional Thresholds	Operational Regional Thresholds
NO_X	100 lbs/day	55 lbs/day
VOC	75 lbs/day	55 lbs/day
PM_{10}	150 lbs/day	150 lbs/day
$PM_{2.5}$	55 lbs/day	55 lbs/day
SO_X	150 lbs/day	150 lbs/day
CO	550 lbs/day	550 lbs/day
Pb	3 lbs/day	3 lbs/day

lbs/day = Pounds Per Day

3.3 California Emissions Estimator Model™ Employed To Analyze Air Quality

Land uses such as the Project affect air quality through construction-source and operational-source emissions.

On October 17, 2017, the SCAQMD in conjunction with the California Air Pollution Control Officers Association (CAPCOA) and other California air districts, released the latest version of the California Emissions Estimator Model (CalEEMod) Version 2016.3.2. The purpose of this model is to calculate construction-source and operational-source criteria pollutant (VOCs, NO_X, SO_X, CO, PM_{10}, and $PM_{2.5}$) and GHG emissions from direct and indirect sources; and quantify applicable air quality and GHG reductions achieved from mitigation measures (22). Accordingly, the latest version of CalEEMod has been used for this Project to determine construction air quality emissions. Output from the model runs are provided in Appendices 3.1 through 3.8.

3.4 Regional Construction Emissions

As previously stated, the Project consists of the construction and operation of the following facilities:

Project Category 1: Well Development and Monitoring Devices

This Project Category includes the development of ASR, injection, pumping, groundwater level monitoring, and groundwater quality wells, associated well housing, as well as monitoring devices such as flow meters and extensometers. The proposed wells and monitoring devices will be installed throughout the Chino Basin.

Well development includes: 60 ASR wells, 10 wells relocated, 8 new wells to expand desalter capacity, modification of up to 5 wells, destruction and replacement of 5 wells for a total of 78 pumping wells. This category also includes the development of 100 monitoring wells, for a total of 178 wells, which serve the varying purposes listed above and outlined below. The monitoring devices proposed as part of the OBMPU include 300 flow meters and 3 extensometers.

Project Category 2: Conveyance Facilities and Ancillary Facilities

This category includes the construction of 550,000 LF of new pipelines, booster pump stations, reservoirs and minor appurtenances whose number, locations and capacities are presently unknown. The proposed conveyance facilities and ancillary facilities would be implemented throughout the entire Chino Basin.

Project Category 3: Storage Basins, Recharge Facilities, and Storage Bands

This Project Category includes the construction of 310 acres of new storage basins—several locations for which are within existing facilities, improvements to existing storage basin(s), 200 acres of flood MAR facilities, new MS4-compliance facilities, and expansion of the maximum storage space (safe storage capacity) to be used within the Chino Basin from 600,000 acre-feet (af) (through June 30, 2021) to between 700,000 af and 1,000,000 af going forward with various impacts that may result for each 100,000 af within this range of storage. The specific locations of the storage basins are described in the Project Description above; however, the locations of the flood MAR facilities and MS4 compliant projects are presently unknown.

PROJECT CATEGORY 4: DESALTERS AND WATER TREATMENT FACILITIES

The projects proposed under this category are: upgrades at Inland Empire Utilities Agency's (IEUA) existing Treatment Plants (discussed in IEUA's 2017 FMP PEIR), a new advanced water treatment plant, improvements to the WFA Agua de Lejos Treatment Plant, upgrades to the Chino Desalters, new groundwater treatment facilities at or near well sites and at regionally located sites, and improvements to existing groundwater treatment facilities.

Because few details are known at this time regarding construction of specific projects, it is assumed that construction any Project facilities may occur simultaneously. As a conservative measure, and in order to identify the maximum daily emissions, this AQIA assumes that the Project would construct the following features simultaneously:

PROJECT CATEGORY 1

- 20 monitoring wells
- 10 production wells
- 65,000 linear feet (LF) of associated conveyance pipeline

PROJECT CATEGORY 2

- 200,000 LF of conveyance pipeline

PROJECT CATEGORY 3

- One new storage reservoir on a 100-acre site
- 60,000 LF of associated conveyance pipeline

PROJECT CATEGORY 4

- One new water treatment facility on a 10-acre site
- One new regional water treatment facility on a 10-acre site
- 60,000 LF of associated conveyance pipeline

3.4.1 CONSTRUCTION ACTIVITIES

During construction activities associated with individual projects, emissions of VOCs, NO_X, SO_X, CO, PM_{10}, and $PM_{2.5}$ will likely be released through the burning of fossil fuel in construction equipment, grading fugitive dust, asphalt paving, and the application of architectural coatings during painting activity.

GRADING ACTIVITIES

Dust is typically a major concern during grading activities. Because such emissions are not amenable to collection and discharge through a controlled source, they are called "fugitive emissions". Fugitive dust emissions rates vary as a function of many parameters (soil silt, soil moisture, wind speed, area disturbed, number of vehicles, depth of disturbance or excavation, etc.). The CalEEMod model was utilized to calculate fugitive dust emissions resulting from this phase of activity. The Project is anticipated to include soil import and export within the Project site boundaries as a part of Project construction. Per the Project Description, it is anticipated that no more than 2 million cubic yards of material would be hauled off-site during the construction of the storage reservoirs. For purposes of analysis, and as a conservative measure, it is anticipated that 333,333 cubic yards of export will be required per storage reservoir. As such, the 333,333 cubic yards of export will be analyzed with the CalEEMod default hauling trip length of 20 miles.

CONSTRUCTION WORKER VEHICLE TRIPS

Construction emissions for construction worker vehicles traveling to and from the Project site, as well as vendor trips (construction materials delivered to the Project site) were estimated based on information from CalEEMod model defaults.

3.4.2 CONSTRUCTION DURATION

As previously stated, individual project-specific details are currently unknown. Based on information provided in the Project Description, construction activities for Project Categories 1 and 2 are expected to occur over a 12-month period while construction activities for Project Categories 3 and 4 will occur over an 18-month period. Construction duration utilized in the analysis represents a “worst-case” analysis scenario should construction occur any time after the respective dates since emission factors for construction decrease as the analysis year increases.

3.4.3 CONSTRUCTION EQUIPMENT

Associated equipment was based on information provided by the Project Description. Please refer to specific detailed modeling inputs/outputs contained in Appendices 3.1 through 3.4 of this AQIA. A detailed summary of construction equipment is provided at Table 3-2.

TABLE 3-2: CONSTRUCTION EQUIPMENT ASSUMPTIONS (1 OF 2)

Equipment	CalEEMod Equivalent	Amount	Hours Per Day
Project Category 1			
Bore/Drill Rigs	Bore/Drill Rigs	1	8
Cement Trucks	Off-Highway Trucks	1	8
Project Category 2			
Backhoes	Tractor/Loaders/Backhoes	2	8
Dump Trucks	Off-Highway Trucks	2	8
Excavators	Excavators	2	8
Pavers	Pavers	2	8
Rollers	Rollers	2	8
Water Trucks	Off-Highway Trucks	20	8

TABLE 3-2: CONSTRUCTION EQUIPMENT ASSUMPTIONS (2 OF 2)

Equipment		Amount	Hours Per Day
Project Category 3			
Bulldozers	Rubber Tired Dozers	2	8
Dump Trucks	Off-Highway Trucks	4	8
Excavators	Excavators	2	8
Loaders	Tractors/Loaders/Backhoes	2	8
Scrapers	Scrapers	7	8
Water Trucks	Off-Highway Trucks	2	
Project Category 4			
Backhoes	Tractors/Loaders/Backhoes	3	8
Compactors	Plate Compactors	3	8
Concrete Trucks	Off-Highway Trucks	3	8
Cranes	Cranes	3	8
Delivery Trucks	Off-Highway Trucks	3	8
Dump Trucks	Off-Highway Trucks	3	8
Graders	Graders	3	8
Loaders	Tractors/Loaders/Backhoes	3	8
Other Trucks	Off-Highway Trucks	3	8
Water Trucks	Off-Highway Trucks	3	8

Source: Construction equipment based on information provided by the Project Description.

It is assumed that the construction of analyzed features would use the equipment listed in Table 3-3 simultaneously. Furthermore, the construction equipment provided in Table 3-3 represent a "worst-case" (i.e. overestimation) of actual construction equipment that may likely be used during construction activities.

3.4.4 REGIONAL CONSTRUCTION EMISSIONS SUMMARY

IMPACTS WITHOUT MITIGATION

The estimated maximum daily construction emissions without mitigation are summarized on Table 3-3. Detailed construction model outputs are presented in Appendices 3.1, 3.3, 3.5, and 3.7. Under the assumed scenarios, emissions resulting from the Project construction would exceed criteria pollutant thresholds established by the SCAQMD for emissions of NO_X.

TABLE 3-3: OVERALL CONSTRUCTION EMISSIONS SUMMARY – WITHOUT MITIGATION

Year	Emissions (lbs/day)					
	VOC	NO_X	CO	SO_X	PM_{10}	$PM_{2.5}$
Summer						
Project Category 1	1.24	16.53	8.31	0.07	2.14	0.78
Project Category 2	15.56	138.27	104.19	0.35	7.00	5.25
Project Category 3	13.21	138.33	90.88	0.23	11.56	7.93
Project Category 4	12.52	115.57	80.14	0.27	6.70	4.54
Total	42.52	408.70	283.51	0.92	27.40	18.50
Winter						
Project Category 1	1.25	16.75	8.23	0.07	2.14	0.78
Project Category 2	15.59	138.38	103.65	0.35	7.00	5.25
Project Category 3	13.21	138.37	90.77	0.23	11.56	7.93
Project Category 4	12.54	115.66	79.54	0.27	6.70	4.54
Total	42.58	409.16	282.18	0.92	27.40	18.50
Maximum Daily Emissions	**42.58**	**409.16**	**283.51**	**0.92**	**27.40**	**18.50**
SCAQMD Regional Threshold	75	100	550	150	150	55
Threshold Exceeded?	**NO**	**YES**	**NO**	**NO**	**NO**	**NO**

Source: The unmitigated CalEEMod regional construction-source emissions are presented in Appendices 3.1, 3.3, 3.5, and 3.7.

IMPACTS WITH MITIGATION

The estimated maximum daily construction emissions with mitigation are summarized on Table 3-4. Detailed construction model outputs are presented in Appendices 3.2, 3.4, 3.6, and 3.8. MM AQ-1 is recommended to reduce the severity of the impacts. After implementation of MM AQ-1, Project construction-source emissions of NO_X would not exceed the applicable SCAQMD thresholds for any criteria pollutant. Thus, a less than significant impact would occur for Project-related construction-source emissions.

TABLE 3-4: OVERALL CONSTRUCTION EMISSIONS SUMMARY – WITH MITIGATION

Year	Emissions (lbs/day)					
	VOC	NO_X	CO	SO_X	PM_{10}	$PM_{2.5}$
Summer						
Project Category 1	0.65	9.45	12.84	0.07	1.82	0.54
Project Category 2	5.40	33.65	156.30	0.35	2.95	1.62
Project Category 3	3.11	16.74	104.41	0.23	4.71	2.46
Project Category 4	4.42	27.63	117.81	0.27	3.10	1.49
Total	13.58	87.47	391.36	0.92	12.58	6.11
Winter						
Project Category 1	0.66	9.67	12.77	0.07	1.82	0.54
Project Category 2	5.42	33.77	155.76	0.35	2.95	1.62
Project Category 3	3.11	16.78	104.30	0.23	4.71	2.46
Project Category 4	4.44	27.72	117.20	0.27	3.10	1.49
Total	13.64	87.93	390.03	0.92	12.58	6.11
Maximum Daily Emissions	**13.64**	**87.93**	**391.36**	**0.92**	**12.58**	**6.11**
SCAQMD Regional Threshold	75	100	550	150	150	55
Threshold Exceeded?	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**

Source: The mitigated CalEEMod regional construction-source emissions are presented in Appendices 3.2, 3.4, 3.6, and 3.8.

3.5 REGIONAL OPERATIONAL EMISSIONS

Long-term air quality impacts occur from mobile source emission generated from project-related traffic and from stationary source emissions generated from natural gas. The proposed Project primarily involves construction activity. For on-going operations, mobile emissions would be generated by the motor vehicles traveling to and from the Project sites during on-going maintenance. However, the Project would generate a nominal number of traffic trips for periodic maintenance and inspections and would not result in any substantive new long-term emissions sources. Stationary area source emissions are typically generated by the consumption of natural gas for space and water heating devices and the use of consumer products. As this Project involves the construction of wells, conveyance facilities and ancillary facilities, storage basins, recharge facilities, storage bands, desalters and water treatment facilities, and associated improvements, heating and consumer products would not be used. Stationary energy emissions would result from energy consumption associated with the proposed Project. However, the proposed Project may include the use of an emergency diesel generator, allowing the pump station to run on backup power in case of emergency. If a backup generator is installed, the lead agency would be required to obtain the applicable permits from SCAQMD for operation of such equipment. The SCAQMD is responsible for issuing permits for the operation of stationary sources in order to reduce air pollution, and to attain and maintain the national and California ambient air quality standards in the SCAB. The Project would not result in a cumulatively considerable net increase of any criteria pollutant for which the Project region is non-attainment. Backup generators would be used only in emergency situations and for routine testing and maintenance purposes and would not contribute a substantial amount of emissions capable of exceeding SCAQMD thresholds. As project operations would not exceed SCAQMD thresholds, the project would not violate an air quality standard or contribute to an existing violation. Therefore, project operations would not result in a cumulatively considerable net increase of any criteria pollutant and impacts would be less than significant.

3.6 LOCALIZED SIGNIFICANCE

3.6.1 BACKGROUND ON LOCALIZED SIGNIFICANCE THRESHOLD (LST) DEVELOPMENT

The analysis makes use of methodology included in the SCAQMD *Final Localized Significance Threshold Methodology* (LST Methodology) (23). The SCAQMD has established that impacts to air quality are significant if there is a potential to contribute or cause localized exceedances of the NAAQS and CAAQS. Collectively, these are referred to as Localized Significance Thresholds (LSTs).

The SCAQMD established LSTs in response to the SCAQMD Governing Board's Environmental Justice Initiative I-4[3]. LSTs represent the maximum emissions from a project that will not cause or contribute to an exceedance of the most stringent applicable federal or state ambient air quality standard at the nearest residence or sensitive receptor. The SCAQMD states that lead agencies can use the LSTs as another indicator of significance in its air quality impact analyses.

LSTs were developed in response to environmental justice and health concerns raised by the public regarding exposure of individuals to criteria pollutants in local communities. To address the issue of localized significance, the SCAQMD adopted LSTs that show whether a project would cause or contribute to localized air quality impacts and thereby cause or contribute to potential localized adverse health effects. The analysis makes use of methodology included in the *LST Methodology* (24).

3.6.2 APPLICABILITY OF LSTS FOR THE PROJECT

For this Project, as the majority of the Project is located within the Southwest San Bernardino Valley, SRA 33 will be used for the LST analysis. LSTs apply to CO, NO_2, PM_{10}, and $PM_{2.5}$. The SCAQMD produced look-up tables for projects less than or equal to 5 acres in size.

In order to determine the appropriate methodology for determining localized impacts that could occur as a result of Project-related construction, the following process is undertaken:

- CalEEMod is utilized to determine the maximum daily on-site emissions that will occur during construction activity.

[3] The purpose of SCAQMD's Environmental Justice program is to ensure that everyone has the right to equal protection from air pollution and fair access to the decision-making process that works to improve the quality of air within their communities. Further, the SCAQMD defines Environmental Justice as "…equitable environmental policymaking and enforcement to protect the health of all residents, regardless of age, culture, ethnicity, gender, race, socioeconomic status, or geographic location, from the health effects of air pollution."

- The SCAQMD's *Fact Sheet for Applying CalEEMod to Localized Significance Thresholds* and CalEEMod User's Guide *Appendix A: Calculation Details for CalEEMod* is used to determine the maximum site acreage that is actively disturbed based on the construction equipment fleet and equipment hours as estimated in CalEEMod (25) (26).
- If the total acreage disturbed is less than or equal to five acres per day, then the SCAQMD's screening look-up tables are utilized to determine if a Project has the potential to result in a significant impact. The look-up tables establish a maximum daily emissions threshold in lbs/day that can be compared to CalEEMod outputs.
- If the total acreage disturbed is greater than five acres per day, then LST impacts are appropriately evaluated through dispersion modeling.
- The LST methodology presents mass emission rates for each SRA, project sizes of 1, 2, and 5 acres, and nearest receptor distances of 25, 50, 100, 200, and 500 meters. For project sizes between the values given, or with receptors at distances between the given receptors, the methodology uses linear interpolation to determine the thresholds.

3.6.3 EMISSIONS CONSIDERED

SCAQMD's Methodology clearly states that "off-site mobile emissions from the Project should not be included in the emissions compared to LSTs (23)." Therefore, for purposes of the construction LST analysis, only emissions included in the CalEEMod "on-site" emissions outputs were considered.

3.6.4 MAXIMUM DAILY DISTURBED-ACREAGE

Based on information provided in the Project Description, the average disturbance for Project Category 1 construction activities, it is anticipated to be half an acre. For Project Category 2 activities, it is anticipated that roughly half an acre would be actively disturbed on a given day. For Project Category 3 construction activities, it is estimated that no more than 2 acres will be actively disturbed. Lastly, during Project Category 4 activities, the maximum area expected to be disturbed during construction is 2 acres.

3.6.5 SENSITIVE RECEPTORS

As previously stated, LSTs represent the maximum emissions from a project that will not cause or contribute to an exceedance of the most stringent applicable NAAQS and CAAQS at the nearest residence or sensitive receptor. Receptor locations are off-site locations where individuals may be exposed to emissions from Project activities.

Some people are especially sensitive to air pollution and are given special consideration when evaluating air quality impacts from projects. These groups of people include children, the elderly, individuals with pre-existing respiratory or cardiovascular illness, and athletes and others who engage in frequent exercise. Structures that house these persons or places where they gather to exercise are defined as "sensitive receptors". These structures typically include residences, hotels, hospitals, etc. as they are also known to be locations where an individual can remain for 24 hours. Consistent with the LST Methodology, the nearest land use where an individual could remain for 24 hours to the Project site (in this case the nearest residential land use) has been used to determine construction and operational air quality impacts for emissions of PM_{10} and $PM_{2.5}$, since PM_{10} and $PM_{2.5}$ thresholds are based on a 24 hour averaging time.

Commercial and industrial facilities are not included in the definition of sensitive receptor because employees and patrons do not typically remain onsite for a full 24 hours but are typically onsite for eight hours or less. The LST Methodology explicitly states that "*LSTs based on shorter averaging periods, such as the NO_2 and CO LSTs, could also be applied to receptors such as industrial or commercial facilities since it is reasonable to assume that a worker at these sites could be present for periods of one to eight hours* (23)." For purposes of analysis, if an industrial/commercial use is located at a closer distance to the Project site than the nearest residential use, the nearest industrial/commercial use will be utilized to determine construction and operational LST air impacts for emissions of NO_2 and CO an individual could be present at these sites for periods of one to eight hours.

PROJECT-RELATED SENSITIVE RECEPTORS

The SCAQMD recommends that the nearest sensitive receptor be considered when determining the Project's potential to cause an individual and cumulatively significant impact. As the location of many of these project sites are unknown, it is assumed that the nearest sensitive receptor could potentially be located immediately adjacent to construction activities. It should be noted that the LST Methodology also explicitly states that "*It is possible that a project may have receptors closer than 25 meters. Projects with boundaries located closer than 25 meters to the nearest receptor should use the LSTs for receptors located at 25 meters* (23)." Consistent with the SCAQMD's LST Methodology, a 25-meter receptor distance is utilized in this analysis and provide for a conservative i.e. "health protective" standard of care.

3.7 LOCALIZED CONSTRUCTION-SOURCE EMISSIONS

3.7.1 LOCALIZED THRESHOLDS FOR CONSTRUCTION ACTIVITY

Since the total acreage disturbed is less than five acres per day for construction activities, the SCAQMD's screening look-up tables are utilized in determining impacts. It should be noted that since the look-up tables identifies thresholds at only 1 acre, 2 acres, and 5 acres, linear regression has been utilized to determine localized significance thresholds. Consistent with SCAQMD guidance, the thresholds presented in Table 3-5 were calculated by interpolating the threshold values for the Project's disturbed acreage.

TABLE 3-5: MAXIMUM DAILY LOCALIZED EMISSIONS THRESHOLDS (1 OF 2)

Pollutant	Construction Localized Thresholds
Project Category 1	
NO_X	118 lbs/day
CO	863 lbs/day
PM_{10}	5 lbs/day
$PM_{2.5}$	4 lbs/day

TABLE 3-5: MAXIMUM DAILY LOCALIZED EMISSIONS THRESHOLDS (2 OF 2)

Pollutant	Construction Localized Thresholds
Project Category 2	
NO_X	118 lbs/day
CO	863 lbs/day
PM_{10}	5 lbs/day
$PM_{2.5}$	4 lbs/day
Project Category 3	
NO_X	170 lbs/day
CO	1,232 lbs/day
PM_{10}	5 lbs/day
$PM_{2.5}$	4 lbs/day
Project Category 4	
NO_X	170 lbs/day
CO	1,232 lbs/day
PM_{10}	5 lbs/day
$PM_{2.5}$	4 lbs/day

Source: Localized Thresholds presented in this table are based on the SCAQMD Final Localized Significance Threshold Methodology, July 2008

3.7.2 CONSTRUCTION-SOURCE LOCALIZED EMISSIONS

IMPACTS WITHOUT MITIGATION

Table 3-6 identifies the localized impacts at the nearest receptor location in the vicinity of the Project. Without mitigation, localized construction emissions would exceed the applicable SCAQMD LSTs for emissions of PM_{10}. Outputs from the model runs for unmitigated construction LSTs are provided in Appendix 3.1.

TABLE 3-6: LOCALIZED SIGNIFICANCE SUMMARY OF CONSTRUCTION – WITHOUT MITIGATION (1 OF 2)

On-Site Construction Emissions	Emissions (lbs/day)			
	NO_X	CO	PM_{10}	$PM_{2.5}$
Project Category 1				
Maximum Daily Emissions	**8.29**	**5.68**	**0.49**	**0.28**
SCAQMD Localized Threshold	118	863	5	4
Threshold Exceeded?	**NO**	**NO**	**NO**	**NO**

TABLE 3-6: LOCALIZED SIGNIFICANCE SUMMARY OF CONSTRUCTION – WITHOUT MITIGATION (2 OF 2)

On-Site Construction Emissions	Emissions (lbs/day)			
	NO_X	CO	PM_{10}	$PM_{2.5}$
Project Category 2				
Maximum Daily Emissions	**133.40**	**100.22**	**5.39**	**4.79**
SCAQMD Localized Threshold	118	863	5	4
Threshold Exceeded?	**YES**	**NO**	**YES**	**YES**
Project Category 3				
Maximum Daily Emissions	**136.70**	**89.91**	**11.13**	**7.81**
SCAQMD Localized Threshold	170	1,232	5	4
Threshold Exceeded?	**NO**	**NO**	**YES**	**YES**
Project Category 4				
Maximum Daily Emissions	**896.04**	**76.21**	**5.21**	**4.13**
SCAQMD Localized Threshold	170	1,232	5	4
Threshold Exceeded?	**YES**	**NO**	**YES**	**YES**

Source: CalEEMod localized construction-source emissions are presented in Appendix 3.1.

IMPACTS WITH MITIGATION

Table 3-7 identifies mitigated localized impacts at the receptors nearest the Project site. After implementation of mitigation measure (MM AQ-1), construction-source emissions would not exceed the applicable SCAQMD LSTs thresholds and would be less-than-significant. Outputs from the model runs for mitigated localized construction-source emissions are provided in Appendix 3.2.

TABLE 3-7: LOCALIZED SIGNIFICANCE SUMMARY OF CONSTRUCTION – WITH MITIGATION (1 OF2)

On-Site Construction Emissions	Emissions (lbs/day)			
	NO_X	CO	PM_{10}	$PM_{2.5}$
Project Category 1				
Maximum Daily Emissions	**1.21**	**10.21**	**0.18**	**0.05**
SCAQMD Localized Threshold	118	863	5	4
Threshold Exceeded?	**NO**	**NO**	**NO**	**NO**
Project Category 2				
Maximum Daily Emissions	**28.79**	**152.33**	**1.34**	**1.16**
SCAQMD Localized Threshold	118	863	5	4
Threshold Exceeded?	**NO**	**NO**	**NO**	**NO**

TABLE 3-7: LOCALIZED SIGNIFICANCE SUMMARY OF CONSTRUCTION – WITH MITIGATION (2 OF2)

On-Site Construction Emissions	Emissions (lbs/day)			
	NO_X	CO	PM_{10}	$PM_{2.5}$
Project Category 3				
Maximum Daily Emissions	**15.11**	**103.43**	**4.27**	**2.34**
SCAQMD Localized Threshold	170	1,232	5	4
Threshold Exceeded?	**NO**	**NO**	**NO**	**NO**
Project Category 4				
Maximum Daily Emissions	**23.91**	**113.88**	**1.61**	**1.07**
SCAQMD Localized Threshold	170	1,232	5	4
Threshold Exceeded?	**NO**	**NO**	**NO**	**NO**

Source: CalEEMod localized construction-source emissions are presented in Appendix 3.2.

3.8 Localized Operational-Source Emissions

According to SCAQMD localized significance threshold methodology, LSTs would apply to the operational phase of a proposed project if the project includes stationary sources or attracts mobile sources that may spend extended periods queuing and idling at the site (e.g., warehouse or transfer facilities). As previously discussed, the Project would generate a nominal number of traffic trips in the context of on-going maintenance resulting in a negligible amount of new mobile source emissions. Additionally, all pumps associated with the Project are assumed to be electrically powered and would not directly generate air emissions. However, the proposed Project may include the use of an emergency diesel generators, allowing pump stations to run on backup power in case of emergency. If backup generator would be installed, the lead agency would be required to obtain the applicable permits from SCAQMD for operation of such equipment. The SCAQMD is responsible for issuing permits for the operation of stationary sources in order to reduce air pollution, and to attain and maintain the national and California ambient air quality standards in the SCAB. Upon compliance with SCAQMD permitting procedures, localized emissions from any potential diesel generator would not result in substantial pollutant concentrations capable of exceeding operational LST thresholds. Therefore, the Project would not expose sensitive receptors to substantial pollutant concentrations and impacts would be less than significant.

3.9 CO "Hot Spot" Analysis

As discussed below, the Project would not result in potentially adverse CO concentrations or "hot spots." Further, detailed modeling of Project-specific CO "hot spots" is not needed to reach this conclusion. An adverse CO concentration, known as a "hot spot", would occur if an exceedance of the state one-hour standard of 20 ppm or the eight-hour standard of 9 ppm were to occur. At the time of the 1993 Handbook, the SCAB was designated nonattainment under the CAAQS and NAAQS for CO (27).

It has long been recognized that CO hotspots are caused by vehicular emissions, primarily when idling at congested intersections. In response, vehicle emissions standards have become increasingly stringent in the last twenty years. Currently, the allowable CO emissions standard in California is a maximum of 3.4 grams/mile for passenger cars (there are requirements for certain vehicles that are more stringent). With the turnover of older vehicles, introduction of cleaner fuels, and implementation of increasingly sophisticated and efficient emissions control technologies, CO concentration in the SCAB is now designated as attainment, as previously noted in Table 2-3. Also, CO concentrations in the Project vicinity have steadily declined. To establish a more accurate record of baseline CO concentrations affecting the SCAB, a CO "hot spot" analysis was conducted in 2003 for four busy intersections in Los Angeles at the peak morning and afternoon time periods. This "hot spot" analysis did not predict any violation of CO standards, as shown on Table 3-8.

TABLE 3-8: CO MODEL RESULTS

Intersection Location	CO Concentrations (ppm)		
	Morning 1-hour	Afternoon 1-hour	8-hour
Wilshire Boulevard/Veteran Avenue	4.6	3.5	3.7
Sunset Boulevard/Highland Avenue	4	4.5	3.5
La Cienega Boulevard/Century Boulevard	3.7	3.1	5.2
Long Beach Boulevard/Imperial Highway	3	3.1	8.4

Source: 2003 AQMP, Appendix V: Modeling and Attainment Demonstrations
Notes: Federal 1-hour standard is 35 ppm and the deferral 8-hour standard is 9.0 ppm.

Based on the SCAQMD's 2003 AQMP and the 1992 Federal Attainment Plan for Carbon Monoxide (1992 CO Plan), peak CO concentrations in the SCAB were a result of unusual meteorological and topographical conditions and not a result of traffic volumes and congestion at a particular intersection. As evidence of this, for example, 8.4 ppm CO concentration measured at the Long Beach Blvd. and Imperial Hwy. intersection (highest CO generating intersection within the "hot spot" analysis), only 0.7 ppm was attributable to the traffic volumes and congestion at this intersection; the remaining 7.7 ppm were due to the ambient air measurements at the time the 2003 AQMP was prepared (27). Therefore, even if the traffic volumes for the proposed Project were double or even triple of the traffic volumes generated at the Long Beach Blvd. and Imperial Hwy. intersection, coupled with the on-going improvements in ambient air quality, the Project would not be capable of resulting in a CO "hot spot" at any study area intersections.

Similar considerations are also employed by other Air Districts when evaluating potential CO concentration impacts. More specifically, the Bay Area Air Quality Management District (BAAQMD) concludes that under existing and future vehicle emission rates, a given project would have to increase traffic volumes at a single intersection by more than 44,000 vehicles per hour (vph)—or 24,000 vph where vertical and/or horizontal air does not mix—in order to generate a significant CO impact (28).

Traffic volumes generating the CO concentrations for the "hot spot" analysis, shown on Table 3-9. The busiest intersection evaluated was that at Wilshire Blvd. and Veteran Ave., which has a daily traffic volume of approximately 100,000 vph. The 2003 AQMP estimated that the 1-hour concentration for this intersection was 4.6 ppm; this indicates that, should the daily traffic volume increase four times to 400,000 vehicles per day, CO concentrations (4.6 ppm x 4= 18.4 ppm) would still not likely exceed the most stringent 1-hour CO standard (20.0 ppm).[4] At buildout of the Project, the highest daily traffic volumes generated at the roadways within the vicinity of the Project are expected to generate less than the highest daily traffic volumes generated at the busiest intersection in the CO "hot spot" analysis. As such, the Project would not likely exceed the most stringent 1-hour CO standard.

TABLE 3-9: TRAFFIC VOLUMES

Intersection Location	Peak Traffic Volumes (vph)				
	Eastbound (AM/PM)	Westbound (AM/PM)	Southbound (AM/PM)	Northbound (AM/PM)	Total (AM/PM)
Wilshire Boulevard/Veteran Avenue	4,954/2,069	1,830/3,317	721/1,400	560/933	8,062/7,719
Sunset Boulevard/Highland Avenue	1,417/1,764	1,342/1,540	2,304/1,832	1,551/2,238	6,614/5,374
La Cienega Boulevard/Century Boulevard	2,540/2,243	1,890/2,728	1,384/2,029	821/1,674	6,634/8,674
Long Beach Boulevard/Imperial Highway	1,217/2,020	1,760/1,400	479/944	756/1,150	4,212/5,514

Source: 2003 AQMP

3.10 AIR QUALITY MANAGEMENT PLANNING

The Project site is located within the SCAB, which is characterized by relatively poor air quality. The SCAQMD has jurisdiction over an approximately 10,743 square-mile area consisting of the four-county Basin and the Los Angeles County and Riverside County portions of what use to be referred to as the Southeast Desert Air Basin. In these areas, the SCAQMD is principally responsible for air pollution control, and works directly with the Southern California Association of Governments (SCAG), county transportation commissions, local governments, as well as state and federal agencies to reduce emissions from stationary, mobile, and indirect sources to meet state and federal ambient air quality standards.

Currently, these state and federal air quality standards are exceeded in most parts of the SCAB. In response, the SCAQMD has adopted a series of AQMPs to meet the state and federal ambient air quality standards. AQMPs are updated regularly in order to more effectively reduce emissions, accommodate growth, and to minimize any negative fiscal impacts of air pollution control on the economy.

In March 2017, the SCAQMD released the Final 2016 AQMP. The 2016 AQMP continues to evaluate current integrated strategies and control measures to meet the NAAQS, as well as, explore new and innovative methods to reach its goals. Some of these approaches include utilizing incentive programs, recognizing existing co-benefit programs from other sectors, and

4 Based on the ratio of the CO standard (20.0 ppm) and the modeled value (4.6 ppm).

developing a strategy with fair-share reductions at the federal, state, and local levels (29). Similar to the 2012 AQMP, the 2016 AQMP incorporates scientific and technological information and planning assumptions, including the 2016 Regional Transportation Plan/Sustainable Communities Strategies (RTP/SCS), a planning document that supports the integration of land use and transportation to help the region meet the CAA requirements (30). The Project's consistency with the AQMP will be determined using the 2016 AQMP as discussed below.

Criteria for determining consistency with the AQMP are defined in Chapter 12, Section 12.2 and Section 12.3 of the SCAQMD's CEQA Air Quality Handbook (1993) (31). These indicators are discussed below:

3.10.1 Consistency Criterion No. 1

The proposed Project will not result in an increase in the frequency or severity of existing air quality violations or cause or contribute to new violations or delay the timely attainment of air quality standards or the interim emissions reductions specified in the AQMP.

The violations that Consistency Criterion No. 1 refers to are the CAAQS and NAAQS. CAAQS and NAAQS violations would occur if regional or localized significance thresholds were exceeded.

Construction Impacts – Consistency Criterion 1

The violations that Consistency Criterion No. 1 refers to are the CAAQS and NAAQS. CAAQS and NAAQS violations would occur if localized or regional significance thresholds were exceeded. The Project would not exceed the applicable LST thresholds or regional significance thresholds for construction activity after implementation of applicable mitigation measures. Therefore, the Project would not conflict with the AQMP according to this criterion.

On the basis of the preceding discussion, the Project would not conflict with the AQMP according to this criterion.

3.10.2 Consistency Criterion No. 2

The Project will not exceed the assumptions in the AQMP based on the years of Project build-out phase.

The 2016 AQMP demonstrates that the applicable ambient air quality standards can be achieved within the timeframes required under federal law. Growth projections from local general plans adopted by counties in the district are provided to the SCAG, which develops regional growth forecasts, which are then used to develop future air quality forecasts for the AQMP. Development consistent with the growth projections in Chino Basin Watermaster General Plan is considered to be consistent with the AQMP.

Construction Impacts – Consistency Criterion 2

Peak day emissions generated by construction activities are largely independent of land use assignments, but rather are a function of development scope and maximum area of disturbance. Irrespective of the site's land use designation, development of the site to its maximum potential would likely occur, with disturbance of the entire site occurring during construction activities.

On the basis of the preceding discussion, the Project is determined to be consistent with the second criterion.

AQMP CONSISTENCY CONCLUSION

The Project would not result in or cause NAAQS or CAAQS violations. The Project's does not propose a land use development but rather involves pump station, well construction, monitoring and associated improvements. The Project is therefore considered to be consistent with the AQMP.

3.11 POTENTIAL IMPACTS TO SENSITIVE RECEPTORS

The potential impact of Project-generated air pollutant emissions at sensitive receptors has also been considered. Sensitive receptors can include uses such as long-term health care facilities, rehabilitation centers, and retirement homes. Residences, schools, playgrounds, childcare centers, and athletic facilities can also be considered as sensitive receptors.

Results of the LST analysis indicate that, the Project would not exceed the SCAQMD localized significance thresholds during construction. Therefore, sensitive receptors would not be exposed to substantial pollutant concentrations during Project construction.

Results of the LST analysis indicate that the Project would not exceed the SCAQMD localized significance thresholds during construction activity. Further Project traffic would not create or result in a CO "hotspot." Therefore, sensitive receptors would not be exposed to substantial pollutant concentrations as the result of Project construction.

3.12 ODORS

The potential for the Project to generate objectionable odors has also been considered. Land uses generally associated with odor complaints include:

- Agricultural uses (livestock and farming)
- Wastewater treatment plants
- Food processing plants
- Chemical plants
- Composting operations
- Refineries
- Landfills
- Dairies
- Fiberglass molding facilities

The Project does not contain land uses typically associated with emitting objectionable odors. Potential odor sources associated with the proposed Project may result from construction equipment exhaust during construction activities and the temporary storage of typical solid waste (refuse) associated with the proposed Project's uses. Standard construction requirements would minimize odor impacts from construction. The construction odor emissions would be temporary, short-term, and intermittent in nature and would cease upon completion of the respective phase of construction and is thus considered less than significant. It is expected that Project-generated refuse would be stored in covered containers and removed at regular intervals in compliance with the lead agency's solid waste regulations. The Project would be required to comply with SCAQMD Rule 402 to prevent occurrences of public nuisances. Therefore, odors associated with the proposed Project construction and operations would be less than significant and no mitigation is required (32).

3.13 CUMULATIVE IMPACTS

As previously shown in Table 2-3, the CAAQS designate the Project site as nonattainment for O_3 PM_{10}, and $PM_{2.5}$ while the NAAQS designates the Project site as nonattainment for O_3 and $PM_{2.5}$.

The AQMD has published a report on how to address cumulative impacts from air pollution: *White Paper on Potential Control Strategies to Address Cumulative Impacts from Air Pollution* (33). In this report the AQMD clearly states (Page D-3):

> *"…the AQMD uses the same significance thresholds for project specific and cumulative impacts for all environmental topics analyzed in an Environmental Assessment or Environmental Impact Report (EIR). The only case where the significance thresholds for project specific and cumulative impacts differ is the Hazard Index (HI) significance threshold for TAC emissions. The project specific (project increment) significance threshold is HI > 1.0 while the cumulative (facility-wide) is HI > 3.0. It should be noted that the HI is only one of three TAC emission significance thresholds considered (when applicable) in a CEQA analysis. The other two are the maximum individual cancer risk (MICR) and the cancer burden, both of which use the same significance thresholds (MICR of 10 in 1 million and cancer burden of 0.5) for project specific and cumulative impacts.*
>
> *Projects that exceed the project-specific significance thresholds are considered by the SCAQMD to be cumulatively considerable. This is the reason project-specific and cumulative significance thresholds are the same. Conversely, projects that do not exceed the project-specific thresholds are generally not considered to be cumulatively significant."*

Therefore, this analysis assumes that individual projects that do not generate operational or construction emissions that exceed the SCAQMD's recommended daily thresholds for project-specific impacts would also not cause a cumulatively considerable increase in emissions for those pollutants for which the Basin is in nonattainment, and, therefore, would not be considered to have a significant, adverse air quality impact. Alternatively, individual project-related construction and operational emissions that exceed SCAQMD thresholds for project-specific impacts would be considered cumulatively considerable.

CONSTRUCTION IMPACTS

The Project-specific evaluation of emissions presented in the preceding analysis demonstrates that Project construction-source air pollutant emissions would not result in exceedances of regional thresholds after implementation of MM AQ-1 and MM AQ-2. Therefore, Project construction-source emissions would be considered less than significant on a project-specific and cumulative basis.

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5 CERTIFICATIONS

The contents of this air study report represent an accurate depiction of the environmental impacts associated with the proposed 2020 Optimum Basin Management Program Update. The information contained in this air quality impact assessment report is based on the best available data at the time of preparation. If you have any questions, please contact me directly at (949) 336-5987.

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AEP – Association of Environmental Planners
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PROFESSIONAL CERTIFICATIONS

Environmental Site Assessment – American Society for Testing and Materials • June 2013
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APPENDIX 2.1:

STATE/FEDERAL ATTAINMENT STATUS OF CRITERIA POLLUTANTS

APPENDIX C

MAPS AND TABLES OF AREA DESIGNATIONS FOR STATE AND NATIONAL AMBIENT AIR QUALITY STANDARDS

APPENDIX C

MAPS AND TABLES OF AREA DESIGNATIONS FOR STATE AND NATIONAL AMBIENT AIR QUALITY STANDARDS

This attachment fulfills the requirement of Health and Safety Code section 40718 for CARB to publish maps that identify areas where one or more violations of any State ambient air quality standard (State standard) or national ambient air quality standard (national standard) have been measured. The national standards are those promulgated under section 109 of the federal Clean Air Act (42 U.S.C. 7409).

This attachment is divided into three parts. The first part comprises a table showing the levels, averaging times, and measurement methods for each of the State and national standards. This is followed by a section containing maps and tables showing the area designations for each pollutant for which there is a State standard in the California Code of Regulations, title 17, section 70200. The last section contains maps and tables showing the most current area designations for the national standards.

Ambient Air Quality Standards

(Updated 5/4/16)

Pollutant	Averaging Time	California Standards[1]		National Standards[2]		
		Concentration[3]	Method[4]	Primary[3,5]	Secondary[3,6]	Method[7]
Ozone (O_3)[8]	1 Hour	0.09 ppm (180 µg/m^3)	Ultraviolet Photometry	—	Same as Primary Standard	Ultraviolet Photometry
	8 Hour	0.070 ppm (137 µg/m^3)		0.070 ppm (137 µg/m^3)		
Respirable Particulate Matter (PM10)[9]	24 Hour	50 µg/m^3	Gravimetric or Beta Attenuation	150 µg/m^3	Same as Primary Standard	Inertial Separation and Gravimetric Analysis
	Annual Arithmetic Mean	20 µg/m^3		—		
Fine Particulate Matter (PM2.5)[9]	24 Hour	—	—	35 µg/m^3	Same as Primary Standard	Inertial Separation and Gravimetric Analysis
	Annual Arithmetic Mean	12 µg/m^3	Gravimetric or Beta Attenuation	12.0 µg/m^3	15 µg/m^3	
Carbon Monoxide (CO)	1 Hour	20 ppm (23 mg/m^3)	Non-Dispersive Infrared Photometry (NDIR)	35 ppm (40 mg/m^3)	—	Non-Dispersive Infrared Photometry (NDIR)
	8 Hour	9.0 ppm (10 mg/m^3)		9 ppm (10 mg/m^3)	—	
	8 Hour (Lake Tahoe)	6 ppm (7 mg/m^3)		—	—	
Nitrogen Dioxide (NO_2)[10]	1 Hour	0.18 ppm (339 µg/m^3)	Gas Phase Chemiluminescence	100 ppb (188 µg/m^3)	—	Gas Phase Chemiluminescence
	Annual Arithmetic Mean	0.030 ppm (57 µg/m^3)		0.053 ppm (100 µg/m^3)	Same as Primary Standard	
Sulfur Dioxide (SO_2)[11]	1 Hour	0.25 ppm (655 µg/m^3)	Ultraviolet Fluorescence	75 ppb (196 µg/m^3)	—	Ultraviolet Flourescence; Spectrophotometry (Pararosaniline Method)
	3 Hour	—		—	0.5 ppm (1300 µg/m^3)	
	24 Hour	0.04 ppm (105 µg/m^3)		0.14 ppm (for certain areas)[11]	—	
	Annual Arithmetic Mean	—		0.030 ppm (for certain areas)[11]	—	
Lead[12,13]	30 Day Average	1.5 µg/m^3	Atomic Absorption	—	—	High Volume Sampler and Atomic Absorption
	Calendar Quarter	—		1.5 µg/m^3 (for certain areas)[12]	Same as Primary Standard	
	Rolling 3-Month Average	—		0.15 µg/m^3		
Visibility Reducing Particles[14]	8 Hour	See footnote 14	Beta Attenuation and Transmittance through Filter Tape	No National Standards		
Sulfates	24 Hour	25 µg/m^3	Ion Chromatography			
Hydrogen Sulfide	1 Hour	0.03 ppm (42 µg/m^3)	Ultraviolet Fluorescence			
Vinyl Chloride[12]	24 Hour	0.01 ppm (26 µg/m^3)	Gas Chromatography			

See footnotes on next page …

1. California standards for ozone, carbon monoxide (except 8-hour Lake Tahoe), sulfur dioxide (1- and 24-hour), nitrogen dioxide, and particulate matter (PM10, PM2.5, and visibility reducing particles), are values that are not to be exceeded. All others are not to be equaled or exceeded. California ambient air quality standards are listed in the Table of Standards in Section 70200 of Title 17 of the California Code of Regulations.

2. National standards (other than ozone, particulate matter, and those based on annual arithmetic mean) are not to be exceeded more than once a year. The ozone standard is attained when the fourth highest 8-hour concentration measured at each site in a year, averaged over three years, is equal to or less than the standard. For PM10, the 24-hour standard is attained when the expected number of days per calendar year with a 24-hour average concentration above 150 $\mu g/m^3$ is equal to or less than one. For PM2.5, the 24-hour standard is attained when 98 percent of the daily concentrations, averaged over three years, are equal to or less than the standard. Contact the U.S. EPA for further clarification and current national policies.

3. Concentration expressed first in units in which it was promulgated. Equivalent units given in parentheses are based upon a reference temperature of 25°C and a reference pressure of 760 torr. Most measurements of air quality are to be corrected to a reference temperature of 25°C and a reference pressure of 760 torr; ppm in this table refers to ppm by volume, or micromoles of pollutant per mole of gas.

4. Any equivalent measurement method which can be shown to the satisfaction of the CARB to give equivalent results at or near the level of the air quality standard may be used.

5. National Primary Standards: The levels of air quality necessary, with an adequate margin of safety to protect the public health.

6. National Secondary Standards: The levels of air quality necessary to protect the public welfare from any known or anticipated adverse effects of a pollutant.

7. Reference method as described by the U.S. EPA. An "equivalent method" of measurement may be used but must have a "consistent relationship to the reference method" and must be approved by the U.S. EPA.

8. On October 1, 2015, the national 8-hour ozone primary and secondary standards were lowered from 0.075 to 0.070 ppm.

9. On December 14, 2012, the national annual PM2.5 primary standard was lowered from 15 $\mu g/m^3$ to 12.0 $\mu g/m^3$. The existing national 24-hour PM2.5 standards (primary and secondary) were retained at 35 $\mu g/m^3$, as was the annual secondary standard of 15 $\mu g/m^3$. The existing 24-hour PM10 standards (primary and secondary) of 150 $\mu g/m^3$ also were retained. The form of the annual primary and secondary standards is the annual mean, averaged over 3 years.

10. To attain the 1-hour national standard, the 3-year average of the annual 98th percentile of the 1-hour daily maximum concentrations at each site must not exceed 100 ppb. Note that the national 1-hour standard is in units of parts per billion (ppb). California standards are in units of parts per million (ppm). To directly compare the national 1-hour standard to the California standards the units can be converted from ppb to ppm. In this case, the national standard of 100 ppb is identical to 0.100 ppm.

11. On June 2, 2010, a new 1-hour SO_2 standard was established and the existing 24-hour and annual primary standards were revoked. To attain the 1-hour national standard, the 3-year average of the annual 99th percentile of the 1-hour daily maximum concentrations at each site must not exceed 75 ppb. The 1971 SO_2 national standards (24-hour and annual) remain in effect until one year after an area is designated for the 2010 standard, except that in areas designated nonattainment for the 1971 standards, the 1971 standards remain in effect until implementation plans to attain or maintain the 2010 standards are approved.

    Note that the 1-hour national standard is in units of parts per billion (ppb). California standards are in units of parts per million (ppm). To directly compare the 1-hour national standard to the California standard the units can be converted to ppm. In this case, the national standard of 75 ppb is identical to 0.075 ppm.

12. The CARB has identified lead and vinyl chloride as 'toxic air contaminants' with no threshold level of exposure for adverse health effects determined. These actions allow for the implementation of control measures at levels below the ambient concentrations specified for these pollutants.

13. The national standard for lead was revised on October 15, 2008 to a rolling 3-month average. The 1978 lead standard (1.5 $\mu g/m^3$ as a quarterly average) remains in effect until one year after an area is designated for the 2008 standard, except that in areas designated nonattainment for the 1978 standard, the 1978 standard remains in effect until implementation plans to attain or maintain the 2008 standard are approved.

14. In 1989, the CARB converted both the general statewide 10-mile visibility standard and the Lake Tahoe 30-mile visibility standard to instrumental equivalents, which are "extinction of 0.23 per kilometer" and "extinction of 0.07 per kilometer" for the statewide and Lake Tahoe Air Basin standards, respectively.

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Area Designations for the State Ambient Air Quality Standards

The following maps and tables show the area designations for each pollutant with a State standard set forth in the California Code of Regulations, title 17, section 60200. Each area is identified as attainment, nonattainment, nonattainment-transitional, or unclassified for each pollutant, as shown below:

Attainment	A
Nonattainment	N
Nonattainment-Transitional	NA-T
Unclassified	U

In general, CARB designates areas by air basin for pollutants with a regional impact and by county for pollutants with a more local impact. However, when there are areas within an air basin or county with distinctly different air quality deriving from sources and conditions not affecting the entire air basin or county, CARB may designate a smaller area. Generally, when boundaries of the designated area differ from the air basin or county boundaries, the description of the specific area is referenced at the bottom of the summary table.

FIGURE 1


2018
Area Designations for State
Ambient Air Quality Standards
OZONE
N
0 50 100 200 Miles
NORTHEAST PLATEAU
NORTH COAST
SACRAMENTO VALLEY
SUTTER BUTTES
MOUNTAIN COUNTIES
LAKE TAHOE
LAKE COUNTY
SAN FRANCISCO BAY AREA
GREAT BASIN VALLEYS
SAN JOAQUIN VALLEY
NORTH CENTRAL COAST
SOUTH CENTRAL COAST
MOJAVE DESERT
SOUTH COAST
SAN DIEGO COUNTY
SALTON SEA
Del Norte
Siskiyou
Modoc
Shasta
Lassen
Trinity
Humboldt
Tehema
Plumas
Butte
Glenn
Mendocino
Sierra
Nevada
Colusa
Yuba
Placer
Lake
Sutter
Yolo
El Dorado
Sonoma
Napa
Sac
Amador
Alpine
Solano
Calaveras
Marin
San Joaquin
Contra Costa
Tuolumne
Mono
San Francisco
Alameda
Mariposa
San Mateo
Stanislaus
Santa Clara
Merced
Santa Cruz
Madera
San Benito
Fresno
Inyo
Tulare
Monterey
Kings
San Luis Obispo
Kern
San Bernardino
Santa Barbara
Los Angeles
Ventura
Riverside
Orange
San Diego
Imperial
Unclassified
Attainment
Nonattainment-Transitional
Nonattainment
Air Basin
County
Source Date:
October 2018
Air Quality Planning and Science Division

TABLE 1

California Ambient Air Quality Standards Area Designations for Ozone [1]

	N	NA-T	U	A		N	NA-T	U	A
GREAT BASIN VALLEYS AIR BASIN					NORTHEAST PLATEAU AIR BASIN				X
Alpine County			X		SACRAMENTO VALLEY AIR BASIN				
Inyo County	X				Colusa and Glenn Counties				X
Mono County	X				Sutter/Yuba Counties				
LAKE COUNTY AIR BASIN				X	Sutter Buttes	X			
LAKE TAHOE AIR BASIN				X	Remainder of Sutter County				X
MOJAVE DESERT AIR BASIN	X				Yuba County				X
MOUNTAIN COUNTIES AIR BASIN					Yolo/Solano Counties		X		
Amador County	X				Remainder of Air Basin	X			
Calaveras County	X				SALTON SEA AIR BASIN	X			
El Dorado County (portion)	X				SAN DIEGO AIR BASIN	X			
Mariposa County	X				SAN FRANCISCO BAY AREA AIR BASIN	X			
Nevada County	X				SAN JOAQUIN VALLEY AIR BASIN	X			
Placer County (portion)	X				SOUTH CENTRAL COAST AIR BASIN				
Plumas County			X		San Luis Obispo County	X			
Sierra County			X		Santa Barbara County		X		
Tuolumne County	X				Ventura County	X			
NORTH CENTRAL COAST AIR BASIN		X			SOUTH COAST AIR BASIN	X			
NORTH COAST AIR BASIN				X					

(1) AB 3048 (Olberg) and AB 2525 (Miller) signed into law in 1996, made changes to Health and Safety Code, section 40925.5. One of the changes allows nonattainment districts to become nonattainment-transitional for ozone by operation of law.

FIGURE 2


2018
Area Designations for State
Ambient Air Quality Standards
PM10
Del Norte
Siskiyou
Modoc
NORTHEAST PLATEAU
NORTH COAST
Trinity
Shasta
Lassen
Humboldt
Tehema
SACRAMENTO VALLEY
Plumas
Mendocino
Glenn
Butte
Sierra
MOUNTAIN COUNTIES
LAKE COUNTY
Nevada
Colusa
Yuba
Placer
Lake
LAKE TAHOE
Sutter
Yolo
El Dorado
Alpine
Sonoma
Napa
Sac
Amador
Yosemite NP
SAN FRANCISCO BAY AREA
Solano
Calaveras
Marin
Contra Costa
San Joaquin
Tuolumne
Mono
San Francisco
Alameda
Stanislaus
Mariposa
GREAT BASIN VALLEYS
San Mateo
Santa Clara
Merced
Madera
Santa Cruz
SAN JOAQUIN VALLEY
San Benito
Fresno
NORTH CENTRAL COAST
Inyo
Tulare
Monterey
Kings
San Luis Obispo
Kern
MOJAVE DESERT
Santa Barbara
Los Angeles
San Bernardino
Ventura
SOUTH CENTRAL COAST
Orange
Riverside
SOUTH COAST
San Diego
Imperial
SAN DIEGO COUNTY
SALTON SEA
N
0 50 100 200 Miles
Unclassified
Attainment
Nonattainment
Air Basin
County
Source Date:
October 2018
Air Quality Planning and Science Division

TABLE 2

California Ambient Air Quality Standards
Area Designation for Suspended Particulate Matter (PM10)

	N	U	A		N	U	A
GREAT BASIN VALLEYS AIR BASIN	X			NORTH CENTRAL COAST AIR BASIN	X		
LAKE COUNTY AIR BASIN			X	NORTH COAST AIR BASIN			
LAKE TAHOE AIR BASIN	X			Del Norte, Sonoma (portion) and Trinity Counties			X
MOJAVE DESERT AIR BASIN	X			Remainder of Air Basin	X		
MOUNTAIN COUNTIES AIR BASIN				NORTHEAST PLATEAU AIR BASIN			
Amador County		X		Siskiyou County			X
Calaveras County	X			Remainder of Air Basin		X	
El Dorado County (portion)	X			SACRAMENTO VALLEY AIR BASIN			
Mariposa County				Shasta County			X
- Yosemite National Park	X			Remainder of Air Basin	X		
- Remainder of County		X		SALTON SEA AIR BASIN	X		
Nevada County	X			SAN DIEGO AIR BASIN	X		
Placer County (portion)	X			SAN FRANCISCO BAY AREA AIR BASIN	X		
Plumas County	X			SAN JOAQUIN VALLEY AIR BASIN	X		
Sierra County	X			SOUTH CENTRAL COAST AIR BASIN	X		
Tuolumne County		X		SOUTH COAST AIR BASIN	X		

FIGURE 3

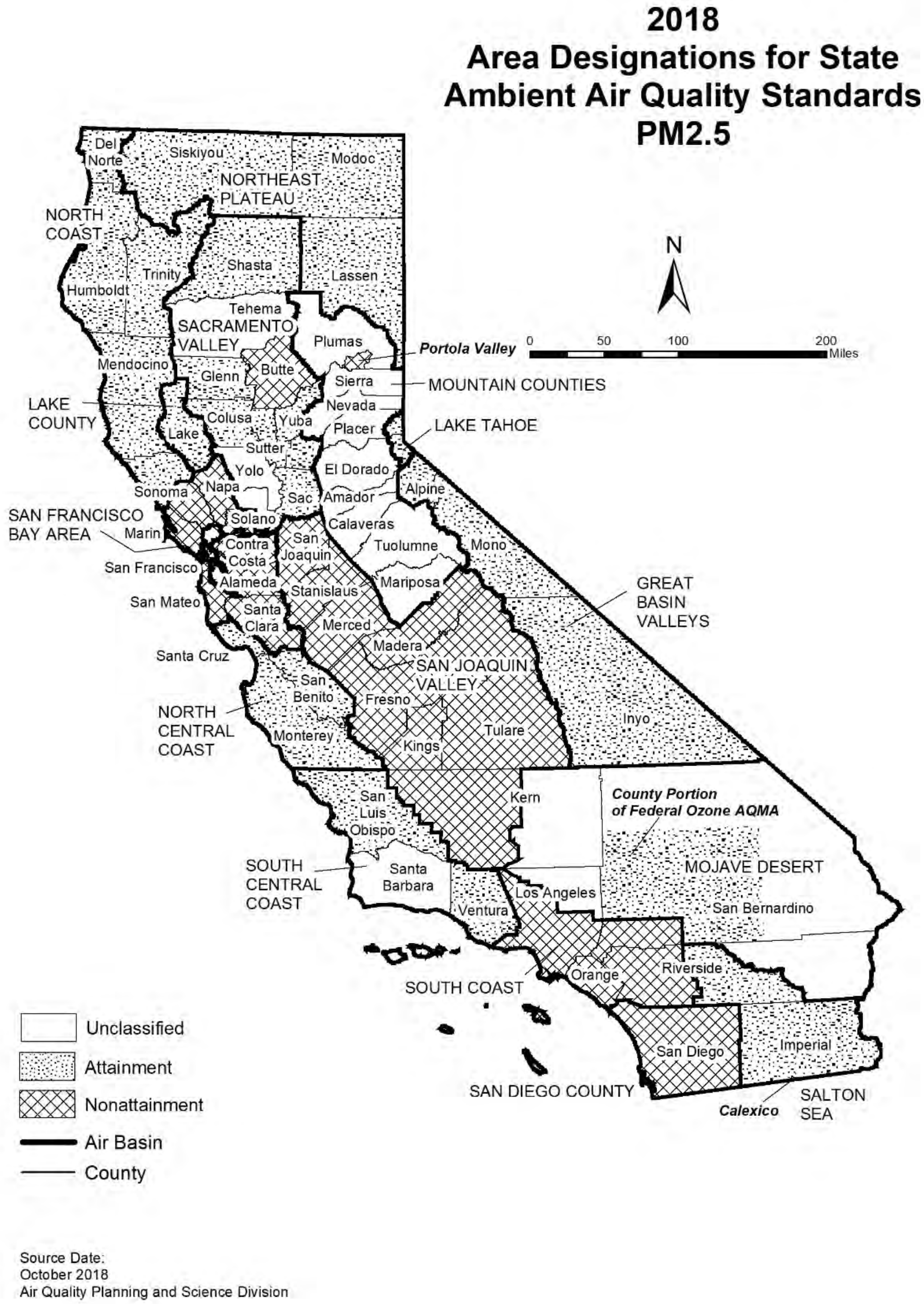

2018
Area Designations for State
Ambient Air Quality Standards
PM2.5
N
Portola Valley
0 50 100 200 Miles
Del Norte
Siskiyou
Modoc
NORTHEAST PLATEAU
NORTH COAST
Shasta
Lassen
Trinity
Humboldt
Tehema
SACRAMENTO VALLEY
Plumas
Butte
Glenn
Mendocino
Sierra
MOUNTAIN COUNTIES
LAKE COUNTY
Nevada
Colusa
Yuba
Lake
Placer
LAKE TAHOE
Sutter
Yolo
El Dorado
Sonoma
Napa
Sac
Amador
Alpine
SAN FRANCISCO BAY AREA
Solano
Calaveras
Marin
Contra Costa
San Joaquin
Tuolumne
Mono
San Francisco
Alameda
Stanislaus
Mariposa
GREAT BASIN VALLEYS
San Mateo
Santa Clara
Merced
Madera
Santa Cruz
SAN JOAQUIN VALLEY
San Benito
Fresno
NORTH CENTRAL COAST
Inyo
Tulare
Monterey
Kings
San Luis Obispo
Kern
County Portion of Federal Ozone AQMA
MOJAVE DESERT
SOUTH CENTRAL COAST
Santa Barbara
Los Angeles
Ventura
San Bernardino
Riverside
Orange
SOUTH COAST
Unclassified
Attainment
Nonattainment
Air Basin
County
San Diego
Imperial
SAN DIEGO COUNTY
SALTON SEA
Calexico
Source Date:
October 2018
Air Quality Planning and Science Division

TABLE 3

California Ambient Air Quality Standards
Area Designations for Fine Particulate Matter (PM2.5)

	N	U	A
GREAT BASIN VALLEYS AIR BASIN			X
LAKE COUNTY AIR BASIN			X
LAKE TAHOE AIR BASIN			X
MOJAVE DESERT AIR BASIN			
San Bernardino County			
- County portion of federal Southeast Desert Modified AQMA for Ozone (1)			X
Remainder of Air Basin		X	
MOUNTAIN COUNTIES AIR BASIN			
Plumas County			
- Portola Valley (2)	X		
Remainder of Air Basin		X	
NORTH CENTRAL COAST AIR BASIN			X
NORTH COAST AIR BASIN			X
NORTHEAST PLATEAU AIR BASIN			X
SACRAMENTO VALLEY AIR BASIN			
Butte County	X		
Colusa County			X
Glenn County			X
Placer County (portion)			X
Sacramento County			X
Shasta County			X
Sutter and Yuba Counties			X
Remainder of Air Basin		X	

	N	U	A
SALTON SEA AIR BASIN			
Imperial County			
- City of Calexico (3)	X		
Remainder of Air Basin			X
SAN DIEGO AIR BASIN	X		
SAN FRANCISCO BAY AREA AIR BASIN	X		
SAN JOAQUIN VALLEY AIR BASIN	X		
SOUTH CENTRAL COAST AIR BASIN			
San Luis Obispo County			X
Santa Barbara County		X	
Ventura County			X
SOUTH COAST AIR BASIN	X		

(1) California Code of Regulations, title 17, section 60200(b)

(2) California Code of Regulations, title 17, section 60200(c)

(3) California Code of Regulations, title 17, section 60200(a)

FIGURE 4

Source Date:
October 2018
Air Quality Planning and Science Division

TABLE 4

California Ambient Air Quality Standards
Area Designation for Carbon Monoxide*

	N	NA-T	U	A		N	NA-T	U	A
GREAT BASIN VALLEYS AIR BASIN					SACRAMENTO VALLEY AIR BASIN				
Alpine County			X		Butte County				X
Inyo County				X	Colusa County			X	
Mono County				X	Glenn County			X	
LAKE COUNTY AIR BASIN				X	Placer County (portion)				X
LAKE TAHOE AIR BASIN				X	Sacramento County				X
MOJAVE DESERT AIR BASIN					Shasta County			X	
Kern County (portion)			X		Solano County (portion)				X
Los Angeles County (portion)				X	Sutter County				X
Riverside County (portion)			X		Tehama County			X	
San Bernardino County (portion)				X	Yolo County				X
MOUNTAIN COUNTIES AIR BASIN					Yuba County			X	
Amador County			X		SALTON SEA AIR BASIN				X
Calaveras County			X		SAN DIEGO AIR BASIN				X
El Dorado County (portion)			X		SAN FRANCISCO BAY AREA AIR BASIN				X
Mariposa County			X		SAN JOAQUIN VALLEY AIR BASIN				
Nevada County			X		Fresno County				X
Placer County (portion)			X		Kern County (portion)				X
Plumas County				X	Kings County			X	
Sierra County			X		Madera County			X	
Tuolumne County				X	Merced County			X	
NORTH CENTRAL COAST AIR BASIN					San Joaquin County				X
Monterey County				X	Stanislaus County				X
San Benito County			X		Tulare County				X
Santa Cruz County			X		SOUTH CENTRAL COAST AIR BASIN				X
NORTH COAST AIR BASIN					SOUTH COAST AIR BASIN				X
Del Norte County			X						
Humboldt County				X					
Mendocino County				X					
Sonoma County (portion)			X						
Trinity County			X						
NORTHEAST PLATEAU AIR BASIN			X						

* The area designated for carbon monoxide is a county or portion of a county

FIGURE 5


2018
Area Designations for State
Ambient Air Quality Standards
NITROGEN DIOXIDE
Del Norte
Siskiyou
NORTHEAST PLATEAU
Modoc
NORTH COAST
Trinity
Shasta
Lassen
Humboldt
Tehema
SACRAMENTO VALLEY
Plumas
Butte
Glenn
Mendocino
Sierra
MOUNTAIN COUNTIES
Nevada
Colusa
Yuba
LAKE COUNTY
Lake
Sutter
Placer
LAKE TAHOE
El Dorado
Yolo
Napa
Sac
Alpine
Sonoma
Amador
SAN FRANCISCO BAY AREA
Solano
Calaveras
Marin
Contra Costa
San Joaquin
Tuolumne
Mono
San Francisco
Alameda
Mariposa
GREAT BASIN VALLEYS
San Mateo
Santa Clara
Stanislaus
Merced
Madera
Santa Cruz
SAN JOAQUIN VALLEY
San Benito
Fresno
NORTH CENTRAL COAST
Monterey
Tulare
Inyo
Kings
San Luis Obispo
Kern
MOJAVE DESERT
Santa Barbara
SOUTH CENTRAL COAST
Los Angeles
San Bernardino
Ventura
Orange
Riverside
SOUTH COAST
CA 60 (Portion)
San Diego
Imperial
SAN DIEGO COUNTY
SALTON SEA
N
0
50
100
200
Miles
Los Angeles
San Bernardino
CA 60 (Portion)
Riverside
Orange
Attainment
Nonattainment
Air Basin
County
Source Date:
October 2018
Air Quality Planning and Science Division

TABLE 5

California Ambient Air Quality Standards
Area Designation for Nitrogen Dioxide

	N	U	A		N	U	A
GREAT BASIN VALLEYS AIR BASIN			X	SACRAMENTO VALLEY AIR BASIN			X
LAKE COUNTY AIR BASIN			X	SALTON SEA AIR BASIN			X
LAKE TAHOE AIR BASIN			X	SAN DIEGO AIR BASIN			X
MOJAVE DESERT AIR BASIN			X	SAN FRANCISCO BAY AREA AIR BASIN			X
MOUNTAIN COUNTIES AIR BASIN			X	SAN JOAQUIN VALLEY AIR BASIN			X
NORTH CENTRAL COAST AIR BASIN			X	SOUTH CENTRAL COAST AIR BASIN			X
NORTH COAST AIR BASIN			X	SOUTH COAST AIR BASIN			
NORTHEAST PLATEAU AIR BASIN			X	CA 60 Near-road Portion of San Bernardino, Riverside, and Los Angeles Counties	X		
				Remainder of Air Basin			X

FIGURE 6

Source Date:
October 2018
Air Quality Planning and Science Division

TABLE 6

California Ambient Air Quality Standards
Area Designation for Sulfur Dioxide*

	N	U/A		N	U/A
GREAT BASIN VALLEYS AIR BASIN		X	SACRAMENTO VALLEY AIR BASIN		X
LAKE COUNTY AIR BASIN		X	SALTON SEA AIR BASIN		X
LAKE TAHOE AIR BASIN		X	SAN DIEGO AIR BASIN		X
MOJAVE DESERT AIR BASIN		X	SAN FRANCISCO BAY AREA AIR BASIN		X
MOUNTAIN COUNTIES AIR BASIN		X	SAN JOAQUIN VALLEY AIR BASIN		X
NORTH CENTRAL COAST AIR BASIN		X	SOUTH CENTRAL COAST AIR BASIN		X
NORTH COAST AIR BASIN		X	SOUTH COAST AIR BASIN		X
NORTHEAST PLATEAU AIR BASIN		X			

* The area designated for sulfur dioxide is a county or portion of a county

FIGURE 7


2018
Area Designations for State
Ambient Air Quality Standards
SULFATES
N
0
50
100
200
Miles
Del Norte
Siskiyou
Modoc
NORTHEAST PLATEAU
NORTH COAST
Shasta
Lassen
Humboldt
Trinity
Tehema
SACRAMENTO VALLEY
Plumas
Mendocino
Glenn
Butte
Sierra
MOUNTAIN COUNTIES
LAKE COUNTY
Nevada
Colusa
Yuba
Placer
LAKE TAHOE
Lake
Sutter
El Dorado
Yolo
Sonoma
Napa
Sac
Amador
Alpine
Solano
Calaveras
SAN FRANCISCO BAY AREA
Marin
Contra Costa
San Joaquin
Tuolumne
Mono
San Francisco
GREAT BASIN VALLEYS
Alameda
Stanislaus
Mariposa
San Mateo
Santa Clara
Merced
Madera
Santa Cruz
SAN JOAQUIN VALLEY
San Benito
NORTH CENTRAL COAST
Fresno
Inyo
Monterey
Tulare
Kings
San Luis Obispo
Kern
MOJAVE DESERT
SOUTH CENTRAL COAST
Santa Barbara
Ventura
Los Angeles
San Bernardino
SOUTH COAST
Orange
Riverside
San Diego
Imperial
SAN DIEGO COUNTY
SALTON SEA
Attainment
Air Basin
County
Source Date:
October 2018
Air Quality Planning and Science Division

TABLE 7

California Ambient Air Quality Standards
Area Designation for Sulfates

	N	U	A		N	U	A
GREAT BASIN VALLEYS AIR BASIN			X	SACRAMENTO VALLEY AIR BASIN			X
LAKE COUNTY AIR BASIN			X	SALTON SEA AIR BASIN			X
LAKE TAHOE AIR BASIN			X	SAN DIEGO AIR BASIN			X
MOJAVE DESERT AIR BASIN			X	SAN FRANCISCO BAY AREA AIR BASIN			X
MOUNTAIN COUNTIES AIR BASIN			X	SAN JOAQUIN VALLEY AIR BASIN			X
NORTH CENTRAL COAST AIR BASIN			X	SOUTH CENTRAL COAST AIR BASIN			X
NORTH COAST AIR BASIN			X	SOUTH COAST AIR BASIN			X
NORTHEAST PLATEAU AIR BASIN			X				

FIGURE 8

2018
Area Designations for State Ambient Air Quality Standards
LEAD

Source Date:
October 2018
Air Quality Planning and Science Division

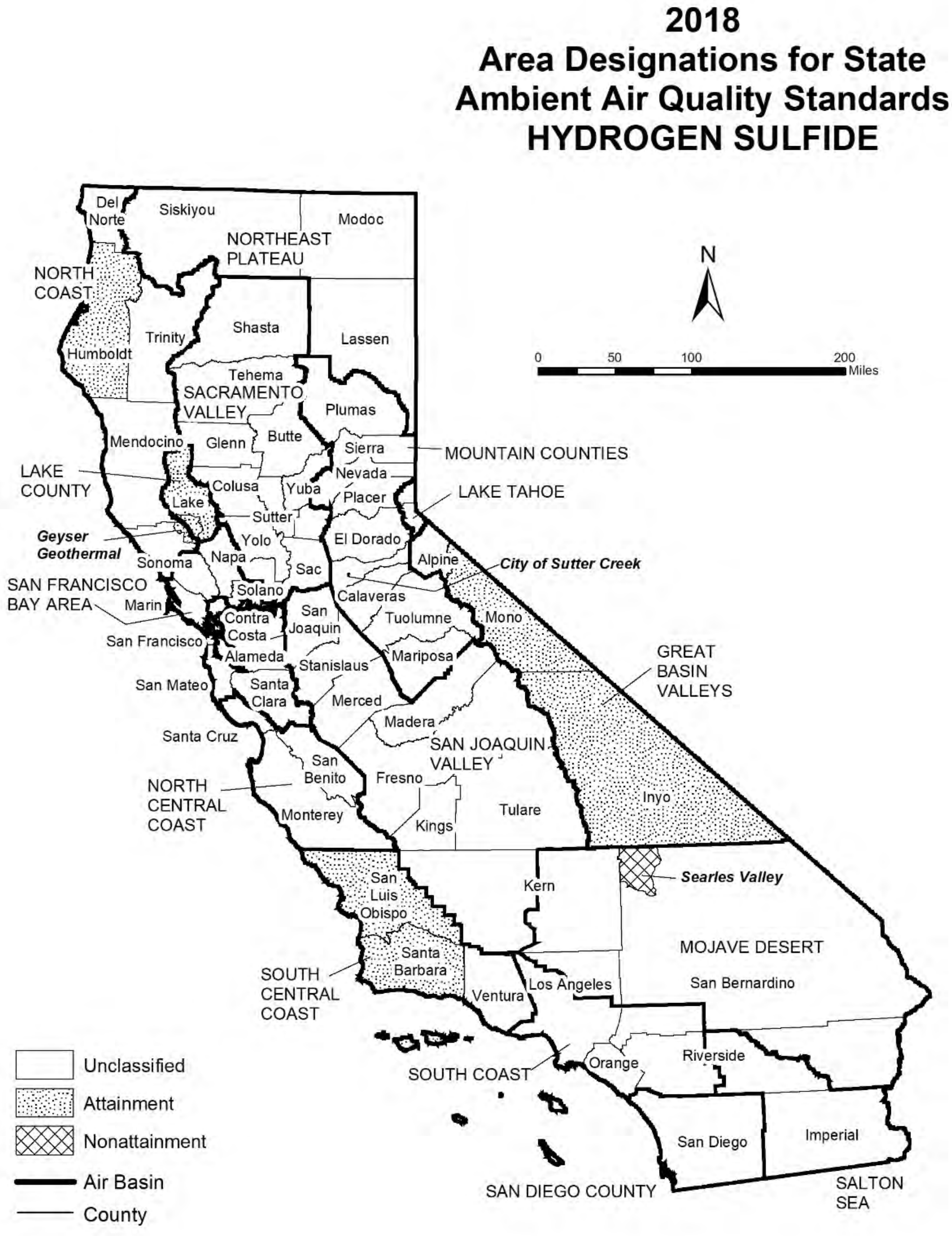
TABLE 8

California Ambient Air Quality Standards
Area Designations for Lead (particulate)*

	N	U	A		N	U	A
GREAT BASIN VALLEYS AIR BASIN			X	SALTON SEA AIR BASIN			X
LAKE COUNTY AIR BASIN			X	SAN DIEGO AIR BASIN			X
LAKE TAHOE AIR BASIN			X	SAN FRANCISCO BAY AREA AIR BASIN			X
MOJAVE DESERT AIR BASIN			X	SAN JOAQUIN VALLEY AIR BASIN			X
MOUNTAIN COUNTIES AIR BASIN			X	SOUTH CENTRAL COAST AIR BASIN			X
NORTH CENTRAL COAST AIR BASIN			X	SOUTH COAST AIR BASIN			X
NORTH COAST AIR BASIN			X				
NORTHEAST PLATEAU AIR BASIN			X				
SACRAMENTO VALLEY AIR BASIN			X				

* The area designated for lead is a county or portion of a county. Since all areas in the State are in attainment for this standard, air basins are indicated here for simplicity.

FIGURE 9



Source Date:
October 2018
Air Quality Planning and Science Division

TABLE 9

California Ambient Air Quality Standards
Area Designation for Hydrogen Sulfide*

	N	NA-T	U	A		N	NA-T	U	A
GREAT BASIN VALLEYS AIR BASIN					NORTH CENTRAL COAST AIR BASIN			X	
Alpine County			X		NORTH COAST AIR BASIN				
Inyo County				X	Del Norte County			X	
Mono County				X	Humboldt County				X
LAKE COUNTY AIR BASIN				X	Mendocino County			X	
LAKE TAHOE AIR BASIN			X		Sonoma County (portion)				
MOJAVE DESERT AIR BASIN					- Geyser Geothermal Area (2)				X
Kern County (portion)			X		- Remainder of County			X	
Los Angeles County (portion)			X		Trinity County			X	
Riverside County (portion)			X		NORTHEAST PLATEAU AIR BASIN			X	
San Bernardino County (portion)					SACRAMENTO VALLEY AIR BASIN			X	
- Searles Valley Planning Area (1)	X				SALTON SEA AIR BASIN			X	
- Remainder of County			X		SAN DIEGO AIR BASIN			X	
MOUNTAIN COUNTIES AIR BASIN					SAN FRANCISCO BAY AREA AIR BASIN			X	
Amador County					SAN JOAQUIN VALLEY AIR BASIN			X	
- City of Sutter Creek	X				SOUTH CENTRAL COAST AIR BASIN				
- Remainder of County			X		San Luis Obispo County				X
Calaveras County			X		Santa Barbara County				X
El Dorado County (portion)			X		Ventura County			X	
Mariposa County			X		SOUTH COAST AIR BASIN			X	
Nevada County			X						
Placer County (portion)			X						
Plumas County			X						
Sierra County			X						
Tuolumne County			X						

* The area designated for hydrogen sulfide is a county or portion of a county

(1) 52 Federal Register 29384 (August 7, 1987)

(2) California Code of Regulations, title 17, section 60200(d)

FIGURE 10

2018
Area Designations for State Ambient Air Quality Standards VISIBILITY REDUCING PARTICLES

Source Date:
October 2018
Air Quality Planning and Science Division

TABLE 10

California Ambient Air Quality Standards
Area Designation for Visibility Reducing Particles

	N	NA-T	U	A		N	NA-T	U	A
GREAT BASIN VALLEYS AIR BASIN			X		SACRAMENTO VALLEY AIR BASIN			X	
LAKE COUNTY AIR BASIN				X	SALTON SEA AIR BASIN			X	
LAKE TAHOE AIR BASIN			X		SAN DIEGO AIR BASIN			X	
MOJAVE DESERT AIR BASIN			X		SAN FRANCISCO BAY AREA AIR BASIN			X	
MOUNTAIN COUNTIES AIR BASIN			X		SAN JOAQUIN VALLEY AIR BASIN			X	
NORTH CENTRAL COAST AIR BASIN			X		SOUTH CENTRAL COAST AIR BASIN			X	
NORTH COAST AIR BASIN			X		SOUTH COAST AIR BASIN			X	
NORTHEAST PLATEAU AIR BASIN			X						

Area Designations for the National Ambient Air Quality Standards

The following maps and tables show the area designations for each pollutant with a national ambient air quality standard. Additional information about the federal area designations is available on the U.S. EPA website:

https://www.epa.gov/green-book

Over the last several years, U.S. EPA has been reviewing the levels of the various national standards. The agency has already promulgated new standard levels for some pollutants and is considering revising the levels for others. Information about the status of these reviews is available on the U.S. EPA website:

https://www.epa.gov/criteria-air-pollutants

<u>Designation Categories</u>

Suspended Particulate Matter (PM_{10}). The U.S. EPA uses three categories to designate areas with respect to PM_{10}:

- Attainment
- Nonattainment
- Unclassifiable

Ozone, Fine Suspended Particulate Matter ($PM_{2.5}$), Carbon Monoxide (CO), and Nitrogen Dioxide (NO_2). The U.S. EPA uses two categories to designate areas with respect to these standards:

- Nonattainment
- Unclassifiable/Attainment

The national 1-hour ozone standard was revoked effective June 15, 2005, and the area designations map reflects the 2015 national 8-hour ozone standard of 0.070 ppm. Original designations were finalized on August 3, 2018.

On December 14, 2012, the U.S. EPA established a new national annual primary $PM_{2.5}$ standard of 12.0 $\mu g/m^3$. New area designations reflecting this revised standard became final in December 2014. The current designation map reflects the most recently revised (2012) annual average standard of 12.0 $\mu g/m^3$ as well as the 24-hour standard of 35 $\mu g/m^3$, revised in 2006.

On January 22, 2010, the U.S. EPA established a new national 1-hour NO_2 standard of 100 parts per billion (ppb) and retained the annual average standard of 53 ppb. Designations for the primary NO_2 standard became effective on February 29, 2012. All areas of California meet this standard.

Sulfur Dioxide (SO_2). The U.S. EPA uses three categories to designate areas with respect to the 24-hour and annual average sulfur dioxide standards. These designation categories are:

- Nonattainment,
- Unclassifiable, and
- Attainment/Unclassifiable.

On June 2, 2010, the U.S. EPA established a new primary 1-hour SO_2 standard of 75 parts per billion (ppb). At the same time, U.S. EPA revoked the 24-hour and annual average standards. Area designations for the 1-hour SO_2 standard were finalized on December 21, 2017 and are reflected in the area designations map.

Lead (particulate). The U.S. EPA promulgated a new rolling 3-month average lead standard in October 2008 of 0.15 $\mu g/m^3$. Designations were made for this standard in November 2010.

Designation Areas

From time to time, the boundaries of the California air basins have been changed to facilitate the planning process. CARB generally initiates these changes, and they are not always reflected in the U.S. EPA's area designations. For purposes of consistency, the maps in this attachment reflect area designation boundaries and nomenclature as promulgated by the U.S. EPA. In some cases, these may not be the same as those adopted by CARB. For example, the national area designations reflect the former Southeast Desert Air Basin. In accordance with Health and Safety Code section 39606.1, CARB redefined this area in 1996 to be the Mojave Desert Air Basin and Salton Sea Air Basin. The definitions and boundaries for all areas designated for the national standards can be found in Title 40, Code of Federal Regulations (CFR), Chapter I, Subchapter C, Part 81.305. They are available on the web at:

https://ecfr.io/Title-40/se40.20.81_1305

FIGURE 11

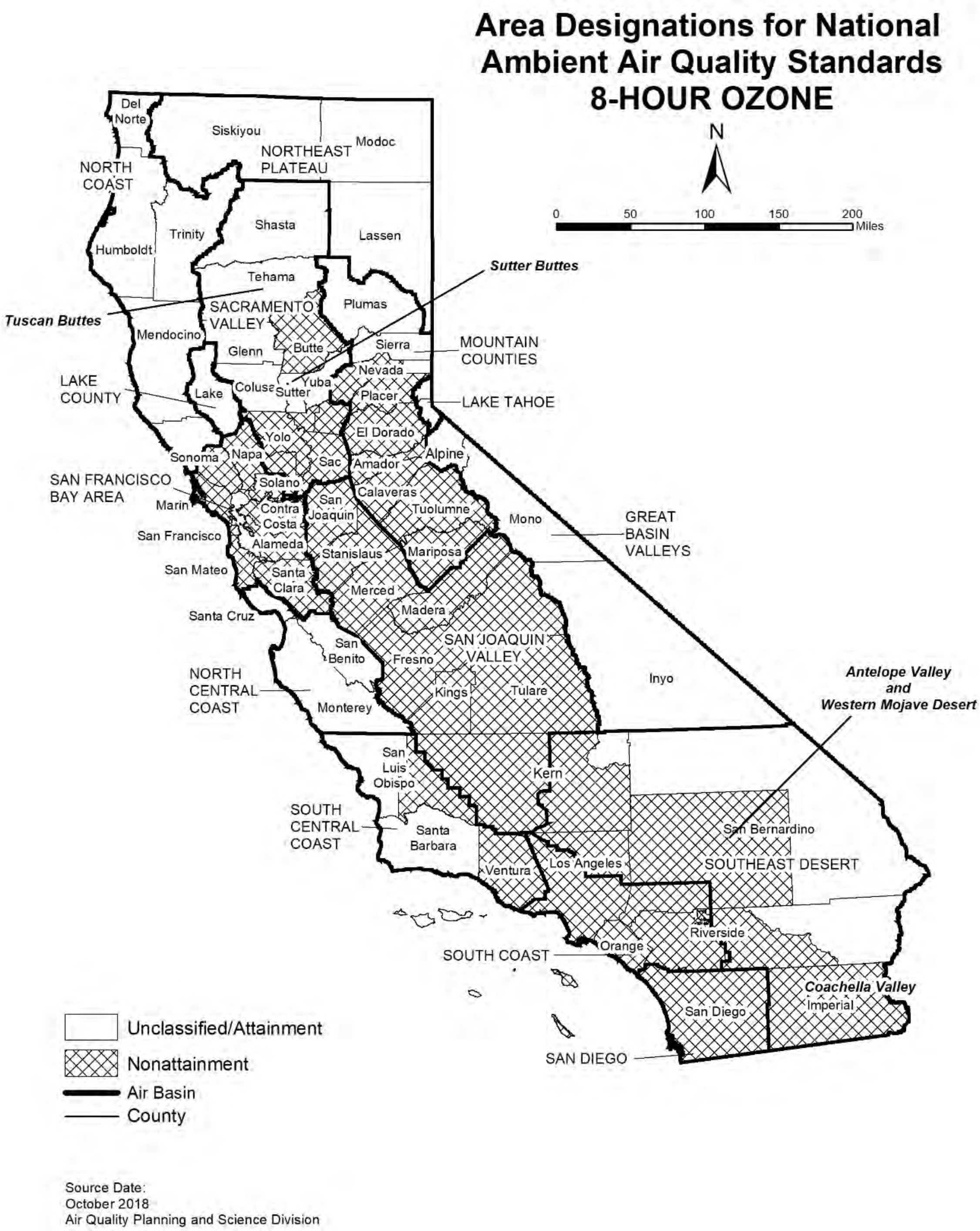

Area Designations for National
Ambient Air Quality Standards
8-HOUR OZONE
N
0 50 100 150 200 Miles
Del Norte
Siskiyou
Modoc
NORTHEAST PLATEAU
NORTH COAST
Trinity
Shasta
Lassen
Humboldt
Tehama
Sutter Buttes
Tuscan Buttes
SACRAMENTO VALLEY
Plumas
Mendocino
Glenn
Butte
Sierra
MOUNTAIN COUNTIES
Nevada
LAKE COUNTY
Lake
Colusa
Sutter
Yuba
Placer
LAKE TAHOE
Yolo
El Dorado
Sonoma
Napa
Sac
Alpine
Amador
SAN FRANCISCO BAY AREA
Solano
Marin
San Joaquin
Calaveras
Contra Costa
Tuolumne
Mono
GREAT BASIN VALLEYS
San Francisco
Alameda
Stanislaus
Mariposa
San Mateo
Santa Clara
Merced
Madera
Santa Cruz
San Benito
SAN JOAQUIN VALLEY
Fresno
Inyo
Antelope Valley and Western Mojave Desert
NORTH CENTRAL COAST
Kings
Tulare
Monterey
San Luis Obispo
Kern
SOUTH CENTRAL COAST
Santa Barbara
San Bernardino
Ventura
Los Angeles
SOUTHEAST DESERT
Riverside
Orange
SOUTH COAST
Coachella Valley
Imperial
San Diego
SAN DIEGO
Unclassified/Attainment
Nonattainment
Air Basin
County
Source Date:
October 2018
Air Quality Planning and Science Division

TABLE 11

National Ambient Air Quality Standards
Area Designations for 8-Hour Ozone*

	N	U/A		N	U/A
GREAT BASIN VALLEYS AIR BASIN		X	SACRAMENTO VALLEY AIR BASIN (cont.)		
LAKE COUNTY AIR BASIN		X	Yolo County (2)	X	
LAKE TAHOE AIR BASIN		X	Yuba County		X
MOUNTAIN COUNTIES AIR BASIN			SAN DIEGO COUNTY	X	
Amador County	X		SAN FRANCISCO BAY AREA AIR BASIN	X	
Calaveras County	X		SAN JOAQUIN VALLEY AIR BASIN	X	
El Dorado County (portion) (2)	X		SOUTH CENTRAL COAST AIR BASIN (1)		
Mariposa County	X		San Luis Obispo County		
Nevada County			- Eastern San Luis Obispo County	X	
- Western Nevada County	X		- Remainder of County		X
- Remainder of County		X	Santa Barbara County		X
Placer County (portion) (2)	X		Ventura County		
Plumas County		X	- Area excluding Anacapa and San Nicolas Islands	X	
Sierra County		X	- Channel Islands (1)		X
Tuolumne County	X		SOUTH COAST AIR BASIN (1)	X	
NORTH CENTRAL COAST AIR BASIN		X	SOUTHEAST DESERT AIR BASIN		
NORTH COAST AIR BASIN		X	Kern County (portion)	X	
NORTHEAST PLATEAU AIR BASIN		X	- Indian Wells Valley		X
SACRAMENTO VALLEY AIR BASIN			Imperial County	X	
Butte County	X		Los Angeles County (portion)	X	
Colusa County		X	Riverside County (portion)		
Glenn County		X	- Coachella Valley	X	
Sacramento Metro Area (2)	X		- Non-AQMA portion		X
Shasta County		X	San Bernardino County		
Sutter County			- Western portion (AQMA)	X	
- Sutter Buttes	X		- Eastern portion (non-AQMA)		X
- Southern portion of Sutter County (2)	X				
- Remainder of Sutter County		X			
Tehama County					
- Tuscan Buttes	X				
- Remainder of Tehama County		X			

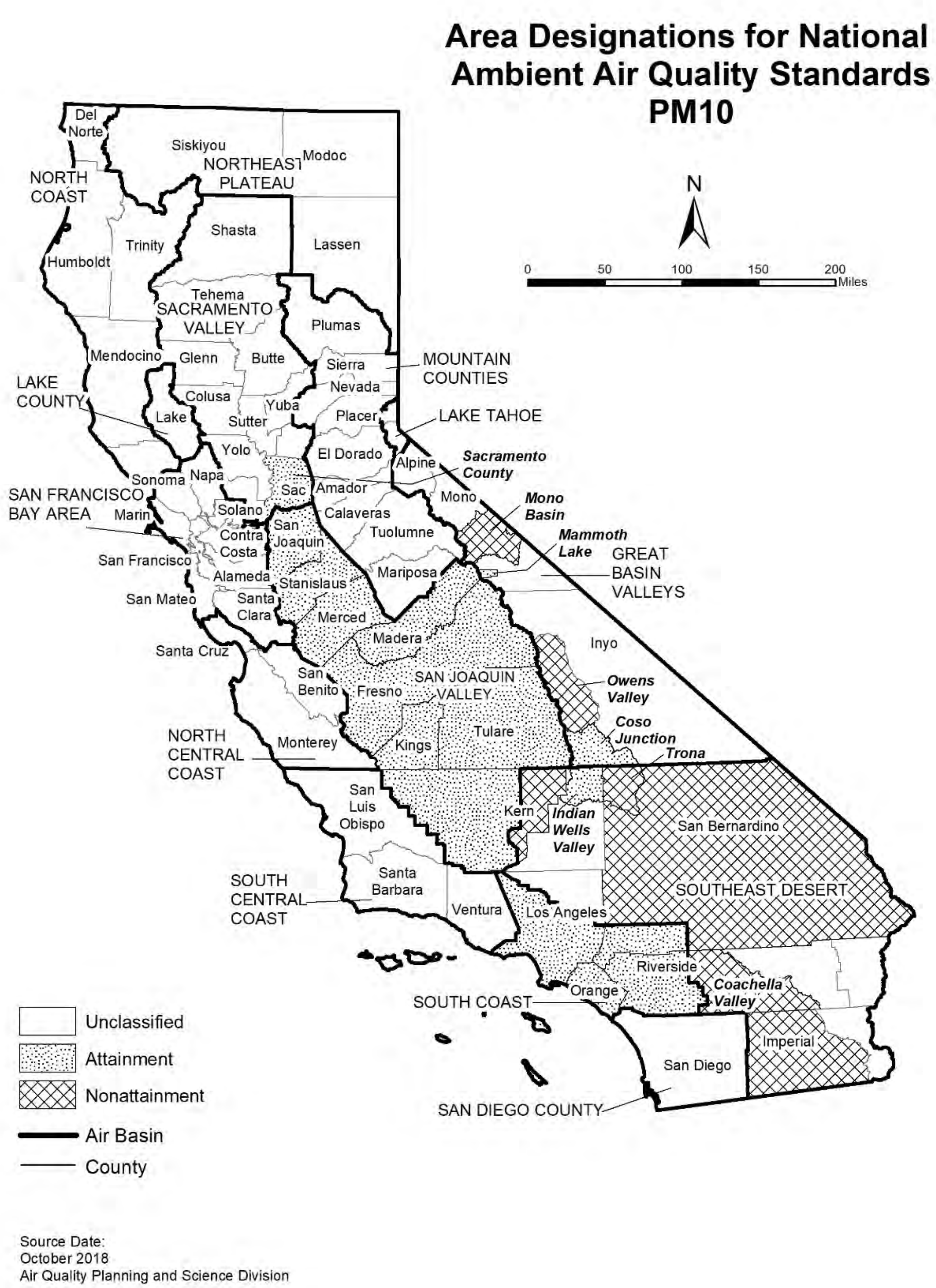
* Definitions and references for all areas can be found in 40 CFR, Chapter I, Part 81.305.

NOTE: This map and table reflect the 2015 8-hour ozone standard of 0.070 ppm.

(1) South Central Coast Air Basin Channel Islands:
Santa Barbara County includes Santa Cruz, San Miguel, Santa Rosa, and Santa Barbara Islands.
Ventura County includes Anacapa and San Nicolas Islands.
South Coast Air Basin:
Los Angeles County includes San Clemente and Santa Catalina Islands.

(2) For this purpose, the Sacramento Metro Area comprises all of Sacramento and Yolo Counties, the Sacramento Valley Air Basin portion of Solano County, the southern portion of Sutter County, and the Sacramento Valley and Mountain Counties Air Basins portions of Placer and El Dorado counties.

FIGURE 12



Area Designations for National Ambient Air Quality Standards PM10
N
0
50
100
150
200
Miles
Del Norte
Siskiyou
NORTHEAST PLATEAU
Modoc
NORTH COAST
Shasta
Lassen
Trinity
Humboldt
Tehema
SACRAMENTO VALLEY
Plumas
Mendocino
Glenn
Butte
Sierra
Nevada
MOUNTAIN COUNTIES
LAKE COUNTY
Colusa
Yuba
Lake
Sutter
Placer
LAKE TAHOE
Yolo
El Dorado
Alpine
Sacramento County
Sonoma
Napa
Sac
Amador
SAN FRANCISCO BAY AREA
Marin
Solano
Calaveras
Mono
Mono Basin
San Joaquin
Contra Costa
Tuolumne
Mammoth Lake
San Francisco
GREAT BASIN VALLEYS
Alameda
Stanislaus
Mariposa
San Mateo
Santa Clara
Merced
Madera
Inyo
Santa Cruz
San Benito
Fresno
SAN JOAQUIN VALLEY
Owens Valley
Tulare
Coso Junction
NORTH CENTRAL COAST
Monterey
Kings
Trona
San Luis Obispo
Kern
Indian Wells Valley
San Bernardino
SOUTHEAST DESERT
SOUTH CENTRAL COAST
Santa Barbara
Ventura
Los Angeles
Riverside
Coachella Valley
SOUTH COAST
Orange
Imperial
San Diego
SAN DIEGO COUNTY
Unclassified
Attainment
Nonattainment
Air Basin
County
Source Date:
October 2018
Air Quality Planning and Science Division

TABLE 12

National Ambient Air Quality Standards
Area Designations for Suspended Particulate Matter (PM10)*

	N	U	A		N	U	A
GREAT BASIN VALLEYS AIR BASIN				SAN DIEGO COUNTY		X	
Alpine County		X		SAN FRANCISCO BAY AREA AIR BASIN		X	
Inyo County				SAN JOAQUIN VALLEY AIR BASIN			X
- Owens Valley Planning Area	X			SOUTH CENTRAL COAST AIR BASIN		X	
- Coso Junction			X	SOUTH COAST AIR BASIN			X
- Remainder of County		X		SOUTHEAST DESERT AIR BASIN			
Mono County				Eastern Kern County			
- Mammoth Lake Planning Area			X	- Indian Wells Valley			X
- Mono Lake Basin	X			- Portion within San Joaquin Valley Planning Area	X		
- Remainder of County		X		- Remainder of County		X	
LAKE COUNTY AIR BASIN		X		Imperial County			
LAKE TAHOE AIR BASIN		X		- Imperial Valley Planning Area	X		
MOUNTAIN COUNTIES AIR BASIN				- Remainder of County		X	
Placer County (portion) (2)		X		Los Angeles County (portion)		X	
Remainder of Air Basin		X		Riverside County (portion)			
NORTH CENTRAL COAST AIR BASIN		X		- Coachella Valley (3)	X		
NORTH COAST AIR BASIN		X		- Non-AQMA portion		X	
NORTHEAST PLATEAU AIR BASIN		X		San Bernardino County			
SACRAMENTO VALLEY AIR BASIN				- Trona	X		
Butte County		X		- Remainder of County	X		
Colusa County		X					
Glenn County		X					
Placer County (portion) (2)		X					
Sacramento County (1)			X				
Shasta County		X					
Solano County (portion)		X					
Sutter County		X					
Tehama County		X					
Yolo County		X					
Yuba County		X					

* Definitions and references for all areas can be found in 40 CFR, Chapter I, Part 81.305.
(1) Air quality in Sacramento County meets the national PM10 standards. The request for redesignation to attainment was approved by U.S. EPA in September 2013.
(2) U.S. EPA designation puts the Sacramento Valley Air Basin portion of Placer County in the Mountain Counties Air Basin.
(3) Air quality in Coachella Valley meets the national PM10 standards. A request for redesignation to attainment has been submitted to U.S. EPA.

FIGURE 13


Area Designations for National Ambient Air Quality Standards PM2.5
N
0 50 100 150 200 Miles
NORTH COAST
Del Norte
Siskiyou
Modoc
NORTHEAST PLATEAU
Humboldt
Trinity
Shasta
Lassen
Tehama
SACRAMENTO VALLEY
Plumas
Glenn
Butte
Sierra
MOUNTAIN COUNTIES
Mendocino
Nevada
LAKE COUNTY
Colusa
Yuba
Placer
Lake
Sutter
LAKE TAHOE
Yolo
El Dorado
Sonoma
Napa
Sacramento
Alpine
Amador
Solano
Calaveras
GREAT BASIN VALLEYS
SAN FRANCISCO BAY AREA
Marin
Tuolumne
Contra Costa
San Joaquin
Mono
Alameda
Stanislaus
Mariposa
San Mateo
Merced
Madera
Santa Clara
Santa Cruz
Fresno
NORTH CENTRAL COAST
San Benito
SAN JOAQUIN VALLEY
Inyo
Tulare
Monterey
Kings
San Luis Obispo
Kern
San Bernardino
SOUTH CENTRAL COAST
Santa Barbara
SOUTHEAST DESERT
Ventura
Los Angeles
Riverside
Orange
SOUTH COAST
San Diego
Imperial
SAN DIEGO COUNTY
Unclassified/Attainment
Nonattainment
Air Basin
County
Source Date:
October 2018
Air Quality Planning and Science Division

TABLE 13

National Ambient Air Quality Standards
Area Designations for Fine Particulate Matter (PM2.5)*

	N	U/A		N	U/A
GREAT BASIN VALLEYS AIR BASIN		X	SAN DIEGO COUNTY		X
LAKE COUNTY AIR BASIN		X	SAN FRANCISCO BAY AREA AIR BASIN (2)	X	
LAKE TAHOE AIR BASIN		X	SAN JOAQUIN VALLEY AIR BASIN	X	
MOUNTAIN COUNTIES AIR BASIN			SOUTH CENTRAL COAST AIR BASIN		X
Plumas County			SOUTH COAST AIR BASIN (3)	X	
- Portola Valley Portion of Plumas	X		SOUTHEAST DESERT AIR BASIN		
- Remainder of Plumas County		X	Imperial County (portion) (4)	X	
Remainder of Air Basin		X	Remainder of Air Basin		X
NORTH CENTRAL COAST AIR BASIN		X			
NORTH COAST AIR BASIN		X			
NORTHEAST PLATEAU AIR BASIN		X			
SACRAMENTO VALLEY AIR BASIN					
Sacramento Metro Area (1)	X				
Sutter County		X			
Yuba County (portion)		X			
Remainder of Air Basin		X			

* Definitions and references for all areas can be found in 40 CFR, Chapter I, Part 81.305. This map reflects the 2006 24-hour PM2.5 standard as well as the 1997 and 2012 PM2.5 annual standards.

(1) For this purpose, Sacramento Metro Area comprises all of Sacramento and portions of El Dorado, Placer, Solano, and Yolo Counties. Air quality in this area meets the national PM2.5 standards. A Determination of Attainment for the 2006 24-hour PM2.5 standard was made by U.S. EPA in June 2017.

(2) Air quality in this area meets the national PM2.5 standards. A Determination of Attainment for the 2006 24-hour PM2.5 standard was made by U.S. EPA in June 2017.

(3) Those lands of the Santa Rosa Band of Cahulla Mission Indians in Riverside County are designated Unclassifiable/Attainment.

(4) That portion of Imperial County encompassing the urban and surrounding areas of Brawley, Calexico, El Centro, Heber, Holtville, Imperial, Seeley, and Westmorland. Air quality in this area meets the national PM2.5 standards. A Determination of Attainment for the 2006 24-hour PM2.5 standard was made by U.S. EPA in June 2017.

FIGURE 14

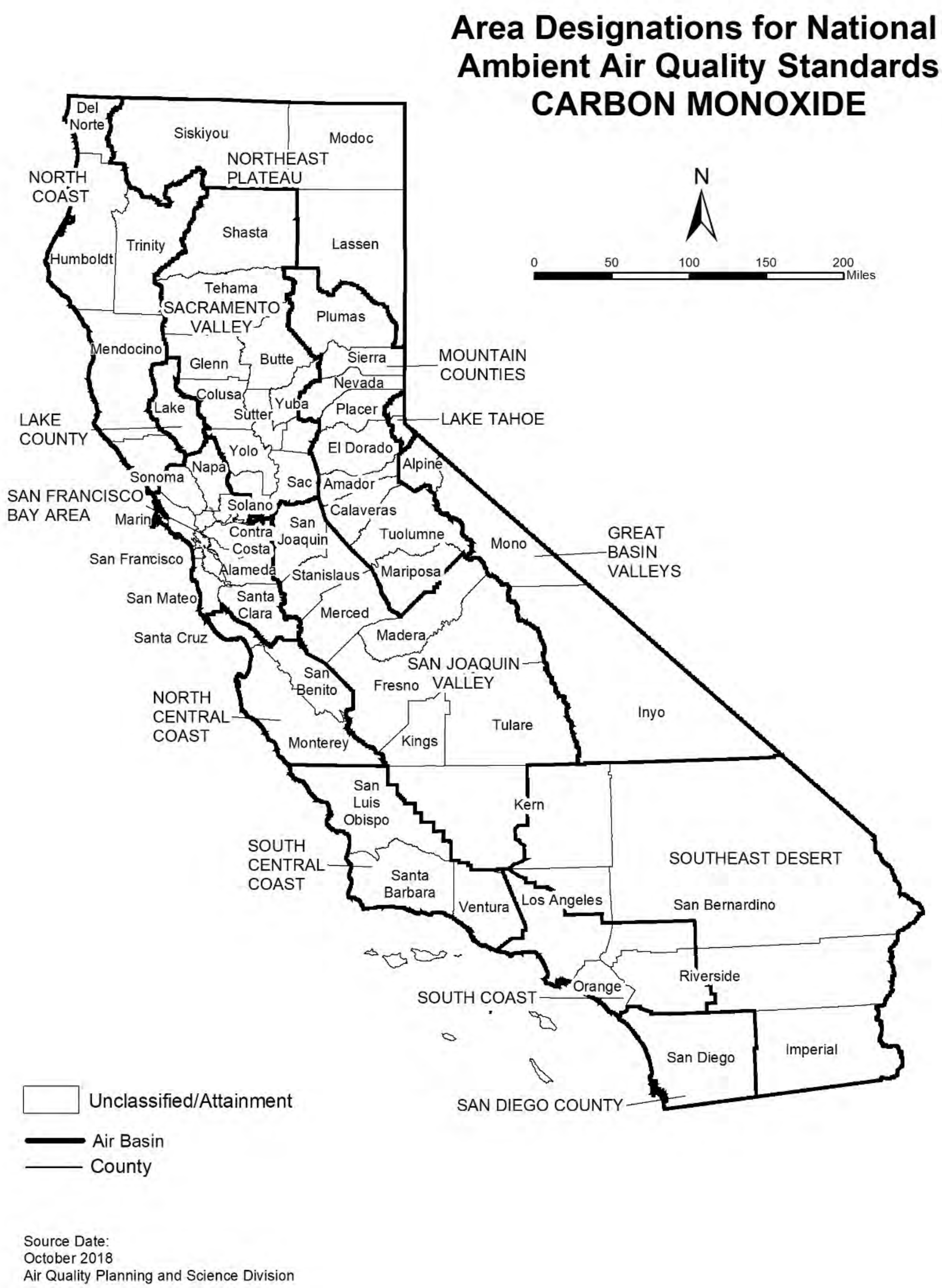

Area Designations for National
Ambient Air Quality Standards
CARBON MONOXIDE
N
0 50 100 150 200 Miles
Del Norte
Siskiyou
Modoc
NORTHEAST PLATEAU
NORTH COAST
Shasta
Lassen
Trinity
Humboldt
Tehama
SACRAMENTO VALLEY
Plumas
Mendocino
Glenn
Butte
Sierra
MOUNTAIN COUNTIES
Nevada
Colusa
Yuba
Lake
Sutter
Placer
LAKE TAHOE
LAKE COUNTY
Yolo
El Dorado
Napa
Alpine
Sonoma
Sac
Amador
SAN FRANCISCO BAY AREA
Solano
Calaveras
Marin
Contra Costa
San Joaquin
Tuolumne
Mono
GREAT BASIN VALLEYS
San Francisco
Alameda
Stanislaus
Mariposa
San Mateo
Santa Clara
Merced
Santa Cruz
Madera
SAN JOAQUIN VALLEY
San Benito
Fresno
NORTH CENTRAL COAST
Inyo
Tulare
Monterey
Kings
San Luis Obispo
Kern
SOUTH CENTRAL COAST
SOUTHEAST DESERT
Santa Barbara
Ventura
Los Angeles
San Bernardino
Riverside
Orange
SOUTH COAST
San Diego
Imperial
SAN DIEGO COUNTY
Unclassified/Attainment
Air Basin
County
Source Date:
October 2018
Air Quality Planning and Science Division

TABLE 14

National Ambient Air Quality Standards
Area Designations for Carbon Monoxide*

	N	U/A		N	U/A
GREAT BASIN VALLEYS AIR BASIN		X	SACRAMENTO VALLEY AIR BASIN		X
LAKE COUNTY AIR BASIN		X	SAN DIEGO COUNTY		X
LAKE TAHOE AIR BASIN		X	SAN FRANCISCO BAY AREA AIR BASIN		X
MOUNTAIN COUNTIES AIR BASIN		X	SAN JOAQUIN VALLEY AIR BASIN		X
NORTH CENTRAL COAST AIR BASIN		X	SOUTH CENTRAL COAST AIR BASIN		X
NORTH COAST AIR BASIN		X	SOUTH COAST AIR BASIN		X
NORTHEAST PLATEAU AIR BASIN		X	SOUTHEAST DESERT AIR BASIN		X

* Definitions and references for all areas can be found in 40 CFR, Chapter I, Part 81.305.

FIGURE 15

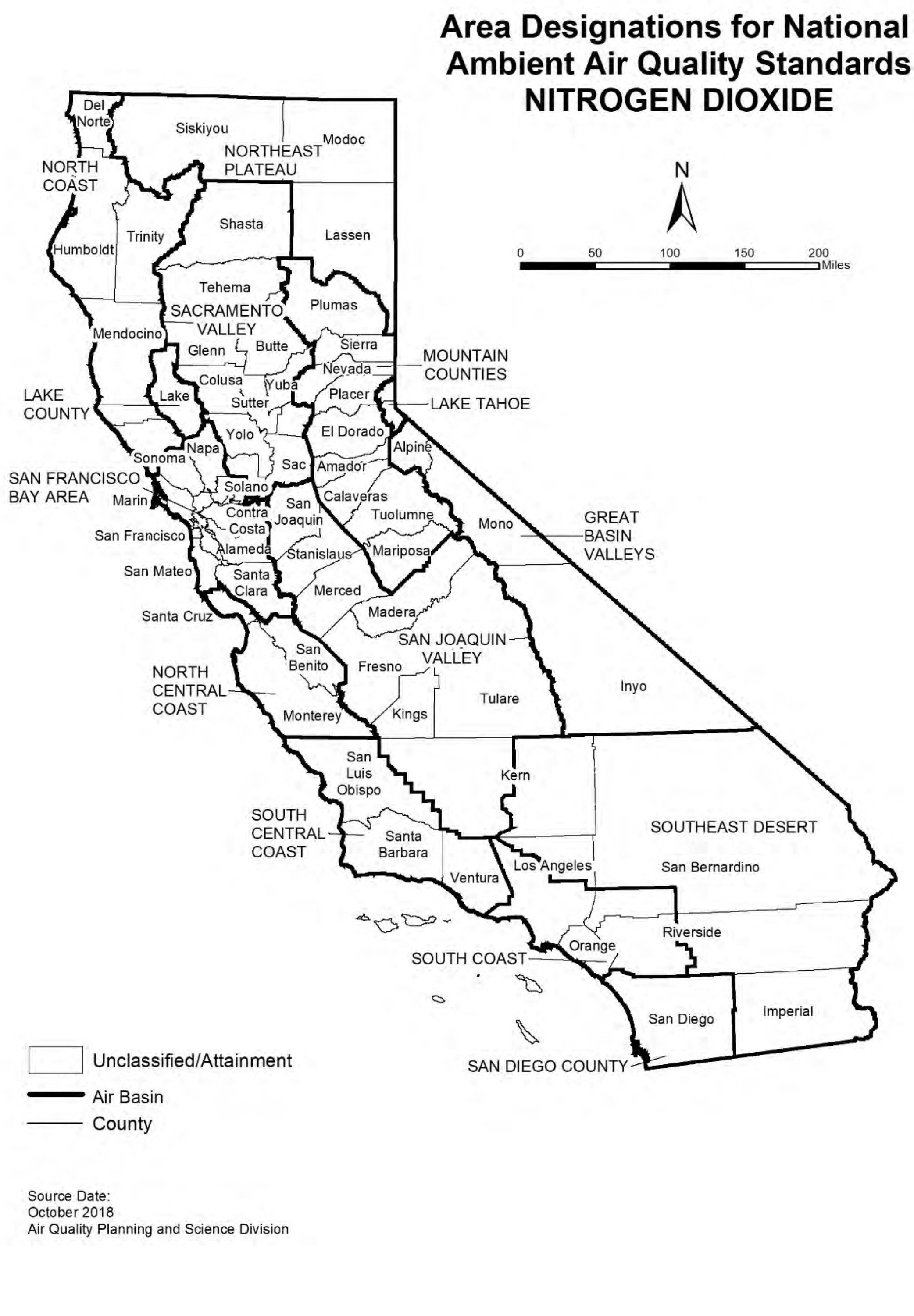

Area Designations for National Ambient Air Quality Standards NITROGEN DIOXIDE
N
0 50 100 150 200 Miles
Del Norte
Siskiyou
Modoc
NORTHEAST PLATEAU
NORTH COAST
Shasta
Lassen
Trinity
Humboldt
Tehema
Plumas
SACRAMENTO VALLEY
Mendocino
Glenn
Butte
Sierra
Nevada
MOUNTAIN COUNTIES
Colusa
Yuba
LAKE COUNTY
Lake
Sutter
Placer
LAKE TAHOE
Yolo
El Dorado
Napa
Sonoma
Alpine
Sac
Amador
SAN FRANCISCO BAY AREA
Solano
Marin
Contra Costa
San Joaquin
Calaveras
Tuolumne
Mono
GREAT BASIN VALLEYS
San Francisco
Alameda
Stanislaus
Mariposa
San Mateo
Santa Clara
Merced
Santa Cruz
Madera
SAN JOAQUIN VALLEY
San Benito
NORTH CENTRAL COAST
Fresno
Inyo
Tulare
Monterey
Kings
San Luis Obispo
Kern
SOUTH CENTRAL COAST
SOUTHEAST DESERT
Santa Barbara
Los Angeles
San Bernardino
Ventura
Riverside
Orange
SOUTH COAST
San Diego
Imperial
SAN DIEGO COUNTY
Unclassified/Attainment
Air Basin
County
Source Date:
October 2018
Air Quality Planning and Science Division

TABLE 15

National Ambient Air Quality Standards
Area Designations for Nitrogen Dioxide*

	N	U/A		N	U/A
GREAT BASIN VALLEYS AIR BASIN		X	SACRAMENTO VALLEY AIR BASIN		X
LAKE COUNTY AIR BASIN		X	SAN DIEGO COUNTY		X
LAKE TAHOE AIR BASIN		X	SAN FRANCISCO BAY AREA AIR BASIN		X
MOUNTAIN COUNTIES AIR BASIN		X	SAN JOAQUIN VALLEY AIR BASIN		X
NORTH CENTRAL COAST AIR BASIN		X	SOUTH CENTRAL COAST AIR BASIN		X
NORTH COAST AIR BASIN		X	SOUTH COAST AIR BASIN		X
NORTHEAST PLATEAU AIR BASIN		X	SOUTHEAST DESERT AIR BASIN		X

* Definitions and references for all areas can be found in 40 CFR, Chapter I, Part 81.305.

FIGURE 16


Area Designations for National Ambient Air Quality Standards
SULFUR DIOXIDE
N
0 50 100 150 200 Miles
Del Norte
Siskiyou
Modoc
NORTHEAST PLATEAU
NORTH COAST
Shasta
Lassen
Trinity
Humboldt
Tehema
Plumas
SACRAMENTO VALLEY
Mendocino
Glenn
Butte
Sierra
MOUNTAIN COUNTIES
Nevada
Colusa
Yuba
Placer
LAKE TAHOE
LAKE COUNTY
Lake
Sutter
Yolo
El Dorado
Napa
Alpine
Sonoma
Sac
Amador
SAN FRANCISCO BAY AREA
Solano
Marin
Contra Costa
San Joaquin
Calaveras
Tuolumne
Mono
GREAT BASIN VALLEYS
San Francisco
Alameda
Stanislaus
Mariposa
San Mateo
Santa Clara
Merced
Madera
Santa Cruz
SAN JOAQUIN VALLEY
San Benito
Fresno
NORTH CENTRAL COAST
Inyo
Tulare
Monterey
Kings
San Luis Obispo
Kern
SOUTH CENTRAL COAST
Santa Barbara
SOUTHEAST DESERT
Ventura
Los Angeles
San Bernardino
Riverside
Orange
SOUTH COAST
San Diego
Imperial
SAN DIEGO COUNTY
Unclassified/Attainment
Air Basin
County
Source Date:
October 2018
Air Quality Planning and Science Division

TABLE 16

National Ambient Air Quality Standards
Area Designations for Sulfur Dioxide*

	N	U/A		N	U/A
GREAT BASIN VALLEYS AIR BASIN		X	SOUTH CENTRAL COAST AIR BASIN		
LAKE COUNTY AIR BASIN		X	San Luis Obispo County		X
LAKE TAHOE AIR BASIN		X	Santa Barbara County		X
MOUNTAIN COUNTIES AIR BASIN		X	Ventura County		X
NORTH CENTRAL COAST AIR BASIN		X	Channel Islands (1)		X
NORTH COAST AIR BASIN		X	SOUTH COAST AIR BASIN		X
NORTHEAST PLATEAU AIR BASIN		X	SOUTHEAST DESERT AIR BASIN		
SACRAMENTO VALLEY AIR BASIN		X	Imperial County		X
SAN DIEGO COUNTY		X	Remainder of Air Basin		X
SAN FRANCISCO BAY AREA AIR BASIN		X			
SAN JOAQUIN VALLEY AIR BASIN					
Fresno County		X			
Kern County (portion)		X			
Kings County		X			
Madera County		X			
Merced County		X			
San Joaquin County		X			
Stanislaus County		X			
Tulare County		X			

* Definitions and references for all areas can be found in 40 CFR, Chapter I, Part 81.305.

NOTE: This map and table reflect the 2010 1-hour SO_2 standard of 75 ppb.

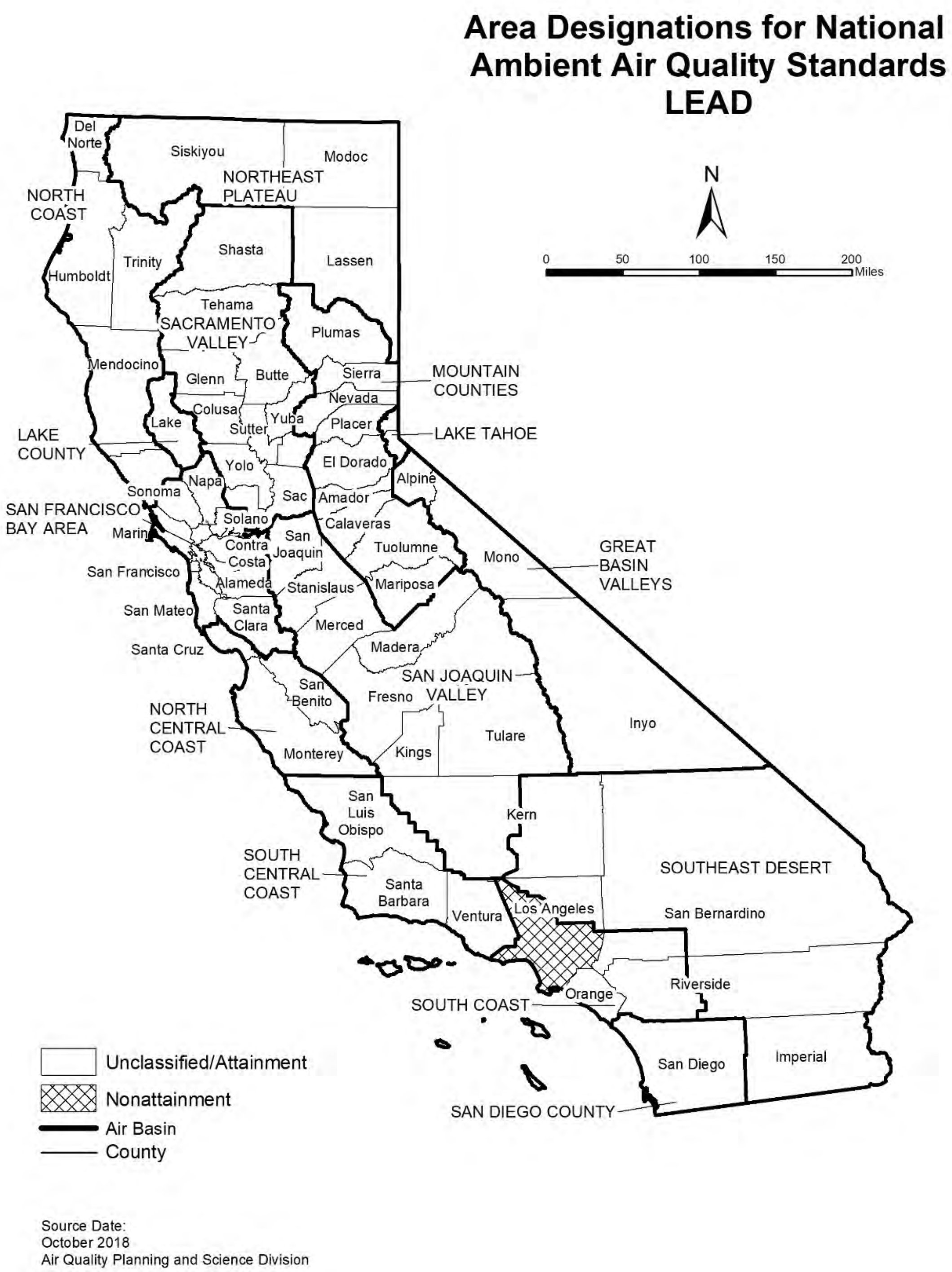
(1) South Central Coast Air Basin Channel Islands:

Santa Barbara County includes Santa Cruz, San Miguel, Santa Rosa, and Santa Barbara Islands.

Ventura County includes Anacapa and San Nicolas Islands.

Note that the San Clemente and Santa Catalina Islands are considered part of Los Angeles County, and therefore, are included as part of the South Coast Air Basin.

FIGURE 17



Area Designations for National Ambient Air Quality Standards LEAD
N
0
50
100
150
200
Miles
Del Norte
Siskiyou
Modoc
NORTHEAST PLATEAU
NORTH COAST
Trinity
Shasta
Lassen
Humboldt
Tehama
SACRAMENTO VALLEY
Plumas
Mendocino
Glenn
Butte
Sierra
MOUNTAIN COUNTIES
Nevada
Colusa
Yuba
Lake
Sutter
Placer
LAKE TAHOE
LAKE COUNTY
Yolo
El Dorado
Napa
Alpine
Sonoma
Sac
Amador
SAN FRANCISCO BAY AREA
Solano
Marin
Calaveras
San Joaquin
Contra Costa
Tuolumne
Mono
GREAT BASIN VALLEYS
San Francisco
Alameda
Stanislaus
Mariposa
San Mateo
Santa Clara
Merced
Santa Cruz
Madera
SAN JOAQUIN VALLEY
San Benito
Fresno
NORTH CENTRAL COAST
Inyo
Tulare
Monterey
Kings
San Luis Obispo
Kern
SOUTH CENTRAL COAST
SOUTHEAST DESERT
Santa Barbara
Ventura
Los Angeles
San Bernardino
Riverside
Orange
SOUTH COAST
San Diego
Imperial
SAN DIEGO COUNTY
Unclassified/Attainment
Nonattainment
Air Basin
County
Source Date:
October 2018
Air Quality Planning and Science Division

TABLE 17

National Ambient Air Quality Standards
Area Designations for Lead (particulate)

	N	U/A		N	U/A
GREAT BASIN VALLEYS AIR BASIN		X	SAN DIEGO COUNTY		X
LAKE COUNTY AIR BASIN		X	SAN FRANCISCO BAY AREA AIR BASIN		X
LAKE TAHOE AIR BASIN		X	SAN JOAQUIN VALLEY AIR BASIN		X
MOUNTAIN COUNTIES AIR BASIN		X	SOUTH CENTRAL COAST AIR BASIN		X
NORTH CENTRAL COAST AIR BASIN		X	SOUTH COAST AIR BASIN		
NORTH COAST AIR BASIN		X	Los Angeles County (portion) (1)	X	
NORTHEAST PLATEAU AIR BASIN		X	Remainder of Air Basin		X
SACRAMENTO VALLEY AIR BASIN		X	SOUTHEAST DESERT AIR BASIN		X

(1) Portion of County in Air Basin, not including Channel Islands

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APPENDIX 3.1:

CALEEMOD PROJECT CATEGORY 1 CONSTRUCTION UNMITIGATED EMISSIONS MODEL OUTPUTS

OBMPU - Project Category 1 (Construction - Unmitigated)

San Bernardino-South Coast County, Summer

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Other Asphalt Surfaces	22.50	1000sqft	0.52	22,500.00	0
Other Non-Asphalt Surfaces	455.00	1000sqft	10.45	455,000.00	0

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	2.2	**Precipitation Freq (Days)**	32
Climate Zone	10			**Operational Year**	2022
Utility Company	Southern California Edison				
CO2 Intensity (lb/MWhr)	702.44	**CH4 Intensity (lb/MWhr)**	0.029	**N2O Intensity (lb/MWhr)**	0.006

1.3 User Entered Comments & Non-Default Data

Project Characteristics -

Land Use - Other Asphalt Surfaces = 20 Monitoring Wells and Production Wells; Other Non-Asphalt Surfaces = Conveyance

Construction Phase - Analysis assumes 20 Monitoring Wells, 10 Production Wells, and 65,000 LF of conveyance to be constructed in a single year.

Off-road Equipment - Equipment based on information provided in the Project Description

Trips and VMT - Based on information provided in the Project Description

Grading - Based on the Project Description, the average area of disturbance of each well site is anticipated to be half an acre or less.

Construction Off-road Equipment Mitigation - Rule 403

Table Name	Column Name	Default Value	New Value
tblConstructionPhase	NumDays	30.00	366.00
tblConstructionPhase	NumDaysWeek	5.00	7.00
tblGrading	AcresOfGrading	0.00	183.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	0.00
tblTripsAndVMT	VendorTripLength	6.90	50.00
tblTripsAndVMT	VendorTripNumber	0.00	30.00
tblTripsAndVMT	WorkerTripLength	14.70	30.00
tblTripsAndVMT	WorkerTripNumber	5.00	10.00

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	1.2371	16.5304	8.3063	0.0681	2.1457	0.3189	2.4646	0.5167	0.2946	0.8113	0.0000	6,970.5806	6,970.5806	0.8261	0.0000	6,991.2333
2022	1.1023	13.7535	7.8477	0.0677	2.1456	0.2480	2.3936	0.5167	0.2291	0.7458	0.0000	6,925.8525	6,925.8525	0.8232	0.0000	6,946.4317
Maximum	**1.2371**	**16.5304**	**8.3063**	**0.0681**	**2.1457**	**0.3189**	**2.4646**	**0.5167**	**0.2946**	**0.8113**	**0.0000**	**6,970.5806**	**6,970.5806**	**0.8261**	**0.0000**	**6,991.2333**

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	1.2371	16.5304	8.3063	0.0681	1.8222	0.3189	2.1411	0.4818	0.2946	0.7763	0.0000	6,970.5806	6,970.5806	0.8261	0.0000	6,991.2333
2022	1.1023	13.7535	7.8477	0.0677	1.8222	0.2480	2.0701	0.4817	0.2291	0.7109	0.0000	6,925.8525	6,925.8525	0.8232	0.0000	6,946.4317
Maximum	**1.2371**	**16.5304**	**8.3063**	**0.0681**	**1.8222**	**0.3189**	**2.1411**	**0.4818**	**0.2946**	**0.7763**	**0.0000**	**6,970.5806**	**6,970.5806**	**0.8261**	**0.0000**	**6,991.2333**

	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**	**15.07**	**0.00**	**13.32**	**6.76**	**0.00**	**4.49**	**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	0.2101	4.5000e-004	0.0488	0.0000		1.7000e-004	1.7000e-004		1.7000e-004	1.7000e-004		0.1045	0.1045	2.8000e-004		0.1114
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	**0.2101**	**4.5000e-004**	**0.0488**	**0.0000**	**0.0000**	**1.7000e-004**	**1.7000e-004**	**0.0000**	**1.7000e-004**	**1.7000e-004**		**0.1045**	**0.1045**	**2.8000e-004**	**0.0000**	**0.1114**

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	0.2101	4.5000e-004	0.0488	0.0000		1.7000e-004	1.7000e-004		1.7000e-004	1.7000e-004		0.1045	0.1045	2.8000e-004		0.1114
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	**0.2101**	**4.5000e-004**	**0.0488**	**0.0000**	**0.0000**	**1.7000e-004**	**1.7000e-004**	**0.0000**	**1.7000e-004**	**1.7000e-004**		**0.1045**	**0.1045**	**2.8000e-004**	**0.0000**	**0.1114**

	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	Grading	Grading	1/1/2021	1/1/2022	7	366	

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 183

Acres of Paving: 10.97

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
Grading	Bore/Drill Rigs	1	8.00	221	0.50
Grading	Excavators	0	8.00	158	0.38
Grading	Graders	0	8.00	187	0.41
Grading	Off-Highway Trucks	1	8.00	402	0.38
Grading	Rubber Tired Dozers	0	8.00	247	0.40
Grading	Scrapers	0	8.00	367	0.48
Grading	Tractors/Loaders/Backhoes	0	8.00	97	0.37

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
Grading	2	10.00	30.00	0.00	30.00	50.00	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

Water Exposed Area

3.2 Grading - 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					0.5303	0.0000	0.5303	0.0573	0.0000	0.0573			0.0000			0.0000
Off-Road	0.8641	8.2861	5.6783	0.0226		0.2847	0.2847		0.2619	0.2619		2,190.585 4	2,190.585 4	0.7085		2,208.297 4
Total	**0.8641**	**8.2861**	**5.6783**	**0.0226**	**0.5303**	**0.2847**	**0.8149**	**0.0573**	**0.2619**	**0.3192**		**2,190.585 4**	**2,190.585 4**	**0.7085**		**2,208.297 4**

3.2 Grading - 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	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	0.2848	8.1834	1.8261	0.0432	1.3874	0.0328	1.4202	0.3990	0.0314	0.4304		4,559.040 1	4,559.040 1	0.1115		4,561.827 6
Worker	0.0882	0.0608	0.8019	2.2200e-003	0.2280	1.3900e-003	0.2294	0.0605	1.2800e-003	0.0617		220.9551	220.9551	6.1300e-003		221.1083
Total	**0.3730**	**8.2442**	**2.6280**	**0.0455**	**1.6154**	**0.0342**	**1.6496**	**0.4594**	**0.0327**	**0.4921**		**4,779.995 2**	**4,779.995 2**	**0.1176**		**4,782.935 9**

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					0.2068	0.0000	0.2068	0.0223	0.0000	0.0223			0.0000			0.0000
Off-Road	0.8641	8.2861	5.6783	0.0226		0.2847	0.2847		0.2619	0.2619	0.0000	2,190.585 4	2,190.585 4	0.7085		2,208.297 4
Total	**0.8641**	**8.2861**	**5.6783**	**0.0226**	**0.2068**	**0.2847**	**0.4915**	**0.0223**	**0.2619**	**0.2843**	**0.0000**	**2,190.585 4**	**2,190.585 4**	**0.7085**		**2,208.297 4**

3.2 Grading - 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	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	0.2848	8.1834	1.8261	0.0432	1.3874	0.0328	1.4202	0.3990	0.0314	0.4304		4,559.040 1	4,559.040 1	0.1115		4,561.827 6
Worker	0.0882	0.0608	0.8019	2.2200e-003	0.2280	1.3900e-003	0.2294	0.0605	1.2800e-003	0.0617		220.9551	220.9551	6.1300e-003		221.1083
Total	**0.3730**	**8.2442**	**2.6280**	**0.0455**	**1.6154**	**0.0342**	**1.6496**	**0.4594**	**0.0327**	**0.4921**		**4,779.995 2**	**4,779.995 2**	**0.1176**		**4,782.935 9**

3.2 Grading - 2022

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					0.5303	0.0000	0.5303	0.0573	0.0000	0.0573			0.0000			0.0000
Off-Road	0.7525	6.2801	5.3999	0.0227		0.2187	0.2187		0.2012	0.2012		2,192.546 1	2,192.546 1	0.7091		2,210.274 0
Total	**0.7525**	**6.2801**	**5.3999**	**0.0227**	**0.5303**	**0.2187**	**0.7490**	**0.0573**	**0.2012**	**0.2585**		**2,192.546 1**	**2,192.546 1**	**0.7091**		**2,210.274 0**

3.2 Grading - 2022

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	0.2673	7.4187	1.7104	0.0429	1.3874	0.0279	1.4153	0.3990	0.0267	0.4256		4,520.3308	4,520.3308	0.1086		4,523.0447
Worker	0.0825	0.0547	0.7374	2.1400e-003	0.2280	1.3500e-003	0.2294	0.0605	1.2400e-003	0.0617		212.9756	212.9756	5.5000e-003		213.1131
Total	**0.3498**	**7.4734**	**2.4478**	**0.0450**	**1.6154**	**0.0293**	**1.6446**	**0.4594**	**0.0279**	**0.4873**		**4,733.3064**	**4,733.3064**	**0.1141**		**4,736.1577**

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					0.2068	0.0000	0.2068	0.0223	0.0000	0.0223			0.0000			0.0000
Off-Road	0.7525	6.2801	5.3999	0.0227		0.2187	0.2187		0.2012	0.2012	0.0000	2,192.5461	2,192.5461	0.7091		2,210.2740
Total	**0.7525**	**6.2801**	**5.3999**	**0.0227**	**0.2068**	**0.2187**	**0.4255**	**0.0223**	**0.2012**	**0.2235**	**0.0000**	**2,192.5461**	**2,192.5461**	**0.7091**		**2,210.2740**

3.2 Grading - 2022

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	0.2673	7.4187	1.7104	0.0429	1.3874	0.0279	1.4153	0.3990	0.0267	0.4256		4,520.3308	4,520.3308	0.1086		4,523.0447
Worker	0.0825	0.0547	0.7374	2.1400e-003	0.2280	1.3500e-003	0.2294	0.0605	1.2400e-003	0.0617		212.9756	212.9756	5.5000e-003		213.1131
Total	**0.3498**	**7.4734**	**2.4478**	**0.0450**	**1.6154**	**0.0293**	**1.6446**	**0.4594**	**0.0279**	**0.4873**		**4,733.3064**	**4,733.3064**	**0.1141**		**4,736.1577**

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 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 Asphalt Surfaces	16.60	8.40	6.90	0.00	0.00	0.00	0	0	0
Other Non-Asphalt Surfaces	16.60	8.40	6.90	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 Asphalt Surfaces	0.553113	0.036408	0.180286	0.116335	0.016165	0.005101	0.018218	0.063797	0.001357	0.001565	0.005903	0.000808	0.000944
Other Non-Asphalt Surfaces	0.553113	0.036408	0.180286	0.116335	0.016165	0.005101	0.018218	0.063797	0.001357	0.001565	0.005903	0.000808	0.000944

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 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
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 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
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	0.2101	4.5000e-004	0.0488	0.0000		1.7000e-004	1.7000e-004		1.7000e-004	1.7000e-004		0.1045	0.1045	2.8000e-004		0.1114
Unmitigated	0.2101	4.5000e-004	0.0488	0.0000		1.7000e-004	1.7000e-004		1.7000e-004	1.7000e-004		0.1045	0.1045	2.8000e-004		0.1114

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	0.0364					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	0.1691					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Landscaping	4.5400e-003	4.5000e-004	0.0488	0.0000		1.7000e-004	1.7000e-004		1.7000e-004	1.7000e-004		0.1045	0.1045	2.8000e-004		0.1114
Total	**0.2101**	**4.5000e-004**	**0.0488**	**0.0000**		**1.7000e-004**	**1.7000e-004**		**1.7000e-004**	**1.7000e-004**		**0.1045**	**0.1045**	**2.8000e-004**		**0.1114**

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	0.0364					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	0.1691					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Landscaping	4.5400e-003	4.5000e-004	0.0488	0.0000		1.7000e-004	1.7000e-004		1.7000e-004	1.7000e-004		0.1045	0.1045	2.8000e-004		0.1114
Total	**0.2101**	**4.5000e-004**	**0.0488**	**0.0000**		**1.7000e-004**	**1.7000e-004**		**1.7000e-004**	**1.7000e-004**		**0.1045**	**0.1045**	**2.8000e-004**		**0.1114**

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

OBMPU - Project Category 1 (Construction - Unmitigated)

San Bernardino-South Coast County, Winter

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Other Asphalt Surfaces	22.50	1000sqft	0.52	22,500.00	0
Other Non-Asphalt Surfaces	455.00	1000sqft	10.45	455,000.00	0

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	2.2	**Precipitation Freq (Days)**	32
Climate Zone	10			**Operational Year**	2022
Utility Company	Southern California Edison				
CO2 Intensity (lb/MWhr)	702.44	**CH4 Intensity (lb/MWhr)**	0.029	**N2O Intensity (lb/MWhr)**	0.006

1.3 User Entered Comments & Non-Default Data

Project Characteristics -

Land Use - Other Asphalt Surfaces = 20 Monitoring Wells and Production Wells; Other Non-Asphalt Surfaces = Conveyance

Construction Phase - Analysis assumes 20 Monitoring Wells, 10 Production Wells, and 65,000 LF of conveyance to be constructed in a single year.

Off-road Equipment - Equipment based on information provided in the Project Description

Trips and VMT - Based on information provided in the Project Description

Grading - Based on the Project Description, the average area of disturbance of each well site is anticipated to be half an acre or less.

Construction Off-road Equipment Mitigation - Rule 403

Table Name	Column Name	Default Value	New Value
tblConstructionPhase	NumDays	30.00	366.00
tblConstructionPhase	NumDaysWeek	5.00	7.00
tblGrading	AcresOfGrading	0.00	183.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	0.00
tblTripsAndVMT	VendorTripLength	6.90	50.00
tblTripsAndVMT	VendorTripNumber	0.00	30.00
tblTripsAndVMT	WorkerTripLength	14.70	30.00
tblTripsAndVMT	WorkerTripNumber	5.00	10.00

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	1.2473	16.7492	8.2292	0.0675	2.1457	0.3190	2.4647	0.5167	0.2947	0.8114	0.0000	6,914.5212	6,914.5212	0.8310	0.0000	6,935.2962
2022	1.1123	13.9412	7.7798	0.0671	2.1456	0.2481	2.3937	0.5167	0.2293	0.7459	0.0000	6,870.6408	6,870.6408	0.8281	0.0000	6,891.3425
Maximum	**1.2473**	**16.7492**	**8.2292**	**0.0675**	**2.1457**	**0.3190**	**2.4647**	**0.5167**	**0.2947**	**0.8114**	**0.0000**	**6,914.5212**	**6,914.5212**	**0.8310**	**0.0000**	**6,935.2962**

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	1.2473	16.7492	8.2292	0.0675	1.8222	0.3190	2.1412	0.4818	0.2947	0.7765	0.0000	6,914.5212	6,914.5212	0.8310	0.0000	6,935.2962
2022	1.1123	13.9412	7.7798	0.0671	1.8222	0.2481	2.0703	0.4817	0.2293	0.7110	0.0000	6,870.6408	6,870.6408	0.8281	0.0000	6,891.3425
Maximum	**1.2473**	**16.7492**	**8.2292**	**0.0675**	**1.8222**	**0.3190**	**2.1412**	**0.4818**	**0.2947**	**0.7765**	**0.0000**	**6,914.5212**	**6,914.5212**	**0.8310**	**0.0000**	**6,935.2962**

	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**	**15.07**	**0.00**	**13.32**	**6.76**	**0.00**	**4.48**	**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	0.2101	4.5000e-004	0.0488	0.0000		1.7000e-004	1.7000e-004		1.7000e-004	1.7000e-004		0.1045	0.1045	2.8000e-004		0.1114
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	**0.2101**	**4.5000e-004**	**0.0488**	**0.0000**	**0.0000**	**1.7000e-004**	**1.7000e-004**	**0.0000**	**1.7000e-004**	**1.7000e-004**		**0.1045**	**0.1045**	**2.8000e-004**	**0.0000**	**0.1114**

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	0.2101	4.5000e-004	0.0488	0.0000		1.7000e-004	1.7000e-004		1.7000e-004	1.7000e-004		0.1045	0.1045	2.8000e-004		0.1114
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	**0.2101**	**4.5000e-004**	**0.0488**	**0.0000**	**0.0000**	**1.7000e-004**	**1.7000e-004**	**0.0000**	**1.7000e-004**	**1.7000e-004**		**0.1045**	**0.1045**	**2.8000e-004**	**0.0000**	**0.1114**

	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	Grading	Grading	1/1/2021	1/1/2022	7	366	

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 183

Acres of Paving: 10.97

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
Grading	Bore/Drill Rigs	1	8.00	221	0.50
Grading	Excavators	0	8.00	158	0.38
Grading	Graders	0	8.00	187	0.41
Grading	Off-Highway Trucks	1	8.00	402	0.38
Grading	Rubber Tired Dozers	0	8.00	247	0.40
Grading	Scrapers	0	8.00	367	0.48
Grading	Tractors/Loaders/Backhoes	0	8.00	97	0.37

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
Grading	2	10.00	30.00	0.00	30.00	50.00	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

Water Exposed Area

3.2 Grading - 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					0.5303	0.0000	0.5303	0.0573	0.0000	0.0573			0.0000			0.0000
Off-Road	0.8641	8.2861	5.6783	0.0226		0.2847	0.2847		0.2619	0.2619		2,190.5854	2,190.5854	0.7085		2,208.2974
Total	**0.8641**	**8.2861**	**5.6783**	**0.0226**	**0.5303**	**0.2847**	**0.8149**	**0.0573**	**0.2619**	**0.3192**		**2,190.5854**	**2,190.5854**	**0.7085**		**2,208.2974**

3.2 Grading - 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	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	0.2911	8.3991	1.9080	0.0429	1.3874	0.0330	1.4203	0.3990	0.0315	0.4305		4,525.877 6	4,525.877 6	0.1172		4,528.807 9
Worker	0.0921	0.0639	0.6429	1.9900e-003	0.2280	1.3900e-003	0.2294	0.0605	1.2800e-003	0.0617		198.0582	198.0582	5.3100e-003		198.1909
Total	**0.3832**	**8.4630**	**2.5508**	**0.0449**	**1.6154**	**0.0343**	**1.6497**	**0.4594**	**0.0328**	**0.4922**		**4,723.935 8**	**4,723.935 8**	**0.1225**		**4,726.998 8**

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					0.2068	0.0000	0.2068	0.0223	0.0000	0.0223			0.0000			0.0000
Off-Road	0.8641	8.2861	5.6783	0.0226		0.2847	0.2847		0.2619	0.2619	0.0000	2,190.585 4	2,190.585 4	0.7085		2,208.297 4
Total	**0.8641**	**8.2861**	**5.6783**	**0.0226**	**0.2068**	**0.2847**	**0.4915**	**0.0223**	**0.2619**	**0.2843**	**0.0000**	**2,190.585 4**	**2,190.585 4**	**0.7085**		**2,208.297 4**

3.2 Grading - 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	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	0.2911	8.3991	1.9080	0.0429	1.3874	0.0330	1.4203	0.3990	0.0315	0.4305		4,525.8776	4,525.8776	0.1172		4,528.8079
Worker	0.0921	0.0639	0.6429	1.9900e-003	0.2280	1.3900e-003	0.2294	0.0605	1.2800e-003	0.0617		198.0582	198.0582	5.3100e-003		198.1909
Total	**0.3832**	**8.4630**	**2.5508**	**0.0449**	**1.6154**	**0.0343**	**1.6497**	**0.4594**	**0.0328**	**0.4922**		**4,723.9358**	**4,723.9358**	**0.1225**		**4,726.9988**

3.2 Grading - 2022

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					0.5303	0.0000	0.5303	0.0573	0.0000	0.0573			0.0000			0.0000
Off-Road	0.7525	6.2801	5.3999	0.0227		0.2187	0.2187		0.2012	0.2012		2,192.5461	2,192.5461	0.7091		2,210.2740
Total	**0.7525**	**6.2801**	**5.3999**	**0.0227**	**0.5303**	**0.2187**	**0.7490**	**0.0573**	**0.2012**	**0.2585**		**2,192.5461**	**2,192.5461**	**0.7091**		**2,210.2740**

3.2 Grading - 2022

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	0.2733	7.6035	1.7895	0.0425	1.3874	0.0280	1.4154	0.3990	0.0268	0.4258		4,487.1768	4,487.1768	0.1142		4,490.0314
Worker	0.0865	0.0575	0.5904	1.9200e-003	0.2280	1.3500e-003	0.2294	0.0605	1.2400e-003	0.0617		190.9179	190.9179	4.7700e-003		191.0371
Total	**0.3598**	**7.6610**	**2.3799**	**0.0445**	**1.6154**	**0.0294**	**1.6448**	**0.4594**	**0.0281**	**0.4875**		**4,678.0947**	**4,678.0947**	**0.1190**		**4,681.0685**

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					0.2068	0.0000	0.2068	0.0223	0.0000	0.0223			0.0000			0.0000
Off-Road	0.7525	6.2801	5.3999	0.0227		0.2187	0.2187		0.2012	0.2012	0.0000	2,192.5461	2,192.5461	0.7091		2,210.2740
Total	**0.7525**	**6.2801**	**5.3999**	**0.0227**	**0.2068**	**0.2187**	**0.4255**	**0.0223**	**0.2012**	**0.2235**	**0.0000**	**2,192.5461**	**2,192.5461**	**0.7091**		**2,210.2740**

3.2 Grading - 2022

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	0.2733	7.6035	1.7895	0.0425	1.3874	0.0280	1.4154	0.3990	0.0268	0.4258		4,487.1768	4,487.1768	0.1142		4,490.0314
Worker	0.0865	0.0575	0.5904	1.9200e-003	0.2280	1.3500e-003	0.2294	0.0605	1.2400e-003	0.0617		190.9179	190.9179	4.7700e-003		191.0371
Total	**0.3598**	**7.6610**	**2.3799**	**0.0445**	**1.6154**	**0.0294**	**1.6448**	**0.4594**	**0.0281**	**0.4875**		**4,678.0947**	**4,678.0947**	**0.1190**		**4,681.0685**

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 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 Asphalt Surfaces	16.60	8.40	6.90	0.00	0.00	0.00	0	0	0
Other Non-Asphalt Surfaces	16.60	8.40	6.90	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 Asphalt Surfaces	0.553113	0.036408	0.180286	0.116335	0.016165	0.005101	0.018218	0.063797	0.001357	0.001565	0.005903	0.000808	0.000944
Other Non-Asphalt Surfaces	0.553113	0.036408	0.180286	0.116335	0.016165	0.005101	0.018218	0.063797	0.001357	0.001565	0.005903	0.000808	0.000944

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 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
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 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
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	0.2101	4.5000e-004	0.0488	0.0000		1.7000e-004	1.7000e-004		1.7000e-004	1.7000e-004		0.1045	0.1045	2.8000e-004		0.1114
Unmitigated	0.2101	4.5000e-004	0.0488	0.0000		1.7000e-004	1.7000e-004		1.7000e-004	1.7000e-004		0.1045	0.1045	2.8000e-004		0.1114

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	0.0364					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	0.1691					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Landscaping	4.5400e-003	4.5000e-004	0.0488	0.0000		1.7000e-004	1.7000e-004		1.7000e-004	1.7000e-004		0.1045	0.1045	2.8000e-004		0.1114
Total	**0.2101**	**4.5000e-004**	**0.0488**	**0.0000**		**1.7000e-004**	**1.7000e-004**		**1.7000e-004**	**1.7000e-004**		**0.1045**	**0.1045**	**2.8000e-004**		**0.1114**

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	0.0364					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	0.1691					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Landscaping	4.5400e-003	4.5000e-004	0.0488	0.0000		1.7000e-004	1.7000e-004		1.7000e-004	1.7000e-004		0.1045	0.1045	2.8000e-004		0.1114
Total	**0.2101**	**4.5000e-004**	**0.0488**	**0.0000**		**1.7000e-004**	**1.7000e-004**		**1.7000e-004**	**1.7000e-004**		**0.1045**	**0.1045**	**2.8000e-004**		**0.1114**

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

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APPENDIX 3.2:

CALEEMOD PROJECT CATEGORY 2 CONSTRUCTION UNMITIGATED EMISSIONS MODEL OUTPUTS

OBMPU - Project Category 2 (Construction - Unmitigated)

San Bernardino-South Coast County, Summer

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Other Non-Asphalt Surfaces	1,400.00	1000sqft	32.14	1,400,000.00	0

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	2.2	**Precipitation Freq (Days)**	32
Climate Zone	10			**Operational Year**	2022
Utility Company	Southern California Edison				
CO2 Intensity (lb/MWhr)	702.44	**CH4 Intensity (lb/MWhr)**	0.029	**N2O Intensity (lb/MWhr)**	0.006

1.3 User Entered Comments & Non-Default Data

Project Characteristics -

Land Use - Other Non-Asphalt Surfaces = Conveyance

Construction Phase - Analysis assumes 100,000 LF of Conveyance Pipelines (Recycled and Potable Water) and 100,000 LF of Conveyance Pipelines (Surplus and Supplemental Water Supply) constructed per year

Off-road Equipment - Equipment based on information provided in the Project Description

Trips and VMT - Based on information provided in the Project Description

Grading - Based on the Project Description, the average area of disturbance of each site is anticipated to be half an acre or less.

Construction Off-road Equipment Mitigation - Rule 403

Table Name	Column Name	Default Value	New Value
tblConstructionPhase	NumDays	45.00	366.00
tblConstructionPhase	NumDaysWeek	5.00	7.00
tblConstructionPhase	PhaseEndDate	3/4/2021	1/1/2022
tblGrading	AcresOfGrading	0.00	183.00
tblOffRoadEquipment	LoadFactor	0.42	0.42
tblOffRoadEquipment	LoadFactor	0.38	0.38
tblOffRoadEquipment	LoadFactor	0.38	0.38
tblOffRoadEquipment	OffRoadEquipmentType		Pavers
tblOffRoadEquipment	OffRoadEquipmentType		Rollers
tblOffRoadEquipment	OffRoadEquipmentType		Off-Highway Trucks
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	0.00
tblTripsAndVMT	VendorTripLength	6.90	40.00
tblTripsAndVMT	VendorTripNumber	0.00	20.00
tblTripsAndVMT	WorkerTripLength	14.70	40.00
tblTripsAndVMT	WorkerTripNumber	75.00	28.00

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	15.5639	138.2659	104.1901	0.3547	2.1215	5.2040	7.3255	0.4957	4.7884	5.2841	0.0000	34,561.2846	34,561.2846	10.2022	0.0000	34,816.3390
2022	13.5985	107.6327	98.2978	0.3543	2.1214	3.9927	6.1141	0.4957	3.6738	4.1696	0.0000	34,521.6514	34,521.6514	10.2016	0.0000	34,776.6915
Maximum	**15.5639**	**138.2659**	**104.1901**	**0.3547**	**2.1215**	**5.2040**	**7.3255**	**0.4957**	**4.7884**	**5.2841**	**0.0000**	**34,561.2846**	**34,561.2846**	**10.2022**	**0.0000**	**34,816.3390**

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	15.5639	138.2659	104.1901	0.3547	1.7980	5.2040	7.0020	0.4608	4.7884	5.2492	0.0000	34,561.2846	34,561.2846	10.2022	0.0000	34,816.3390
2022	13.5985	107.6327	98.2978	0.3543	1.7980	3.9927	5.7907	0.4608	3.6738	4.1346	0.0000	34,521.6514	34,521.6514	10.2016	0.0000	34,776.6915
Maximum	**15.5639**	**138.2659**	**104.1901**	**0.3547**	**1.7980**	**5.2040**	**7.0020**	**0.4608**	**4.7884**	**5.2492**	**0.0000**	**34,561.2846**	**34,561.2846**	**10.2022**	**0.0000**	**34,816.3390**

	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**	**15.25**	**0.00**	**4.81**	**7.04**	**0.00**	**0.74**	**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	0.6159	1.3100e-003	0.1432	1.0000e-005		5.1000e-004	5.1000e-004		5.1000e-004	5.1000e-004		0.3064	0.3064	8.1000e-004		0.3266
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	**0.6159**	**1.3100e-003**	**0.1432**	**1.0000e-005**	**0.0000**	**5.1000e-004**	**5.1000e-004**	**0.0000**	**5.1000e-004**	**5.1000e-004**		**0.3064**	**0.3064**	**8.1000e-004**	**0.0000**	**0.3266**

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	0.6159	1.3100e-003	0.1432	1.0000e-005		5.1000e-004	5.1000e-004		5.1000e-004	5.1000e-004		0.3064	0.3064	8.1000e-004		0.3266
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	**0.6159**	**1.3100e-003**	**0.1432**	**1.0000e-005**	**0.0000**	**5.1000e-004**	**5.1000e-004**	**0.0000**	**5.1000e-004**	**5.1000e-004**		**0.3064**	**0.3064**	**8.1000e-004**	**0.0000**	**0.3266**

	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	Grading	Grading	1/1/2021	1/1/2022	7	366	

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 183

Acres of Paving: 32.14

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
Grading	Excavators	2	8.00	158	0.38
Grading	Graders	0	8.00	187	0.41
Grading	Pavers	2	8.00	130	0.42
Grading	Rollers	2	8.00	80	0.38
Grading	Rubber Tired Dozers	0	8.00	247	0.40
Grading	Scrapers	0	8.00	367	0.48
Grading	Tractors/Loaders/Backhoes	2	8.00	97	0.37
Grading	Off-Highway Trucks	22	8.00	402	0.38

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
Grading	30	28.00	20.00	0.00	40.00	40.00	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

Water Exposed Area

3.2 Grading - 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					0.5303	0.0000	0.5303	0.0573	0.0000	0.0573			0.0000			0.0000
Off-Road	15.0907	133.4046	100.2156	0.3230		5.1813	5.1813		4.7668	4.7668		31,272.2399	31,272.2399	10.1141		31,525.0918
Total	**15.0907**	**133.4046**	**100.2156**	**0.3230**	**0.5303**	**5.1813**	**5.7116**	**0.0573**	**4.7668**	**4.8241**		**31,272.2399**	**31,272.2399**	**10.1141**		**31,525.0918**

3.2 Grading - 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	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	0.1578	4.6373	1.0191	0.0234	0.7401	0.0176	0.7576	0.2128	0.0168	0.2296		2,466.232 1	2,466.232 1	0.0654		2,467.867 9
Worker	0.3154	0.2240	2.9553	8.2600e-003	0.8512	5.1400e-003	0.8563	0.2257	4.7300e-003	0.2304		822.8126	822.8126	0.0227		823.3793
Total	**0.4732**	**4.8614**	**3.9745**	**0.0317**	**1.5912**	**0.0227**	**1.6139**	**0.4385**	**0.0215**	**0.4600**		**3,289.044 7**	**3,289.044 7**	**0.0881**		**3,291.247 2**

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					0.2068	0.0000	0.2068	0.0223	0.0000	0.0223			0.0000			0.0000
Off-Road	15.0907	133.4046	100.2156	0.3230		5.1813	5.1813		4.7668	4.7668	0.0000	31,272.23 99	31,272.23 99	10.1141		31,525.09 18
Total	**15.0907**	**133.4046**	**100.2156**	**0.3230**	**0.2068**	**5.1813**	**5.3881**	**0.0223**	**4.7668**	**4.7891**	**0.0000**	**31,272.23 99**	**31,272.23 99**	**10.1141**		**31,525.09 18**

3.2 Grading - 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	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	0.1578	4.6373	1.0191	0.0234	0.7401	0.0176	0.7576	0.2128	0.0168	0.2296		2,466.2321	2,466.2321	0.0654		2,467.8679
Worker	0.3154	0.2240	2.9553	8.2600e-003	0.8512	5.1400e-003	0.8563	0.2257	4.7300e-003	0.2304		822.8126	822.8126	0.0227		823.3793
Total	**0.4732**	**4.8614**	**3.9745**	**0.0317**	**1.5912**	**0.0227**	**1.6139**	**0.4385**	**0.0215**	**0.4600**		**3,289.0447**	**3,289.0447**	**0.0881**		**3,291.2472**

3.2 Grading - 2022

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					0.5303	0.0000	0.5303	0.0573	0.0000	0.0573			0.0000			0.0000
Off-Road	13.1551	103.2084	94.6260	0.3232		3.9728	3.9728		3.6550	3.6550		31,283.2050	31,283.2050	10.1176		31,536.1456
Total	**13.1551**	**103.2084**	**94.6260**	**0.3232**	**0.5303**	**3.9728**	**4.5030**	**0.0573**	**3.6550**	**3.7122**		**31,283.2050**	**31,283.2050**	**10.1176**		**31,536.1456**

3.2 Grading - 2022

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	0.1480	4.2227	0.9536	0.0232	0.7400	0.0149	0.7550	0.2128	0.0143	0.2271		2,445.3546	2,445.3546	0.0636		2,446.9455
Worker	0.2953	0.2017	2.7182	7.9600e-003	0.8512	4.9800e-003	0.8561	0.2257	4.5900e-003	0.2303		793.0918	793.0918	0.0204		793.6004
Total	**0.4434**	**4.4244**	**3.6718**	**0.0311**	**1.5912**	**0.0199**	**1.6111**	**0.4385**	**0.0189**	**0.4574**		**3,238.4464**	**3,238.4464**	**0.0840**		**3,240.5459**

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					0.2068	0.0000	0.2068	0.0223	0.0000	0.0223			0.0000			0.0000
Off-Road	13.1551	103.2084	94.6260	0.3232		3.9728	3.9728		3.6550	3.6550	0.0000	31,283.2050	31,283.2050	10.1176		31,536.1455
Total	**13.1551**	**103.2084**	**94.6260**	**0.3232**	**0.2068**	**3.9728**	**4.1796**	**0.0223**	**3.6550**	**3.6773**	**0.0000**	**31,283.2050**	**31,283.2050**	**10.1176**		**31,536.1455**

3.2 Grading - 2022

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	0.1480	4.2227	0.9536	0.0232	0.7400	0.0149	0.7550	0.2128	0.0143	0.2271		2,445.3546	2,445.3546	0.0636		2,446.9455
Worker	0.2953	0.2017	2.7182	7.9600e-003	0.8512	4.9800e-003	0.8561	0.2257	4.5900e-003	0.2303		793.0918	793.0918	0.0204		793.6004
Total	**0.4434**	**4.4244**	**3.6718**	**0.0311**	**1.5912**	**0.0199**	**1.6111**	**0.4385**	**0.0189**	**0.4574**		**3,238.4464**	**3,238.4464**	**0.0840**		**3,240.5459**

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		
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	16.60	8.40	6.90	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	0.553113	0.036408	0.180286	0.116335	0.016165	0.005101	0.018218	0.063797	0.001357	0.001565	0.005903	0.000808	0.000944

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**

5.2 Energy by Land Use - NaturalGas

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	0.6159	1.3100e-003	0.1432	1.0000e-005		5.1000e-004	5.1000e-004		5.1000e-004	5.1000e-004		0.3064	0.3064	8.1000e-004		0.3266
Unmitigated	0.6159	1.3100e-003	0.1432	1.0000e-005		5.1000e-004	5.1000e-004		5.1000e-004	5.1000e-004		0.3064	0.3064	8.1000e-004		0.3266

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	0.1067					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	0.4959					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Landscaping	0.0133	1.3100e-003	0.1432	1.0000e-005		5.1000e-004	5.1000e-004		5.1000e-004	5.1000e-004		0.3064	0.3064	8.1000e-004		0.3266
Total	**0.6159**	**1.3100e-003**	**0.1432**	**1.0000e-005**		**5.1000e-004**	**5.1000e-004**		**5.1000e-004**	**5.1000e-004**		**0.3064**	**0.3064**	**8.1000e-004**		**0.3266**

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	0.1067					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	0.4959					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Landscaping	0.0133	1.3100e-003	0.1432	1.0000e-005		5.1000e-004	5.1000e-004		5.1000e-004	5.1000e-004		0.3064	0.3064	8.1000e-004		0.3266
Total	**0.6159**	**1.3100e-003**	**0.1432**	**1.0000e-005**		**5.1000e-004**	**5.1000e-004**		**5.1000e-004**	**5.1000e-004**		**0.3064**	**0.3064**	**8.1000e-004**		**0.3266**

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

OBMPU - Project Category 2 (Construction - Unmitigated)

San Bernardino-South Coast County, Winter

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Other Non-Asphalt Surfaces	1,400.00	1000sqft	32.14	1,400,000.00	0

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	2.2	**Precipitation Freq (Days)**	32
Climate Zone	10			**Operational Year**	2022
Utility Company	Southern California Edison				
CO2 Intensity (lb/MWhr)	702.44	**CH4 Intensity (lb/MWhr)**	0.029	**N2O Intensity (lb/MWhr)**	0.006

1.3 User Entered Comments & Non-Default Data

Project Characteristics -

Land Use - Other Non-Asphalt Surfaces = Conveyance

Construction Phase - Analysis assumes 100,000 LF of Conveyance Pipelines (Recycled and Potable Water) and 100,000 LF of Conveyance Pipelines (Surplus and Supplemental Water Supply) constructed per year

Off-road Equipment - Equipment based on information provided in the Project Description

Trips and VMT - Based on information provided in the Project Description

Grading - Based on the Project Description, the average area of disturbance of each site is anticipated to be half an acre or less.

Construction Off-road Equipment Mitigation - Rule 403

Table Name	Column Name	Default Value	New Value
tblConstructionPhase	NumDays	45.00	366.00
tblConstructionPhase	NumDaysWeek	5.00	7.00
tblConstructionPhase	PhaseEndDate	3/4/2021	1/1/2022
tblGrading	AcresOfGrading	0.00	183.00
tblOffRoadEquipment	LoadFactor	0.42	0.42
tblOffRoadEquipment	LoadFactor	0.38	0.38
tblOffRoadEquipment	LoadFactor	0.38	0.38
tblOffRoadEquipment	OffRoadEquipmentType		Pavers
tblOffRoadEquipment	OffRoadEquipmentType		Rollers
tblOffRoadEquipment	OffRoadEquipmentType		Off-Highway Trucks
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	0.00
tblTripsAndVMT	VendorTripLength	6.90	40.00
tblTripsAndVMT	VendorTripNumber	0.00	20.00
tblTripsAndVMT	WorkerTripLength	14.70	40.00
tblTripsAndVMT	WorkerTripNumber	75.00	28.00

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	15.5858	138.3831	103.6460	0.3536	2.1215	5.2041	7.3256	0.4957	4.7884	5.2842	0.0000	34,453.7654	34,453.7654	10.2029	0.0000	34,708.8386
2022	13.6200	107.7326	97.7971	0.3533	2.1214	3.9928	6.1142	0.4957	3.6739	4.1696	0.0000	34,417.2684	34,417.2684	10.2026	0.0000	34,672.3340
Maximum	**15.5858**	**138.3831**	**103.6460**	**0.3536**	**2.1215**	**5.2041**	**7.3256**	**0.4957**	**4.7884**	**5.2842**	**0.0000**	**34,453.7654**	**34,453.7654**	**10.2029**	**0.0000**	**34,708.8386**

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	15.5858	138.3831	103.6460	0.3536	1.7980	5.2041	7.0021	0.4608	4.7884	5.2493	0.0000	34,453.7654	34,453.7654	10.2029	0.0000	34,708.8386
2022	13.6200	107.7326	97.7971	0.3533	1.7980	3.9928	5.7908	0.4608	3.6739	4.1347	0.0000	34,417.2684	34,417.2684	10.2026	0.0000	34,672.3340
Maximum	**15.5858**	**138.3831**	**103.6460**	**0.3536**	**1.7980**	**5.2041**	**7.0021**	**0.4608**	**4.7884**	**5.2493**	**0.0000**	**34,453.7654**	**34,453.7654**	**10.2029**	**0.0000**	**34,708.8386**

	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**	**15.25**	**0.00**	**4.81**	**7.04**	**0.00**	**0.74**	**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	0.6159	1.3100e-003	0.1432	1.0000e-005		5.1000e-004	5.1000e-004		5.1000e-004	5.1000e-004		0.3064	0.3064	8.1000e-004		0.3266
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	**0.6159**	**1.3100e-003**	**0.1432**	**1.0000e-005**	**0.0000**	**5.1000e-004**	**5.1000e-004**	**0.0000**	**5.1000e-004**	**5.1000e-004**		**0.3064**	**0.3064**	**8.1000e-004**	**0.0000**	**0.3266**

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	0.6159	1.3100e-003	0.1432	1.0000e-005		5.1000e-004	5.1000e-004		5.1000e-004	5.1000e-004		0.3064	0.3064	8.1000e-004		0.3266
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	**0.6159**	**1.3100e-003**	**0.1432**	**1.0000e-005**	**0.0000**	**5.1000e-004**	**5.1000e-004**	**0.0000**	**5.1000e-004**	**5.1000e-004**		**0.3064**	**0.3064**	**8.1000e-004**	**0.0000**	**0.3266**

	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	Grading	Grading	1/1/2021	1/1/2022	7	366	

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 183

Acres of Paving: 32.14

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
Grading	Excavators	2	8.00	158	0.38
Grading	Graders	0	8.00	187	0.41
Grading	Pavers	2	8.00	130	0.42
Grading	Rollers	2	8.00	80	0.38
Grading	Rubber Tired Dozers	0	8.00	247	0.40
Grading	Scrapers	0	8.00	367	0.48
Grading	Tractors/Loaders/Backhoes	2	8.00	97	0.37
Grading	Off-Highway Trucks	22	8.00	402	0.38

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
Grading	30	28.00	20.00	0.00	40.00	40.00	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

Water Exposed Area

3.2 Grading - 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					0.5303	0.0000	0.5303	0.0573	0.0000	0.0573			0.0000			0.0000
Off-Road	15.0907	133.4046	100.2156	0.3230		5.1813	5.1813		4.7668	4.7668		31,272.2399	31,272.2399	10.1141		31,525.0918
Total	**15.0907**	**133.4046**	**100.2156**	**0.3230**	**0.5303**	**5.1813**	**5.7116**	**0.0573**	**4.7668**	**4.8241**		**31,272.2399**	**31,272.2399**	**10.1141**		**31,525.0918**

3.2 Grading - 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	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	0.1618	4.7430	1.0754	0.0232	0.7401	0.0177	0.7577	0.2128	0.0169	0.2297		2,444.1238	2,444.1238	0.0693		2,445.8553
Worker	0.3334	0.2355	2.3551	7.4000e-003	0.8512	5.1400e-003	0.8563	0.2257	4.7300e-003	0.2304		737.4018	737.4018	0.0196		737.8915
Total	**0.4952**	**4.9785**	**3.4304**	**0.0306**	**1.5912**	**0.0228**	**1.6140**	**0.4385**	**0.0216**	**0.4601**		**3,181.5256**	**3,181.5256**	**0.0889**		**3,183.7468**

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					0.2068	0.0000	0.2068	0.0223	0.0000	0.0223			0.0000			0.0000
Off-Road	15.0907	133.4046	100.2156	0.3230		5.1813	5.1813		4.7668	4.7668	0.0000	31,272.2399	31,272.2399	10.1141		31,525.0918
Total	**15.0907**	**133.4046**	**100.2156**	**0.3230**	**0.2068**	**5.1813**	**5.3881**	**0.0223**	**4.7668**	**4.7891**	**0.0000**	**31,272.2399**	**31,272.2399**	**10.1141**		**31,525.0918**

3.2 Grading - 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	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	0.1618	4.7430	1.0754	0.0232	0.7401	0.0177	0.7577	0.2128	0.0169	0.2297		2,444.1238	2,444.1238	0.0693		2,445.8553
Worker	0.3334	0.2355	2.3551	7.4000e-003	0.8512	5.1400e-003	0.8563	0.2257	4.7300e-003	0.2304		737.4018	737.4018	0.0196		737.8915
Total	**0.4952**	**4.9785**	**3.4304**	**0.0306**	**1.5912**	**0.0228**	**1.6140**	**0.4385**	**0.0216**	**0.4601**		**3,181.5256**	**3,181.5256**	**0.0889**		**3,183.7468**

3.2 Grading - 2022

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					0.5303	0.0000	0.5303	0.0573	0.0000	0.0573			0.0000			0.0000
Off-Road	13.1551	103.2084	94.6260	0.3232		3.9728	3.9728		3.6550	3.6550		31,283.2050	31,283.2050	10.1176		31,536.1456
Total	**13.1551**	**103.2084**	**94.6260**	**0.3232**	**0.5303**	**3.9728**	**4.5030**	**0.0573**	**3.6550**	**3.7122**		**31,283.2050**	**31,283.2050**	**10.1176**		**31,536.1456**

3.2 Grading - 2022

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	0.1518	4.3124	1.0077	0.0230	0.7400	0.0150	0.7551	0.2128	0.0144	0.2272		2,423.252 0	2,423.252 0	0.0674		2,424.937 1
Worker	0.3131	0.2119	2.1635	7.1300e-003	0.8512	4.9800e-003	0.8561	0.2257	4.5900e-003	0.2303		710.8114	710.8114	0.0176		711.2514
Total	**0.4649**	**4.5243**	**3.1711**	**0.0301**	**1.5912**	**0.0200**	**1.6112**	**0.4385**	**0.0190**	**0.4574**		**3,134.063 4**	**3,134.063 4**	**0.0850**		**3,136.188 4**

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					0.2068	0.0000	0.2068	0.0223	0.0000	0.0223			0.0000			0.0000
Off-Road	13.1551	103.2084	94.6260	0.3232		3.9728	3.9728		3.6550	3.6550	0.0000	31,283.20 50	31,283.20 50	10.1176		31,536.14 55
Total	**13.1551**	**103.2084**	**94.6260**	**0.3232**	**0.2068**	**3.9728**	**4.1796**	**0.0223**	**3.6550**	**3.6773**	**0.0000**	**31,283.20 50**	**31,283.20 50**	**10.1176**		**31,536.14 55**

3.2 Grading - 2022

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	0.1518	4.3124	1.0077	0.0230	0.7400	0.0150	0.7551	0.2128	0.0144	0.2272		2,423.2520	2,423.2520	0.0674		2,424.9371
Worker	0.3131	0.2119	2.1635	7.1300e-003	0.8512	4.9800e-003	0.8561	0.2257	4.5900e-003	0.2303		710.8114	710.8114	0.0176		711.2514
Total	**0.4649**	**4.5243**	**3.1711**	**0.0301**	**1.5912**	**0.0200**	**1.6112**	**0.4385**	**0.0190**	**0.4574**		**3,134.0634**	**3,134.0634**	**0.0850**		**3,136.1884**

4.0 Operational Detail - Mobile

4.1 Mitigation Measures Mobile

Category	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
	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		
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	16.60	8.40	6.90	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	0.553113	0.036408	0.180286	0.116335	0.016165	0.005101	0.018218	0.063797	0.001357	0.001565	0.005903	0.000808	0.000944

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**

5.2 Energy by Land Use - NaturalGas

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	0.6159	1.3100e-003	0.1432	1.0000e-005		5.1000e-004	5.1000e-004		5.1000e-004	5.1000e-004		0.3064	0.3064	8.1000e-004		0.3266
Unmitigated	0.6159	1.3100e-003	0.1432	1.0000e-005		5.1000e-004	5.1000e-004		5.1000e-004	5.1000e-004		0.3064	0.3064	8.1000e-004		0.3266

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	0.1067					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	0.4959					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Landscaping	0.0133	1.3100e-003	0.1432	1.0000e-005		5.1000e-004	5.1000e-004		5.1000e-004	5.1000e-004		0.3064	0.3064	8.1000e-004		0.3266
Total	**0.6159**	**1.3100e-003**	**0.1432**	**1.0000e-005**		**5.1000e-004**	**5.1000e-004**		**5.1000e-004**	**5.1000e-004**		**0.3064**	**0.3064**	**8.1000e-004**		**0.3266**

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	0.1067					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	0.4959					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Landscaping	0.0133	1.3100e-003	0.1432	1.0000e-005		5.1000e-004	5.1000e-004		5.1000e-004	5.1000e-004		0.3064	0.3064	8.1000e-004		0.3266
Total	**0.6159**	**1.3100e-003**	**0.1432**	**1.0000e-005**		**5.1000e-004**	**5.1000e-004**		**5.1000e-004**	**5.1000e-004**		**0.3064**	**0.3064**	**8.1000e-004**		**0.3266**

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

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APPENDIX 3.3:

CALEEMOD PROJECT CATEGORY 3 CONSTRUCTION UNMITIGATED EMISSIONS MODEL OUTPUTS

OBMPU - Project Category 3 (Construction - Unmitigated)

San Bernardino-South Coast County, Summer

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Other Asphalt Surfaces	100.00	Acre	100.00	4,356,000.00	0
Other Non-Asphalt Surfaces	420.00	1000sqft	9.64	420,000.00	0

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	2.2	**Precipitation Freq (Days)**	32
Climate Zone	10			**Operational Year**	2022
Utility Company	Southern California Edison				
CO2 Intensity (lb/MWhr)	702.44	**CH4 Intensity (lb/MWhr)**	0.029	**N2O Intensity (lb/MWhr)**	0.006

1.3 User Entered Comments & Non-Default Data

Project Characteristics -

Land Use - Other Non-Asphalt Surfaces = Conveyance; Other Asphalt Surfaces = Storage Basin

Construction Phase - As a conservative measure, analysis assumes the construction of one New Storage Basin (Chino Institute for Men + the associated pipeline)

Off-road Equipment - Equipment based on information provided in the Project Description

Trips and VMT - Based on information provided in the Project Description

Grading - Based on the Project Description, the average area of disturbance of each site is anticipated to be 2 acres on any given day.

Construction Off-road Equipment Mitigation - Rule 403

Table Name	Column Name	Default Value	New Value
tblConstructionPhase	NumDays	310.00	550.00
tblConstructionPhase	NumDaysWeek	5.00	7.00
tblGrading	AcresOfGrading	3,850.00	1,100.00
tblGrading	MaterialExported	0.00	333,333.33
tblOffRoadEquipment	LoadFactor	0.38	0.38
tblOffRoadEquipment	OffRoadEquipmentType	Off-Highway Tractors	Off-Highway Trucks
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	2.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	7.00
tblTripsAndVMT	HaulingTripLength	20.00	30.00
tblTripsAndVMT	HaulingTripNumber	41,667.00	370.00
tblTripsAndVMT	VendorTripLength	6.90	40.00
tblTripsAndVMT	VendorTripNumber	0.00	6.00
tblTripsAndVMT	WorkerTripLength	14.70	40.00
tblTripsAndVMT	WorkerTripNumber	48.00	6.00

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	13.2057	138.3313	90.8782	0.2289	14.6625	5.5832	20.2457	6.9786	5.1367	12.1153	0.0000	22,235.6190	22,235.6190	6.8980	0.0000	22,408.0694
2022	11.4422	112.7854	83.9339	0.2290	14.6821	4.5168	19.1989	6.9834	4.1557	11.1390	0.0000	22,241.2560	22,241.2560	6.9031	0.0000	22,413.8335
Maximum	**13.2057**	**138.3313**	**90.8782**	**0.2290**	**14.6821**	**5.5832**	**20.2457**	**6.9834**	**5.1367**	**12.1153**	**0.0000**	**22,241.2560**	**22,241.2560**	**6.9031**	**0.0000**	**22,413.8335**

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	13.2057	138.3313	90.8782	0.2289	5.9800	5.5832	11.5631	2.7941	5.1367	7.9308	0.0000	22,235.6190	22,235.6190	6.8980	0.0000	22,408.0694
2022	11.4422	112.7854	83.9339	0.2290	5.9995	4.5168	10.5164	2.7988	4.1557	6.9545	0.0000	22,241.2559	22,241.2559	6.9031	0.0000	22,413.8335
Maximum	**13.2057**	**138.3313**	**90.8782**	**0.2290**	**5.9995**	**5.5832**	**11.5631**	**2.7988**	**5.1367**	**7.9308**	**0.0000**	**22,241.2559**	**22,241.2559**	**6.9031**	**0.0000**	**22,413.8335**

	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**	**59.18**	**0.00**	**44.02**	**59.94**	**0.00**	**35.99**	**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	2.0605	4.9000e-004	0.0532	0.0000		1.9000e-004	1.9000e-004		1.9000e-004	1.9000e-004		0.1138	0.1138	3.0000e-004		0.1213
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	**2.0605**	**4.9000e-004**	**0.0532**	**0.0000**	**0.0000**	**1.9000e-004**	**1.9000e-004**	**0.0000**	**1.9000e-004**	**1.9000e-004**		**0.1138**	**0.1138**	**3.0000e-004**	**0.0000**	**0.1213**

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	2.0605	4.9000e-004	0.0532	0.0000		1.9000e-004	1.9000e-004		1.9000e-004	1.9000e-004		0.1138	0.1138	3.0000e-004		0.1213
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	**2.0605**	**4.9000e-004**	**0.0532**	**0.0000**	**0.0000**	**1.9000e-004**	**1.9000e-004**	**0.0000**	**1.9000e-004**	**1.9000e-004**		**0.1138**	**0.1138**	**3.0000e-004**	**0.0000**	**0.1213**

	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	Grading	Grading	1/1/2021	7/4/2022	7	550	

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 1100

Acres of Paving: 109.64

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
Grading	Excavators	2	8.00	158	0.38
Grading	Graders	0	8.00	187	0.41
Grading	Off-Highway Trucks	6	8.00	402	0.38
Grading	Rubber Tired Dozers	2	8.00	247	0.40
Grading	Scrapers	7	8.00	367	0.48
Grading	Tractors/Loaders/Backhoes	2	8.00	97	0.37

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
Grading	19	6.00	6.00	370.00	40.00	40.00	30.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

Water Exposed Area

3.2 Grading - 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					14.2337	0.0000	14.2337	6.8599	0.0000	6.8599			0.0000			0.0000
Off-Road	13.0854	136.6986	89.9068	0.2194		5.5761	5.5761		5.1300	5.1300		21,241.7628	21,241.7628	6.8700		21,413.5132
Total	**13.0854**	**136.6986**	**89.9068**	**0.2194**	**14.2337**	**5.5761**	**19.8098**	**6.8599**	**5.1300**	**11.9899**		**21,241.7628**	**21,241.7628**	**6.8700**		**21,413.5132**

3.2 Grading - 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	lb/day										lb/day					
Hauling	5.3200e-003	0.1935	0.0324	7.3000e-004	0.0244	6.4000e-004	0.0251	6.5000e-003	6.1000e-004	7.1100e-003		77.6696	77.6696	3.5100e-003		77.7574
Vendor	0.0473	1.3912	0.3057	7.0200e-003	0.2220	5.2700e-003	0.2273	0.0639	5.0400e-003	0.0689		739.8696	739.8696	0.0196		740.3604
Worker	0.0676	0.0480	0.6333	1.7700e-003	0.1824	1.1000e-003	0.1835	0.0484	1.0100e-003	0.0494		176.3170	176.3170	4.8600e-003		176.4384
Total	**0.1203**	**1.6327**	**0.9714**	**9.5200e-003**	**0.4288**	**7.0100e-003**	**0.4358**	**0.1187**	**6.6600e-003**	**0.1254**		**993.8563**	**993.8563**	**0.0280**		**994.5562**

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					5.5512	0.0000	5.5512	2.6753	0.0000	2.6753			0.0000			0.0000
Off-Road	13.0854	136.6986	89.9068	0.2194		5.5761	5.5761		5.1300	5.1300	0.0000	21,241.7628	21,241.7628	6.8700		21,413.5132
Total	**13.0854**	**136.6986**	**89.9068**	**0.2194**	**5.5512**	**5.5761**	**11.1273**	**2.6753**	**5.1300**	**7.8054**	**0.0000**	**21,241.7628**	**21,241.7628**	**6.8700**		**21,413.5132**

3.2 Grading - 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	lb/day										lb/day					
Hauling	5.3200e-003	0.1935	0.0324	7.3000e-004	0.0244	6.4000e-004	0.0251	6.5000e-003	6.1000e-004	7.1100e-003		77.6696	77.6696	3.5100e-003		77.7574
Vendor	0.0473	1.3912	0.3057	7.0200e-003	0.2220	5.2700e-003	0.2273	0.0639	5.0400e-003	0.0689		739.8696	739.8696	0.0196		740.3604
Worker	0.0676	0.0480	0.6333	1.7700e-003	0.1824	1.1000e-003	0.1835	0.0484	1.0100e-003	0.0494		176.3170	176.3170	4.8600e-003		176.4384
Total	**0.1203**	**1.6327**	**0.9714**	**9.5200e-003**	**0.4288**	**7.0100e-003**	**0.4358**	**0.1187**	**6.6600e-003**	**0.1254**		**993.8563**	**993.8563**	**0.0280**		**994.5562**

3.2 Grading - 2022

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					14.2337	0.0000	14.2337	6.8599	0.0000	6.8599			0.0000			0.0000
Off-Road	11.3295	111.2997	83.0339	0.2196		4.5108	4.5108		4.1499	4.1499		21,260.9178	21,260.9178	6.8762		21,432.8231
Total	**11.3295**	**111.2997**	**83.0339**	**0.2196**	**14.2337**	**4.5108**	**18.7445**	**6.8599**	**4.1499**	**11.0098**		**21,260.9178**	**21,260.9178**	**6.8762**		**21,432.8231**

3.2 Grading - 2022

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	5.0300e-003	0.1757	0.0315	7.2000e-004	0.0440	5.3000e-004	0.0445	0.0113	5.1000e-004	0.0118		76.7835	76.7835	3.4400e-003		76.8695
Vendor	0.0444	1.2668	0.2861	6.9500e-003	0.2220	4.4800e-003	0.2265	0.0638	4.2800e-003	0.0681		733.6064	733.6064	0.0191		734.0837
Worker	0.0633	0.0432	0.5825	1.7100e-003	0.1824	1.0700e-003	0.1835	0.0484	9.8000e-004	0.0493		169.9482	169.9482	4.3600e-003		170.0572
Total	**0.1127**	**1.4857**	**0.9000**	**9.3800e-003**	**0.4484**	**6.0800e-003**	**0.4545**	**0.1235**	**5.7700e-003**	**0.1293**		**980.3382**	**980.3382**	**0.0269**		**981.0104**

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					5.5512	0.0000	5.5512	2.6753	0.0000	2.6753			0.0000			0.0000
Off-Road	11.3295	111.2997	83.0339	0.2196		4.5108	4.5108		4.1499	4.1499	0.0000	21,260.9178	21,260.9178	6.8762		21,432.8231
Total	**11.3295**	**111.2997**	**83.0339**	**0.2196**	**5.5512**	**4.5108**	**10.0619**	**2.6753**	**4.1499**	**6.8252**	**0.0000**	**21,260.9178**	**21,260.9178**	**6.8762**		**21,432.8231**

3.2 Grading - 2022

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	5.0300e-003	0.1757	0.0315	7.2000e-004	0.0440	5.3000e-004	0.0445	0.0113	5.1000e-004	0.0118		76.7835	76.7835	3.4400e-003		76.8695
Vendor	0.0444	1.2668	0.2861	6.9500e-003	0.2220	4.4800e-003	0.2265	0.0638	4.2800e-003	0.0681		733.6064	733.6064	0.0191		734.0837
Worker	0.0633	0.0432	0.5825	1.7100e-003	0.1824	1.0700e-003	0.1835	0.0484	9.8000e-004	0.0493		169.9482	169.9482	4.3600e-003		170.0572
Total	**0.1127**	**1.4857**	**0.9000**	**9.3800e-003**	**0.4484**	**6.0800e-003**	**0.4545**	**0.1235**	**5.7700e-003**	**0.1293**		**980.3382**	**980.3382**	**0.0269**		**981.0104**

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 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 Asphalt Surfaces	16.60	8.40	6.90	0.00	0.00	0.00	0	0	0
Other Non-Asphalt Surfaces	16.60	8.40	6.90	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 Asphalt Surfaces	0.553113	0.036408	0.180286	0.116335	0.016165	0.005101	0.018218	0.063797	0.001357	0.001565	0.005903	0.000808	0.000944
Other Non-Asphalt Surfaces	0.553113	0.036408	0.180286	0.116335	0.016165	0.005101	0.018218	0.063797	0.001357	0.001565	0.005903	0.000808	0.000944

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 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
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 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
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	2.0605	4.9000e-004	0.0532	0.0000		1.9000e-004	1.9000e-004		1.9000e-004	1.9000e-004		0.1138	0.1138	3.0000e-004		0.1213
Unmitigated	2.0605	4.9000e-004	0.0532	0.0000		1.9000e-004	1.9000e-004		1.9000e-004	1.9000e-004		0.1138	0.1138	3.0000e-004		0.1213

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	0.3639					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	1.6917					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Landscaping	4.9500e-003	4.9000e-004	0.0532	0.0000		1.9000e-004	1.9000e-004		1.9000e-004	1.9000e-004		0.1138	0.1138	3.0000e-004		0.1213
Total	**2.0605**	**4.9000e-004**	**0.0532**	**0.0000**		**1.9000e-004**	**1.9000e-004**		**1.9000e-004**	**1.9000e-004**		**0.1138**	**0.1138**	**3.0000e-004**		**0.1213**

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	0.3639					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	1.6917					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Landscaping	4.9500e-003	4.9000e-004	0.0532	0.0000		1.9000e-004	1.9000e-004		1.9000e-004	1.9000e-004		0.1138	0.1138	3.0000e-004		0.1213
Total	**2.0605**	**4.9000e-004**	**0.0532**	**0.0000**		**1.9000e-004**	**1.9000e-004**		**1.9000e-004**	**1.9000e-004**		**0.1138**	**0.1138**	**3.0000e-004**		**0.1213**

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

OBMPU - Project Category 3 (Construction - Unmitigated)

San Bernardino-South Coast County, Winter

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Other Asphalt Surfaces	100.00	Acre	100.00	4,356,000.00	0
Other Non-Asphalt Surfaces	420.00	1000sqft	9.64	420,000.00	0

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	2.2	**Precipitation Freq (Days)**	32
Climate Zone	10			**Operational Year**	2022
Utility Company	Southern California Edison				
CO2 Intensity (lb/MWhr)	702.44	**CH4 Intensity (lb/MWhr)**	0.029	**N2O Intensity (lb/MWhr)**	0.006

1.3 User Entered Comments & Non-Default Data

Project Characteristics -

Land Use - Other Non-Asphalt Surfaces = Conveyance; Other Asphalt Surfaces = Storage Basin

Construction Phase - As a conservative measure, analysis assumes the construction of one New Storage Basin (Chino Institute for Men + the associated pipeline)

Off-road Equipment - Equipment based on information provided in the Project Description

Trips and VMT - Based on information provided in the Project Description

Grading - Based on the Project Description, the average area of disturbance of each site is anticipated to be 2 acres on any given day.

Construction Off-road Equipment Mitigation - Rule 403

Table Name	Column Name	Default Value	New Value
tblConstructionPhase	NumDays	310.00	550.00
tblConstructionPhase	NumDaysWeek	5.00	7.00
tblGrading	AcresOfGrading	3,850.00	1,100.00
tblGrading	MaterialExported	0.00	333,333.33
tblOffRoadEquipment	LoadFactor	0.38	0.38
tblOffRoadEquipment	OffRoadEquipmentType	Off-Highway Tractors	Off-Highway Trucks
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	2.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	7.00
tblTripsAndVMT	HaulingTripLength	20.00	30.00
tblTripsAndVMT	HaulingTripNumber	41,667.00	370.00
tblTripsAndVMT	VendorTripLength	6.90	40.00
tblTripsAndVMT	VendorTripNumber	0.00	6.00
tblTripsAndVMT	WorkerTripLength	14.70	40.00
tblTripsAndVMT	WorkerTripNumber	48.00	6.00

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	13.2109	138.3679	90.7698	0.2286	14.6625	5.5832	20.2457	6.9786	5.1367	12.1153	0.0000	22,209.2294	22,209.2294	6.8988	0.0000	22,381.6984
2022	11.4473	112.8163	83.8345	0.2287	14.6821	4.5169	19.1990	6.9834	4.1557	11.1391	0.0000	22,215.5396	22,215.5396	6.9039	0.0000	22,388.1369
Maximum	**13.2109**	**138.3679**	**90.7698**	**0.2287**	**14.6821**	**5.5832**	**20.2457**	**6.9834**	**5.1367**	**12.1153**	**0.0000**	**22,215.5396**	**22,215.5396**	**6.9039**	**0.0000**	**22,388.1369**

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	13.2109	138.3679	90.7698	0.2286	5.9800	5.5832	11.5631	2.7941	5.1367	7.9308	0.0000	22,209.2294	22,209.2294	6.8988	0.0000	22,381.6983
2022	11.4473	112.8163	83.8345	0.2287	5.9995	4.5169	10.5164	2.7988	4.1557	6.9545	0.0000	22,215.5396	22,215.5396	6.9039	0.0000	22,388.1369
Maximum	**13.2109**	**138.3679**	**90.7698**	**0.2287**	**5.9995**	**5.5832**	**11.5631**	**2.7988**	**5.1367**	**7.9308**	**0.0000**	**22,215.5396**	**22,215.5396**	**6.9039**	**0.0000**	**22,388.1369**

	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**	**59.18**	**0.00**	**44.02**	**59.94**	**0.00**	**35.99**	**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	2.0605	4.9000e-004	0.0532	0.0000		1.9000e-004	1.9000e-004		1.9000e-004	1.9000e-004		0.1138	0.1138	3.0000e-004		0.1213
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	**2.0605**	**4.9000e-004**	**0.0532**	**0.0000**	**0.0000**	**1.9000e-004**	**1.9000e-004**	**0.0000**	**1.9000e-004**	**1.9000e-004**		**0.1138**	**0.1138**	**3.0000e-004**	**0.0000**	**0.1213**

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	2.0605	4.9000e-004	0.0532	0.0000		1.9000e-004	1.9000e-004		1.9000e-004	1.9000e-004		0.1138	0.1138	3.0000e-004		0.1213
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	**2.0605**	**4.9000e-004**	**0.0532**	**0.0000**	**0.0000**	**1.9000e-004**	**1.9000e-004**	**0.0000**	**1.9000e-004**	**1.9000e-004**		**0.1138**	**0.1138**	**3.0000e-004**	**0.0000**	**0.1213**

	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	Grading	Grading	1/1/2021	7/4/2022	7	550	

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 1100

Acres of Paving: 109.64

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
Grading	Excavators	2	8.00	158	0.38
Grading	Graders	0	8.00	187	0.41
Grading	Off-Highway Trucks	6	8.00	402	0.38
Grading	Rubber Tired Dozers	2	8.00	247	0.40
Grading	Scrapers	7	8.00	367	0.48
Grading	Tractors/Loaders/Backhoes	2	8.00	97	0.37

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
Grading	19	6.00	6.00	370.00	40.00	40.00	30.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

Water Exposed Area

3.2 Grading - 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					14.2337	0.0000	14.2337	6.8599	0.0000	6.8599			0.0000			0.0000
Off-Road	13.0854	136.6986	89.9068	0.2194		5.5761	5.5761		5.1300	5.1300		21,241.7628	21,241.7628	6.8700		21,413.5132
Total	**13.0854**	**136.6986**	**89.9068**	**0.2194**	**14.2337**	**5.5761**	**19.8098**	**6.8599**	**5.1300**	**11.9899**		**21,241.7628**	**21,241.7628**	**6.8700**		**21,413.5132**

3.2 Grading - 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	lb/day										lb/day					
Hauling	5.5000e-003	0.1959	0.0357	7.2000e-004	0.0244	6.5000e-004	0.0251	6.5000e-003	6.2000e-004	7.1200e-003		76.2148	76.2148	3.7700e-003		76.3090
Vendor	0.0485	1.4229	0.3226	6.9500e-003	0.2220	5.3000e-003	0.2273	0.0639	5.0700e-003	0.0689		733.2371	733.2371	0.0208		733.7566
Worker	0.0714	0.0505	0.5047	1.5900e-003	0.1824	1.1000e-003	0.1835	0.0484	1.0100e-003	0.0494		158.0147	158.0147	4.2000e-003		158.1196
Total	**0.1255**	**1.6693**	**0.8630**	**9.2600e-003**	**0.4288**	**7.0500e-003**	**0.4359**	**0.1187**	**6.7000e-003**	**0.1254**		**967.4666**	**967.4666**	**0.0288**		**968.1852**

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					5.5512	0.0000	5.5512	2.6753	0.0000	2.6753			0.0000			0.0000
Off-Road	13.0854	136.6986	89.9068	0.2194		5.5761	5.5761		5.1300	5.1300	0.0000	21,241.7628	21,241.7628	6.8700		21,413.5132
Total	**13.0854**	**136.6986**	**89.9068**	**0.2194**	**5.5512**	**5.5761**	**11.1273**	**2.6753**	**5.1300**	**7.8054**	**0.0000**	**21,241.7628**	**21,241.7628**	**6.8700**		**21,413.5132**

3.2 Grading - 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	lb/day										lb/day					
Hauling	5.5000e-003	0.1959	0.0357	7.2000e-004	0.0244	6.5000e-004	0.0251	6.5000e-003	6.2000e-004	7.1200e-003		76.2148	76.2148	3.7700e-003		76.3090
Vendor	0.0485	1.4229	0.3226	6.9500e-003	0.2220	5.3000e-003	0.2273	0.0639	5.0700e-003	0.0689		733.2371	733.2371	0.0208		733.7566
Worker	0.0714	0.0505	0.5047	1.5900e-003	0.1824	1.1000e-003	0.1835	0.0484	1.0100e-003	0.0494		158.0147	158.0147	4.2000e-003		158.1196
Total	**0.1255**	**1.6693**	**0.8630**	**9.2600e-003**	**0.4288**	**7.0500e-003**	**0.4359**	**0.1187**	**6.7000e-003**	**0.1254**		**967.4666**	**967.4666**	**0.0288**		**968.1852**

3.2 Grading - 2022

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					14.2337	0.0000	14.2337	6.8599	0.0000	6.8599			0.0000			0.0000
Off-Road	11.3295	111.2997	83.0339	0.2196		4.5108	4.5108		4.1499	4.1499		21,260.9178	21,260.9178	6.8762		21,432.8231
Total	**11.3295**	**111.2997**	**83.0339**	**0.2196**	**14.2337**	**4.5108**	**18.7445**	**6.8599**	**4.1499**	**11.0098**		**21,260.9178**	**21,260.9178**	**6.8762**		**21,432.8231**

3.2 Grading - 2022

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	5.2100e-003	0.1775	0.0347	7.1000e-004	0.0440	5.4000e-004	0.0445	0.0113	5.1000e-004	0.0118		75.3295	75.3295	3.6900e-003		75.4217
Vendor	0.0455	1.2937	0.3023	6.8900e-003	0.2220	4.5000e-003	0.2265	0.0638	4.3100e-003	0.0682		726.9756	726.9756	0.0202		727.4811
Worker	0.0671	0.0454	0.4636	1.5300e-003	0.1824	1.0700e-003	0.1835	0.0484	9.8000e-004	0.0493		152.3167	152.3167	3.7700e-003		152.4110
Total	**0.1179**	**1.5166**	**0.8006**	**9.1300e-003**	**0.4484**	**6.1100e-003**	**0.4545**	**0.1235**	**5.8000e-003**	**0.1293**		**954.6218**	**954.6218**	**0.0277**		**955.3139**

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					5.5512	0.0000	5.5512	2.6753	0.0000	2.6753			0.0000			0.0000
Off-Road	11.3295	111.2997	83.0339	0.2196		4.5108	4.5108		4.1499	4.1499	0.0000	21,260.9178	21,260.9178	6.8762		21,432.8231
Total	**11.3295**	**111.2997**	**83.0339**	**0.2196**	**5.5512**	**4.5108**	**10.0619**	**2.6753**	**4.1499**	**6.8252**	**0.0000**	**21,260.9178**	**21,260.9178**	**6.8762**		**21,432.8231**

3.2 Grading - 2022

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	5.2100e-003	0.1775	0.0347	7.1000e-004	0.0440	5.4000e-004	0.0445	0.0113	5.1000e-004	0.0118		75.3295	75.3295	3.6900e-003		75.4217
Vendor	0.0455	1.2937	0.3023	6.8900e-003	0.2220	4.5000e-003	0.2265	0.0638	4.3100e-003	0.0682		726.9756	726.9756	0.0202		727.4811
Worker	0.0671	0.0454	0.4636	1.5300e-003	0.1824	1.0700e-003	0.1835	0.0484	9.8000e-004	0.0493		152.3167	152.3167	3.7700e-003		152.4110
Total	**0.1179**	**1.5166**	**0.8006**	**9.1300e-003**	**0.4484**	**6.1100e-003**	**0.4545**	**0.1235**	**5.8000e-003**	**0.1293**		**954.6218**	**954.6218**	**0.0277**		**955.3139**

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 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 Asphalt Surfaces	16.60	8.40	6.90	0.00	0.00	0.00	0	0	0
Other Non-Asphalt Surfaces	16.60	8.40	6.90	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 Asphalt Surfaces	0.553113	0.036408	0.180286	0.116335	0.016165	0.005101	0.018218	0.063797	0.001357	0.001565	0.005903	0.000808	0.000944
Other Non-Asphalt Surfaces	0.553113	0.036408	0.180286	0.116335	0.016165	0.005101	0.018218	0.063797	0.001357	0.001565	0.005903	0.000808	0.000944

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 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
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 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
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	2.0605	4.9000e-004	0.0532	0.0000		1.9000e-004	1.9000e-004		1.9000e-004	1.9000e-004		0.1138	0.1138	3.0000e-004		0.1213
Unmitigated	2.0605	4.9000e-004	0.0532	0.0000		1.9000e-004	1.9000e-004		1.9000e-004	1.9000e-004		0.1138	0.1138	3.0000e-004		0.1213

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	0.3639					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	1.6917					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Landscaping	4.9500e-003	4.9000e-004	0.0532	0.0000		1.9000e-004	1.9000e-004		1.9000e-004	1.9000e-004		0.1138	0.1138	3.0000e-004		0.1213
Total	**2.0605**	**4.9000e-004**	**0.0532**	**0.0000**		**1.9000e-004**	**1.9000e-004**		**1.9000e-004**	**1.9000e-004**		**0.1138**	**0.1138**	**3.0000e-004**		**0.1213**

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	0.3639					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	1.6917					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Landscaping	4.9500e-003	4.9000e-004	0.0532	0.0000		1.9000e-004	1.9000e-004		1.9000e-004	1.9000e-004		0.1138	0.1138	3.0000e-004		0.1213
Total	**2.0605**	**4.9000e-004**	**0.0532**	**0.0000**		**1.9000e-004**	**1.9000e-004**		**1.9000e-004**	**1.9000e-004**		**0.1138**	**0.1138**	**3.0000e-004**		**0.1213**

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

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APPENDIX 3.4:

CALEEMOD PROJECT CATEGORY 4 CONSTRUCTION UNMITIGATED EMISSIONS MODEL OUTPUTS

OBMPU - Project Category 4 (Construction - Unmitigated)

San Bernardino-South Coast County, Summer

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
General Light Industry	871.20	1000sqft	20.00	871,200.00	0
Other Non-Asphalt Surfaces	420.00	1000sqft	9.64	420,000.00	0

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	2.2	**Precipitation Freq (Days)**	32
Climate Zone	10			**Operational Year**	2022
Utility Company	Southern California Edison				
CO2 Intensity (lb/MWhr)	702.44	**CH4 Intensity (lb/MWhr)**	0.029	**N2O Intensity (lb/MWhr)**	0.006

1.3 User Entered Comments & Non-Default Data

Project Characteristics -

Land Use - General Light Industry = Water Treatment and Regional Water Treatment Facility; Other Non-Asphalt Surfaces = Conveyance

Construction Phase - Analysis assumes construction of a single Water Treatment and Regional Water Treatment Facility and Pipelines that would be constructed within an 18-month period

Off-road Equipment - Based on information provided in the Project Description

Trips and VMT - Based on information provided in the Project Description

Grading - Based on the Project Description, the average area of disturbance of each site is anticipated to be 2 acres on any given day.

Construction Off-road Equipment Mitigation - Rule 403

Vehicle Trips - Construction Run Only.

Energy Use - Construction Run Only.

Water And Wastewater - Construction Run Only.

Solid Waste - Construction Run Only.

Table Name	Column Name	Default Value	New Value
tblConstructionPhase	NumDays	45.00	547.00
tblConstructionPhase	NumDaysWeek	5.00	7.00
tblConstructionPhase	PhaseEndDate	3/4/2021	7/1/2022
tblEnergyUse	LightingElect	2.93	0.00
tblEnergyUse	NT24E	5.02	0.00
tblEnergyUse	NT24NG	17.13	0.00
tblEnergyUse	T24E	2.20	0.00
tblEnergyUse	T24NG	15.36	0.00
tblGrading	AcresOfGrading	273.50	1,092.00
tblOffRoadEquipment	LoadFactor	0.38	0.38
tblOffRoadEquipment	LoadFactor	0.29	0.29
tblOffRoadEquipment	OffRoadEquipmentType		Off-Highway Trucks
tblOffRoadEquipment	OffRoadEquipmentType		Cranes
tblOffRoadEquipment	OffRoadEquipmentType		Plate Compactors

tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	6.00
tblSolidWaste	SolidWasteGenerationRate	1,080.29	0.00
tblTripsAndVMT	VendorTripLength	6.90	40.00
tblTripsAndVMT	VendorTripNumber	0.00	15.00
tblTripsAndVMT	WorkerTripLength	14.70	40.00
tblTripsAndVMT	WorkerTripNumber	70.00	30.00
tblVehicleTrips	CC_TTP	28.00	0.00
tblVehicleTrips	CNW_TTP	13.00	0.00
tblVehicleTrips	CW_TTP	59.00	0.00
tblVehicleTrips	DV_TP	5.00	0.00
tblVehicleTrips	PB_TP	3.00	0.00
tblVehicleTrips	PR_TP	92.00	0.00
tblVehicleTrips	ST_TR	1.32	0.00
tblVehicleTrips	SU_TR	0.68	0.00
tblVehicleTrips	WD_TR	6.97	0.00
tblWater	IndoorWaterUseRate	201,465,000.00	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	12.5178	115.5693	80.1360	0.2694	3.5841	4.4035	7.9876	0.6300	4.0540	4.6840	0.0000	26,220.7501	26,220.7501	7.6476	0.0000	26,411.9407
2022	11.0285	92.4257	75.6810	0.2691	3.5841	3.4718	7.0559	0.6300	3.1968	3.8268	0.0000	26,182.1184	26,182.1184	7.6467	0.0000	26,373.2848
Maximum	**12.5178**	**115.5693**	**80.1360**	**0.2694**	**3.5841**	**4.4035**	**7.9876**	**0.6300**	**4.0540**	**4.6840**	**0.0000**	**26,220.7501**	**26,220.7501**	**7.6476**	**0.0000**	**26,411.9407**

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	12.5178	115.5693	80.1360	0.2694	2.2927	4.4035	6.6961	0.4906	4.0540	4.5446	0.0000	26,220.7501	26,220.7501	7.6476	0.0000	26,411.9407
2022	11.0285	92.4257	75.6810	0.2691	2.2927	3.4718	5.7645	0.4906	3.1968	3.6874	0.0000	26,182.1183	26,182.1183	7.6467	0.0000	26,373.2848
Maximum	**12.5178**	**115.5693**	**80.1360**	**0.2694**	**2.2927**	**4.4035**	**6.6961**	**0.4906**	**4.0540**	**4.5446**	**0.0000**	**26,220.7501**	**26,220.7501**	**7.6476**	**0.0000**	**26,411.9407**

	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**	**36.03**	**0.00**	**17.17**	**22.13**	**0.00**	**3.28**	**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	19.6554	1.2100e-003	0.1320	1.0000e-005		4.7000e-004	4.7000e-004		4.7000e-004	4.7000e-004		0.2826	0.2826	7.5000e-004		0.3012
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	**19.6554**	**1.2100e-003**	**0.1320**	**1.0000e-005**	**0.0000**	**4.7000e-004**	**4.7000e-004**	**0.0000**	**4.7000e-004**	**4.7000e-004**		**0.2826**	**0.2826**	**7.5000e-004**	**0.0000**	**0.3012**

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	19.6554	1.2100e-003	0.1320	1.0000e-005		4.7000e-004	4.7000e-004		4.7000e-004	4.7000e-004		0.2826	0.2826	7.5000e-004		0.3012
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	**19.6554**	**1.2100e-003**	**0.1320**	**1.0000e-005**	**0.0000**	**4.7000e-004**	**4.7000e-004**	**0.0000**	**4.7000e-004**	**4.7000e-004**		**0.2826**	**0.2826**	**7.5000e-004**	**0.0000**	**0.3012**

	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	Grading	Grading	1/1/2021	7/1/2022	7	547	

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 1092

Acres of Paving: 9.64

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
Grading	Off-Highway Trucks	15	8.00	402	0.38
Grading	Cranes	3	8.00	231	0.29
Grading	Excavators	0	8.00	158	0.38
Grading	Graders	1	8.00	187	0.41
Grading	Plate Compactors	3	8.00	8	0.43
Grading	Rubber Tired Dozers	0	8.00	247	0.40
Grading	Scrapers	0	8.00	367	0.48
Grading	Tractors/Loaders/Backhoes	6	8.00	97	0.37

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
Grading	28	30.00	15.00	0.00	40.00	40.00	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

Water Exposed Area

3.2 Grading - 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					2.1171	0.0000	2.1171	0.2286	0.0000	0.2286			0.0000			0.0000
Off-Road	12.0615	111.8513	76.2052	0.2430		4.3848	4.3848		4.0363	4.0363		23,489.491 1	23,489.491 1	7.5743		23,678.84 76
Total	**12.0615**	**111.8513**	**76.2052**	**0.2430**	**2.1171**	**4.3848**	**6.5019**	**0.2286**	**4.0363**	**4.2649**		**23,489.49 11**	**23,489.49 11**	**7.5743**		**23,678.84 76**

3.2 Grading - 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	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	0.1184	3.4780	0.7643	0.0175	0.5550	0.0132	0.5682	0.1596	0.0126	0.1722		1,849.674 1	1,849.674 1	0.0491		1,850.901 0
Worker	0.3380	0.2400	3.1664	8.8500e-003	0.9120	5.5000e-003	0.9175	0.2418	5.0700e-003	0.2469		881.5849	881.5849	0.0243		882.1921
Total	**0.4563**	**3.7180**	**3.9308**	**0.0264**	**1.4670**	**0.0187**	**1.4857**	**0.4014**	**0.0177**	**0.4191**		**2,731.259 0**	**2,731.259 0**	**0.0734**		**2,733.093 0**

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					0.8257	0.0000	0.8257	0.0892	0.0000	0.0892			0.0000			0.0000
Off-Road	12.0615	111.8513	76.2052	0.2430		4.3848	4.3848		4.0363	4.0363	0.0000	23,489.491 1	23,489.491 1	7.5743		23,678.84 76
Total	**12.0615**	**111.8513**	**76.2052**	**0.2430**	**0.8257**	**4.3848**	**5.2105**	**0.0892**	**4.0363**	**4.1255**	**0.0000**	**23,489.49 11**	**23,489.49 11**	**7.5743**		**23,678.84 76**

3.2 Grading - 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	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	0.1184	3.4780	0.7643	0.0175	0.5550	0.0132	0.5682	0.1596	0.0126	0.1722		1,849.674 1	1,849.674 1	0.0491		1,850.901 0
Worker	0.3380	0.2400	3.1664	8.8500e-003	0.9120	5.5000e-003	0.9175	0.2418	5.0700e-003	0.2469		881.5849	881.5849	0.0243		882.1921
Total	**0.4563**	**3.7180**	**3.9308**	**0.0264**	**1.4670**	**0.0187**	**1.4857**	**0.4014**	**0.0177**	**0.4191**		**2,731.259 0**	**2,731.259 0**	**0.0734**		**2,733.093 0**

3.2 Grading - 2022

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					2.1171	0.0000	2.1171	0.2286	0.0000	0.2286			0.0000			0.0000
Off-Road	10.6010	89.0426	72.0535	0.2431		3.4553	3.4553		3.1812	3.1812		23,498.36 12	23,498.36 12	7.5771		23,687.78 95
Total	**10.6010**	**89.0426**	**72.0535**	**0.2431**	**2.1171**	**3.4553**	**5.5724**	**0.2286**	**3.1812**	**3.4098**		**23,498.36 12**	**23,498.36 12**	**7.5771**		**23,687.78 95**

3.2 Grading - 2022

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	0.1110	3.1670	0.7152	0.0174	0.5550	0.0112	0.5662	0.1596	0.0107	0.1703		1,834.016 0	1,834.016 0	0.0477		1,835.209 1
Worker	0.3164	0.2161	2.9124	8.5300e-003	0.9120	5.3400e-003	0.9173	0.2418	4.9200e-003	0.2467		849.7412	849.7412	0.0218		850.2862
Total	**0.4275**	**3.3831**	**3.6276**	**0.0259**	**1.4670**	**0.0165**	**1.4835**	**0.4014**	**0.0156**	**0.4170**		**2,683.757 1**	**2,683.757 1**	**0.0695**		**2,685.495 3**

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					0.8257	0.0000	0.8257	0.0892	0.0000	0.0892			0.0000			0.0000
Off-Road	10.6010	89.0426	72.0535	0.2431		3.4553	3.4553		3.1812	3.1812	0.0000	23,498.36 12	23,498.36 12	7.5771		23,687.78 95
Total	**10.6010**	**89.0426**	**72.0535**	**0.2431**	**0.8257**	**3.4553**	**4.2809**	**0.0892**	**3.1812**	**3.2703**	**0.0000**	**23,498.36 12**	**23,498.36 12**	**7.5771**		**23,687.78 95**

3.2 Grading - 2022

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	0.1110	3.1670	0.7152	0.0174	0.5550	0.0112	0.5662	0.1596	0.0107	0.1703		1,834.016 0	1,834.016 0	0.0477		1,835.209 1
Worker	0.3164	0.2161	2.9124	8.5300e-003	0.9120	5.3400e-003	0.9173	0.2418	4.9200e-003	0.2467		849.7412	849.7412	0.0218		850.2862
Total	**0.4275**	**3.3831**	**3.6276**	**0.0259**	**1.4670**	**0.0165**	**1.4835**	**0.4014**	**0.0156**	**0.4170**		**2,683.757 1**	**2,683.757 1**	**0.0695**		**2,685.495 3**

4.0 Operational Detail - Mobile

4.1 Mitigation Measures Mobile

Category	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
	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
General Light Industry	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
General Light Industry	16.60	8.40	6.90	0.00	0.00	0.00	0	0	0
Other Non-Asphalt Surfaces	16.60	8.40	6.90	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
General Light Industry	0.553113	0.036408	0.180286	0.116335	0.016165	0.005101	0.018218	0.063797	0.001357	0.001565	0.005903	0.000808	0.000944
Other Non-Asphalt Surfaces	0.553113	0.036408	0.180286	0.116335	0.016165	0.005101	0.018218	0.063797	0.001357	0.001565	0.005903	0.000808	0.000944

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					
General Light Industry	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
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					
General Light Industry	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
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	19.6554	1.2100e-003	0.1320	1.0000e-005		4.7000e-004	4.7000e-004		4.7000e-004	4.7000e-004		0.2826	0.2826	7.5000e-004		0.3012
Unmitigated	19.6554	1.2100e-003	0.1320	1.0000e-005		4.7000e-004	4.7000e-004		4.7000e-004	4.7000e-004		0.2826	0.2826	7.5000e-004		0.3012

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	2.2446					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	17.3985					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Landscaping	0.0123	1.2100e-003	0.1320	1.0000e-005		4.7000e-004	4.7000e-004		4.7000e-004	4.7000e-004		0.2826	0.2826	7.5000e-004		0.3012
Total	**19.6554**	**1.2100e-003**	**0.1320**	**1.0000e-005**		**4.7000e-004**	**4.7000e-004**		**4.7000e-004**	**4.7000e-004**		**0.2826**	**0.2826**	**7.5000e-004**		**0.3012**

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	2.2446					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	17.3985					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Landscaping	0.0123	1.2100e-003	0.1320	1.0000e-005		4.7000e-004	4.7000e-004		4.7000e-004	4.7000e-004		0.2826	0.2826	7.5000e-004		0.3012
Total	**19.6554**	**1.2100e-003**	**0.1320**	**1.0000e-005**		**4.7000e-004**	**4.7000e-004**		**4.7000e-004**	**4.7000e-004**		**0.2826**	**0.2826**	**7.5000e-004**		**0.3012**

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

OBMPU - Project Category 4 (Construction - Unmitigated)

San Bernardino-South Coast County, Winter

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
General Light Industry	871.20	1000sqft	20.00	871,200.00	0
Other Non-Asphalt Surfaces	420.00	1000sqft	9.64	420,000.00	0

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	2.2	**Precipitation Freq (Days)**	32
Climate Zone	10			**Operational Year**	2022
Utility Company	Southern California Edison				
CO2 Intensity (lb/MWhr)	702.44	**CH4 Intensity (lb/MWhr)**	0.029	**N2O Intensity (lb/MWhr)**	0.006

1.3 User Entered Comments & Non-Default Data

Project Characteristics -

Land Use - General Light Industry = Water Treatment and Regional Water Treatment Facility; Other Non-Asphalt Surfaces = Conveyance

Construction Phase - Analysis assumes construction of a single Water Treatment and Regional Water Treatment Facility and Pipelines that would be constructed within an 18-month period

Off-road Equipment - Based on information provided in the Project Description

Trips and VMT - Based on information provided in the Project Description

Grading - Based on the Project Description, the average area of disturbance of each site is anticipated to be 2 acres on any given day.

Construction Off-road Equipment Mitigation - Rule 403

Vehicle Trips - Construction Run Only.

Energy Use - Construction Run Only.

Water And Wastewater - Construction Run Only.

Solid Waste - Construction Run Only.

Table Name	Column Name	Default Value	New Value
tblConstructionPhase	NumDays	45.00	547.00
tblConstructionPhase	NumDaysWeek	5.00	7.00
tblConstructionPhase	PhaseEndDate	3/4/2021	7/1/2022
tblEnergyUse	LightingElect	2.93	0.00
tblEnergyUse	NT24E	5.02	0.00
tblEnergyUse	NT24NG	17.13	0.00
tblEnergyUse	T24E	2.20	0.00
tblEnergyUse	T24NG	15.36	0.00
tblGrading	AcresOfGrading	273.50	1,092.00
tblOffRoadEquipment	LoadFactor	0.38	0.38
tblOffRoadEquipment	LoadFactor	0.29	0.29
tblOffRoadEquipment	OffRoadEquipmentType		Off-Highway Trucks
tblOffRoadEquipment	OffRoadEquipmentType		Cranes
tblOffRoadEquipment	OffRoadEquipmentType		Plate Compactors

tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	6.00
tblSolidWaste	SolidWasteGenerationRate	1,080.29	0.00
tblTripsAndVMT	VendorTripLength	6.90	40.00
tblTripsAndVMT	VendorTripNumber	0.00	15.00
tblTripsAndVMT	WorkerTripLength	14.70	40.00
tblTripsAndVMT	WorkerTripNumber	70.00	30.00
tblVehicleTrips	CC_TTP	28.00	0.00
tblVehicleTrips	CNW_TTP	13.00	0.00
tblVehicleTrips	CW_TTP	59.00	0.00
tblVehicleTrips	DV_TP	5.00	0.00
tblVehicleTrips	PB_TP	3.00	0.00
tblVehicleTrips	PR_TP	92.00	0.00
tblVehicleTrips	ST_TR	1.32	0.00
tblVehicleTrips	SU_TR	0.68	0.00
tblVehicleTrips	WD_TR	6.97	0.00
tblWater	IndoorWaterUseRate	201,465,000.00	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	12.5400	115.6609	79.5350	0.2683	3.5841	4.4035	7.9876	0.6300	4.0541	4.6841	0.0000	26,112.6572	26,112.6572	7.6472	0.0000	26,303.8371
2022	11.0503	92.5039	75.1272	0.2680	3.5841	3.4719	7.0560	0.6300	3.1969	3.8269	0.0000	26,077.3839	26,077.3839	7.6465	0.0000	26,268.5474
Maximum	**12.5400**	**115.6609**	**79.5350**	**0.2683**	**3.5841**	**4.4035**	**7.9876**	**0.6300**	**4.0541**	**4.6841**	**0.0000**	**26,112.6572**	**26,112.6572**	**7.6472**	**0.0000**	**26,303.8371**

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	12.5400	115.6609	79.5350	0.2683	2.2927	4.4035	6.6962	0.4906	4.0541	4.5446	0.0000	26,112.6572	26,112.6572	7.6472	0.0000	26,303.8371
2022	11.0503	92.5039	75.1272	0.2680	2.2927	3.4719	5.7645	0.4906	3.1969	3.6874	0.0000	26,077.3839	26,077.3839	7.6465	0.0000	26,268.5473
Maximum	**12.5400**	**115.6609**	**79.5350**	**0.2683**	**2.2927**	**4.4035**	**6.6962**	**0.4906**	**4.0541**	**4.5446**	**0.0000**	**26,112.6572**	**26,112.6572**	**7.6472**	**0.0000**	**26,303.8371**

	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**	**36.03**	**0.00**	**17.17**	**22.13**	**0.00**	**3.28**	**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	19.6554	1.2100e-003	0.1320	1.0000e-005		4.7000e-004	4.7000e-004		4.7000e-004	4.7000e-004		0.2826	0.2826	7.5000e-004		0.3012
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	**19.6554**	**1.2100e-003**	**0.1320**	**1.0000e-005**	**0.0000**	**4.7000e-004**	**4.7000e-004**	**0.0000**	**4.7000e-004**	**4.7000e-004**		**0.2826**	**0.2826**	**7.5000e-004**	**0.0000**	**0.3012**

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	19.6554	1.2100e-003	0.1320	1.0000e-005		4.7000e-004	4.7000e-004		4.7000e-004	4.7000e-004		0.2826	0.2826	7.5000e-004		0.3012
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	**19.6554**	**1.2100e-003**	**0.1320**	**1.0000e-005**	**0.0000**	**4.7000e-004**	**4.7000e-004**	**0.0000**	**4.7000e-004**	**4.7000e-004**		**0.2826**	**0.2826**	**7.5000e-004**	**0.0000**	**0.3012**

	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	Grading	Grading	1/1/2021	7/1/2022	7	547	

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 1092

Acres of Paving: 9.64

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
Grading	Off-Highway Trucks	15	8.00	402	0.38
Grading	Cranes	3	8.00	231	0.29
Grading	Excavators	0	8.00	158	0.38
Grading	Graders	1	8.00	187	0.41
Grading	Plate Compactors	3	8.00	8	0.43
Grading	Rubber Tired Dozers	0	8.00	247	0.40
Grading	Scrapers	0	8.00	367	0.48
Grading	Tractors/Loaders/Backhoes	6	8.00	97	0.37

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
Grading	28	30.00	15.00	0.00	40.00	40.00	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

Water Exposed Area

3.2 Grading - 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					2.1171	0.0000	2.1171	0.2286	0.0000	0.2286			0.0000			0.0000
Off-Road	12.0615	111.8513	76.2052	0.2430		4.3848	4.3848		4.0363	4.0363		23,489.491 1	23,489.491 1	7.5743		23,678.84 76
Total	**12.0615**	**111.8513**	**76.2052**	**0.2430**	**2.1171**	**4.3848**	**6.5019**	**0.2286**	**4.0363**	**4.2649**		**23,489.49 11**	**23,489.49 11**	**7.5743**		**23,678.84 76**

3.2 Grading - 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	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	0.1213	3.5572	0.8065	0.0174	0.5550	0.0132	0.5683	0.1596	0.0127	0.1723		1,833.0928	1,833.0928	0.0520		1,834.3915
Worker	0.3572	0.2524	2.5233	7.9300e-003	0.9120	5.5000e-003	0.9175	0.2418	5.0700e-003	0.2469		790.0733	790.0733	0.0210		790.5980
Total	**0.4786**	**3.8096**	**3.3298**	**0.0253**	**1.4670**	**0.0187**	**1.4857**	**0.4014**	**0.0177**	**0.4191**		**2,623.1662**	**2,623.1662**	**0.0729**		**2,624.9895**

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					0.8257	0.0000	0.8257	0.0892	0.0000	0.0892			0.0000			0.0000
Off-Road	12.0615	111.8513	76.2052	0.2430		4.3848	4.3848		4.0363	4.0363	0.0000	23,489.4911	23,489.4911	7.5743		23,678.8476
Total	**12.0615**	**111.8513**	**76.2052**	**0.2430**	**0.8257**	**4.3848**	**5.2105**	**0.0892**	**4.0363**	**4.1255**	**0.0000**	**23,489.4911**	**23,489.4911**	**7.5743**		**23,678.8476**

3.2 Grading - 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	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	0.1213	3.5572	0.8065	0.0174	0.5550	0.0132	0.5683	0.1596	0.0127	0.1723		1,833.0928	1,833.0928	0.0520		1,834.3915
Worker	0.3572	0.2524	2.5233	7.9300e-003	0.9120	5.5000e-003	0.9175	0.2418	5.0700e-003	0.2469		790.0733	790.0733	0.0210		790.5980
Total	**0.4786**	**3.8096**	**3.3298**	**0.0253**	**1.4670**	**0.0187**	**1.4857**	**0.4014**	**0.0177**	**0.4191**		**2,623.1662**	**2,623.1662**	**0.0729**		**2,624.9895**

3.2 Grading - 2022

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					2.1171	0.0000	2.1171	0.2286	0.0000	0.2286			0.0000			0.0000
Off-Road	10.6010	89.0426	72.0535	0.2431		3.4553	3.4553		3.1812	3.1812		23,498.3612	23,498.3612	7.5771		23,687.7895
Total	**10.6010**	**89.0426**	**72.0535**	**0.2431**	**2.1171**	**3.4553**	**5.5724**	**0.2286**	**3.1812**	**3.4098**		**23,498.3612**	**23,498.3612**	**7.5771**		**23,687.7895**

3.2 Grading - 2022

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	0.1139	3.2343	0.7557	0.0172	0.5550	0.0113	0.5663	0.1596	0.0108	0.1704		1,817.4390	1,817.4390	0.0506		1,818.7028
Worker	0.3355	0.2271	2.3180	7.6400e-003	0.9120	5.3400e-003	0.9173	0.2418	4.9200e-003	0.2467		761.5837	761.5837	0.0189		762.0550
Total	**0.4493**	**3.4613**	**3.0738**	**0.0249**	**1.4670**	**0.0166**	**1.4836**	**0.4014**	**0.0157**	**0.4171**		**2,579.0227**	**2,579.0227**	**0.0694**		**2,580.7579**

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					0.8257	0.0000	0.8257	0.0892	0.0000	0.0892			0.0000			0.0000
Off-Road	10.6010	89.0426	72.0535	0.2431		3.4553	3.4553		3.1812	3.1812	0.0000	23,498.3612	23,498.3612	7.5771		23,687.7895
Total	**10.6010**	**89.0426**	**72.0535**	**0.2431**	**0.8257**	**3.4553**	**4.2809**	**0.0892**	**3.1812**	**3.2703**	**0.0000**	**23,498.3612**	**23,498.3612**	**7.5771**		**23,687.7895**

3.2 Grading - 2022

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	0.1139	3.2343	0.7557	0.0172	0.5550	0.0113	0.5663	0.1596	0.0108	0.1704		1,817.439 0	1,817.439 0	0.0506		1,818.702 8
Worker	0.3355	0.2271	2.3180	7.6400e-003	0.9120	5.3400e-003	0.9173	0.2418	4.9200e-003	0.2467		761.5837	761.5837	0.0189		762.0550
Total	**0.4493**	**3.4613**	**3.0738**	**0.0249**	**1.4670**	**0.0166**	**1.4836**	**0.4014**	**0.0157**	**0.4171**		**2,579.022 7**	**2,579.022 7**	**0.0694**		**2,580.757 9**

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
General Light Industry	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
General Light Industry	16.60	8.40	6.90	0.00	0.00	0.00	0	0	0
Other Non-Asphalt Surfaces	16.60	8.40	6.90	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
General Light Industry	0.553113	0.036408	0.180286	0.116335	0.016165	0.005101	0.018218	0.063797	0.001357	0.001565	0.005903	0.000808	0.000944
Other Non-Asphalt Surfaces	0.553113	0.036408	0.180286	0.116335	0.016165	0.005101	0.018218	0.063797	0.001357	0.001565	0.005903	0.000808	0.000944

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					
General Light Industry	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
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					
General Light Industry	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
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	19.6554	1.2100e-003	0.1320	1.0000e-005		4.7000e-004	4.7000e-004		4.7000e-004	4.7000e-004		0.2826	0.2826	7.5000e-004		0.3012
Unmitigated	19.6554	1.2100e-003	0.1320	1.0000e-005		4.7000e-004	4.7000e-004		4.7000e-004	4.7000e-004		0.2826	0.2826	7.5000e-004		0.3012

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	2.2446					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	17.3985					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Landscaping	0.0123	1.2100e-003	0.1320	1.0000e-005		4.7000e-004	4.7000e-004		4.7000e-004	4.7000e-004		0.2826	0.2826	7.5000e-004		0.3012
Total	**19.6554**	**1.2100e-003**	**0.1320**	**1.0000e-005**		**4.7000e-004**	**4.7000e-004**		**4.7000e-004**	**4.7000e-004**		**0.2826**	**0.2826**	**7.5000e-004**		**0.3012**

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	2.2446					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	17.3985					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Landscaping	0.0123	1.2100e-003	0.1320	1.0000e-005		4.7000e-004	4.7000e-004		4.7000e-004	4.7000e-004		0.2826	0.2826	7.5000e-004		0.3012
Total	**19.6554**	**1.2100e-003**	**0.1320**	**1.0000e-005**		**4.7000e-004**	**4.7000e-004**		**4.7000e-004**	**4.7000e-004**		**0.2826**	**0.2826**	**7.5000e-004**		**0.3012**

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

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APPENDIX 3.5:

CALEEMOD PROJECT CATEGORY 1 CONSTRUCTION MITIGATED EMISSIONS MODEL OUTPUTS

OBMPU - Project Category 1 (Construction - Mitigated)

San Bernardino-South Coast County, Summer

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Other Asphalt Surfaces	22.50	1000sqft	0.52	22,500.00	0
Other Non-Asphalt Surfaces	455.00	1000sqft	10.45	455,000.00	0

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	2.2	**Precipitation Freq (Days)**	32
Climate Zone	10			**Operational Year**	2022
Utility Company	Southern California Edison				
CO2 Intensity (lb/MWhr)	702.44	**CH4 Intensity (lb/MWhr)**	0.029	**N2O Intensity (lb/MWhr)**	0.006

1.3 User Entered Comments & Non-Default Data

Project Characteristics -

Land Use - Other Asphalt Surfaces = 20 Monitoring Wells and Production Wells; Other Non-Asphalt Surfaces = Conveyance

Construction Phase - Analysis assumes 20 Monitoring Wells, 10 Production Wells, and 65,000 LF of conveyance to be constructed in a single year.

Off-road Equipment - Equipment based on information provided in the Project Description

Trips and VMT - Based on information provided in the Project Description

Grading - Based on the Project Description, the average area of disturbance of each site is anticipated to be half an acre or less.

Construction Off-road Equipment Mitigation - All equipment operating at >150 hp are required to be equipped with Tier 4 or better engines. Increase watering to 4 times per day.

Table Name	Column Name	Default Value	New Value
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstructionPhase	NumDays	30.00	366.00
tblConstructionPhase	NumDaysWeek	5.00	7.00
tblGrading	AcresOfGrading	0.00	183.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	0.00
tblTripsAndVMT	VendorTripLength	6.90	50.00
tblTripsAndVMT	VendorTripNumber	0.00	30.00
tblTripsAndVMT	WorkerTripLength	14.70	30.00
tblTripsAndVMT	WorkerTripNumber	5.00	10.00

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	1.2371	16.5304	8.3063	0.0681	2.1457	0.3189	2.4646	0.5167	0.2946	0.8113	0.0000	6,970.5806	6,970.5806	0.8261	0.0000	6,991.2333
2022	1.1023	13.7535	7.8477	0.0677	2.1456	0.2480	2.3936	0.5167	0.2291	0.7458	0.0000	6,925.8525	6,925.8525	0.8232	0.0000	6,946.4317
Maximum	**1.2371**	**16.5304**	**8.3063**	**0.0681**	**2.1457**	**0.3189**	**2.4646**	**0.5167**	**0.2946**	**0.8113**	**0.0000**	**6,970.5806**	**6,970.5806**	**0.8261**	**0.0000**	**6,991.2333**

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	0.6516	9.4514	12.8428	0.0681	1.7533	0.0714	1.8246	0.4743	0.0698	0.5441	0.0000	6,970.5806	6,970.5806	0.8261	0.0000	6,991.2333
2022	0.6284	8.6806	12.6627	0.0677	1.7533	0.0664	1.8196	0.4743	0.0651	0.5394	0.0000	6,925.8525	6,925.8525	0.8232	0.0000	6,946.4317
Maximum	**0.6516**	**9.4514**	**12.8428**	**0.0681**	**1.7533**	**0.0714**	**1.8246**	**0.4743**	**0.0698**	**0.5441**	**0.0000**	**6,970.5806**	**6,970.5806**	**0.8261**	**0.0000**	**6,991.2333**

	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	**45.29**	**40.13**	**-57.89**	**0.00**	**18.29**	**75.70**	**24.99**	**8.20**	**74.24**	**30.41**	**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	0.2101	4.5000e-004	0.0488	0.0000		1.7000e-004	1.7000e-004		1.7000e-004	1.7000e-004		0.1045	0.1045	2.8000e-004		0.1114
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	**0.2101**	**4.5000e-004**	**0.0488**	**0.0000**	**0.0000**	**1.7000e-004**	**1.7000e-004**	**0.0000**	**1.7000e-004**	**1.7000e-004**		**0.1045**	**0.1045**	**2.8000e-004**	**0.0000**	**0.1114**

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	0.2101	4.5000e-004	0.0488	0.0000		1.7000e-004	1.7000e-004		1.7000e-004	1.7000e-004		0.1045	0.1045	2.8000e-004		0.1114
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	**0.2101**	**4.5000e-004**	**0.0488**	**0.0000**	**0.0000**	**1.7000e-004**	**1.7000e-004**	**0.0000**	**1.7000e-004**	**1.7000e-004**		**0.1045**	**0.1045**	**2.8000e-004**	**0.0000**	**0.1114**

	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	Grading	Grading	1/1/2021	1/1/2022	7	366	

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 183

Acres of Paving: 10.97

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
Grading	Bore/Drill Rigs	1	8.00	221	0.50
Grading	Excavators	0	8.00	158	0.38
Grading	Graders	0	8.00	187	0.41
Grading	Off-Highway Trucks	1	8.00	402	0.38
Grading	Rubber Tired Dozers	0	8.00	247	0.40
Grading	Scrapers	0	8.00	367	0.48
Grading	Tractors/Loaders/Backhoes	0	8.00	97	0.37

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
Grading	2	10.00	30.00	0.00	30.00	50.00	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

Use Cleaner Engines for Construction Equipment

Water Exposed Area

3.2 Grading - 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					0.5303	0.0000	0.5303	0.0573	0.0000	0.0573			0.0000			0.0000
Off-Road	0.8641	8.2861	5.6783	0.0226		0.2847	0.2847		0.2619	0.2619		2,190.585 4	2,190.585 4	0.7085		2,208.297 4
Total	**0.8641**	**8.2861**	**5.6783**	**0.0226**	**0.5303**	**0.2847**	**0.8149**	**0.0573**	**0.2619**	**0.3192**		**2,190.585 4**	**2,190.585 4**	**0.7085**		**2,208.297 4**

3.2 Grading - 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	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	0.2848	8.1834	1.8261	0.0432	1.3874	0.0328	1.4202	0.3990	0.0314	0.4304		4,559.040 1	4,559.040 1	0.1115		4,561.827 6
Worker	0.0882	0.0608	0.8019	2.2200e-003	0.2280	1.3900e-003	0.2294	0.0605	1.2800e-003	0.0617		220.9551	220.9551	6.1300e-003		221.1083
Total	**0.3730**	**8.2442**	**2.6280**	**0.0455**	**1.6154**	**0.0342**	**1.6496**	**0.4594**	**0.0327**	**0.4921**		**4,779.995 2**	**4,779.995 2**	**0.1176**		**4,782.935 9**

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					0.1379	0.0000	0.1379	0.0149	0.0000	0.0149			0.0000			0.0000
Off-Road	0.2786	1.2072	10.2149	0.0226		0.0371	0.0371		0.0371	0.0371	0.0000	2,190.585 4	2,190.585 4	0.7085		2,208.297 4
Total	**0.2786**	**1.2072**	**10.2149**	**0.0226**	**0.1379**	**0.0371**	**0.1750**	**0.0149**	**0.0371**	**0.0520**	**0.0000**	**2,190.585 4**	**2,190.585 4**	**0.7085**		**2,208.297 4**

3.2 Grading - 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	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	0.2848	8.1834	1.8261	0.0432	1.3874	0.0328	1.4202	0.3990	0.0314	0.4304		4,559.040 1	4,559.040 1	0.1115		4,561.827 6
Worker	0.0882	0.0608	0.8019	2.2200e-003	0.2280	1.3900e-003	0.2294	0.0605	1.2800e-003	0.0617		220.9551	220.9551	6.1300e-003		221.1083
Total	**0.3730**	**8.2442**	**2.6280**	**0.0455**	**1.6154**	**0.0342**	**1.6496**	**0.4594**	**0.0327**	**0.4921**		**4,779.995 2**	**4,779.995 2**	**0.1176**		**4,782.935 9**

3.2 Grading - 2022

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					0.5303	0.0000	0.5303	0.0573	0.0000	0.0573			0.0000			0.0000
Off-Road	0.7525	6.2801	5.3999	0.0227		0.2187	0.2187		0.2012	0.2012		2,192.546 1	2,192.546 1	0.7091		2,210.274 0
Total	**0.7525**	**6.2801**	**5.3999**	**0.0227**	**0.5303**	**0.2187**	**0.7490**	**0.0573**	**0.2012**	**0.2585**		**2,192.546 1**	**2,192.546 1**	**0.7091**		**2,210.274 0**

3.2 Grading - 2022

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	0.2673	7.4187	1.7104	0.0429	1.3874	0.0279	1.4153	0.3990	0.0267	0.4256		4,520.3308	4,520.3308	0.1086		4,523.0447
Worker	0.0825	0.0547	0.7374	2.1400e-003	0.2280	1.3500e-003	0.2294	0.0605	1.2400e-003	0.0617		212.9756	212.9756	5.5000e-003		213.1131
Total	**0.3498**	**7.4734**	**2.4478**	**0.0450**	**1.6154**	**0.0293**	**1.6446**	**0.4594**	**0.0279**	**0.4873**		**4,733.3064**	**4,733.3064**	**0.1141**		**4,736.1577**

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					0.1379	0.0000	0.1379	0.0149	0.0000	0.0149			0.0000			0.0000
Off-Road	0.2786	1.2072	10.2149	0.0227		0.0371	0.0371		0.0371	0.0371	0.0000	2,192.5461	2,192.5461	0.7091		2,210.2740
Total	**0.2786**	**1.2072**	**10.2149**	**0.0227**	**0.1379**	**0.0371**	**0.1750**	**0.0149**	**0.0371**	**0.0520**	**0.0000**	**2,192.5461**	**2,192.5461**	**0.7091**		**2,210.2740**

3.2 Grading - 2022

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	0.2673	7.4187	1.7104	0.0429	1.3874	0.0279	1.4153	0.3990	0.0267	0.4256		4,520.3308	4,520.3308	0.1086		4,523.0447
Worker	0.0825	0.0547	0.7374	2.1400e-003	0.2280	1.3500e-003	0.2294	0.0605	1.2400e-003	0.0617		212.9756	212.9756	5.5000e-003		213.1131
Total	**0.3498**	**7.4734**	**2.4478**	**0.0450**	**1.6154**	**0.0293**	**1.6446**	**0.4594**	**0.0279**	**0.4873**		**4,733.3064**	**4,733.3064**	**0.1141**		**4,736.1577**

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 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 Asphalt Surfaces	16.60	8.40	6.90	0.00	0.00	0.00	0	0	0
Other Non-Asphalt Surfaces	16.60	8.40	6.90	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 Asphalt Surfaces	0.553113	0.036408	0.180286	0.116335	0.016165	0.005101	0.018218	0.063797	0.001357	0.001565	0.005903	0.000808	0.000944
Other Non-Asphalt Surfaces	0.553113	0.036408	0.180286	0.116335	0.016165	0.005101	0.018218	0.063797	0.001357	0.001565	0.005903	0.000808	0.000944

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 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
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 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
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	0.2101	4.5000e-004	0.0488	0.0000		1.7000e-004	1.7000e-004		1.7000e-004	1.7000e-004		0.1045	0.1045	2.8000e-004		0.1114
Unmitigated	0.2101	4.5000e-004	0.0488	0.0000		1.7000e-004	1.7000e-004		1.7000e-004	1.7000e-004		0.1045	0.1045	2.8000e-004		0.1114

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	0.0364					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	0.1691					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Landscaping	4.5400e-003	4.5000e-004	0.0488	0.0000		1.7000e-004	1.7000e-004		1.7000e-004	1.7000e-004		0.1045	0.1045	2.8000e-004		0.1114
Total	**0.2101**	**4.5000e-004**	**0.0488**	**0.0000**		**1.7000e-004**	**1.7000e-004**		**1.7000e-004**	**1.7000e-004**		**0.1045**	**0.1045**	**2.8000e-004**		**0.1114**

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	0.0364					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	0.1691					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Landscaping	4.5400e-003	4.5000e-004	0.0488	0.0000		1.7000e-004	1.7000e-004		1.7000e-004	1.7000e-004		0.1045	0.1045	2.8000e-004		0.1114
Total	**0.2101**	**4.5000e-004**	**0.0488**	**0.0000**		**1.7000e-004**	**1.7000e-004**		**1.7000e-004**	**1.7000e-004**		**0.1045**	**0.1045**	**2.8000e-004**		**0.1114**

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

OBMPU - Project Category 1 (Construction - Mitigated)

San Bernardino-South Coast County, Winter

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Other Asphalt Surfaces	22.50	1000sqft	0.52	22,500.00	0
Other Non-Asphalt Surfaces	455.00	1000sqft	10.45	455,000.00	0

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	2.2	**Precipitation Freq (Days)**	32
Climate Zone	10			**Operational Year**	2022
Utility Company	Southern California Edison				
CO2 Intensity (lb/MWhr)	702.44	**CH4 Intensity (lb/MWhr)**	0.029	**N2O Intensity (lb/MWhr)**	0.006

1.3 User Entered Comments & Non-Default Data

Project Characteristics -

Land Use - Other Asphalt Surfaces = 20 Monitoring Wells and Production Wells; Other Non-Asphalt Surfaces = Conveyance

Construction Phase - Analysis assumes 20 Monitoring Wells, 10 Production Wells, and 65,000 LF of conveyance to be constructed in a single year.

Off-road Equipment - Equipment based on information provided in the Project Description

Trips and VMT - Based on information provided in the Project Description

Grading - Based on the Project Description, the average area of disturbance of each site is anticipated to be half an acre or less.

Construction Off-road Equipment Mitigation - All equipment operating at >150 hp are required to be equipped with Tier 4 or better engines. Increase watering to 4 times per day.

Table Name	Column Name	Default Value	New Value
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstructionPhase	NumDays	30.00	366.00
tblConstructionPhase	NumDaysWeek	5.00	7.00
tblGrading	AcresOfGrading	0.00	183.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	0.00
tblTripsAndVMT	VendorTripLength	6.90	50.00
tblTripsAndVMT	VendorTripNumber	0.00	30.00
tblTripsAndVMT	WorkerTripLength	14.70	30.00
tblTripsAndVMT	WorkerTripNumber	5.00	10.00

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	1.2473	16.7492	8.2292	0.0675	2.1457	0.3190	2.4647	0.5167	0.2947	0.8114	0.0000	6,914.5212	6,914.5212	0.8310	0.0000	6,935.2962
2022	1.1123	13.9412	7.7798	0.0671	2.1456	0.2481	2.3937	0.5167	0.2293	0.7459	0.0000	6,870.6408	6,870.6408	0.8281	0.0000	6,891.3425
Maximum	**1.2473**	**16.7492**	**8.2292**	**0.0675**	**2.1457**	**0.3190**	**2.4647**	**0.5167**	**0.2947**	**0.8114**	**0.0000**	**6,914.5212**	**6,914.5212**	**0.8310**	**0.0000**	**6,935.2962**

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	0.6618	9.6703	12.7657	0.0675	1.7533	0.0715	1.8248	0.4743	0.0699	0.5443	0.0000	6,914.5212	6,914.5212	0.8310	0.0000	6,935.2962
2022	0.6383	8.8683	12.5947	0.0671	1.7533	0.0665	1.8198	0.4743	0.0652	0.5395	0.0000	6,870.6408	6,870.6408	0.8281	0.0000	6,891.3425
Maximum	**0.6618**	**9.6703**	**12.7657**	**0.0675**	**1.7533**	**0.0715**	**1.8248**	**0.4743**	**0.0699**	**0.5443**	**0.0000**	**6,914.5212**	**6,914.5212**	**0.8310**	**0.0000**	**6,935.2962**

	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	**44.90**	**39.60**	**-58.41**	**0.00**	**18.29**	**75.66**	**24.99**	**8.20**	**74.21**	**30.41**	**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	0.2101	4.5000e-004	0.0488	0.0000		1.7000e-004	1.7000e-004		1.7000e-004	1.7000e-004		0.1045	0.1045	2.8000e-004		0.1114
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	**0.2101**	**4.5000e-004**	**0.0488**	**0.0000**	**0.0000**	**1.7000e-004**	**1.7000e-004**	**0.0000**	**1.7000e-004**	**1.7000e-004**		**0.1045**	**0.1045**	**2.8000e-004**	**0.0000**	**0.1114**

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	0.2101	4.5000e-004	0.0488	0.0000		1.7000e-004	1.7000e-004		1.7000e-004	1.7000e-004		0.1045	0.1045	2.8000e-004		0.1114
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	**0.2101**	**4.5000e-004**	**0.0488**	**0.0000**	**0.0000**	**1.7000e-004**	**1.7000e-004**	**0.0000**	**1.7000e-004**	**1.7000e-004**		**0.1045**	**0.1045**	**2.8000e-004**	**0.0000**	**0.1114**

	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	Grading	Grading	1/1/2021	1/1/2022	7	366	

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 183

Acres of Paving: 10.97

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
Grading	Bore/Drill Rigs	1	8.00	221	0.50
Grading	Excavators	0	8.00	158	0.38
Grading	Graders	0	8.00	187	0.41
Grading	Off-Highway Trucks	1	8.00	402	0.38
Grading	Rubber Tired Dozers	0	8.00	247	0.40
Grading	Scrapers	0	8.00	367	0.48
Grading	Tractors/Loaders/Backhoes	0	8.00	97	0.37

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
Grading	2	10.00	30.00	0.00	30.00	50.00	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

Use Cleaner Engines for Construction Equipment

Water Exposed Area

3.2 Grading - 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					0.5303	0.0000	0.5303	0.0573	0.0000	0.0573			0.0000			0.0000
Off-Road	0.8641	8.2861	5.6783	0.0226		0.2847	0.2847		0.2619	0.2619		2,190.585 4	2,190.585 4	0.7085		2,208.297 4
Total	**0.8641**	**8.2861**	**5.6783**	**0.0226**	**0.5303**	**0.2847**	**0.8149**	**0.0573**	**0.2619**	**0.3192**		**2,190.585 4**	**2,190.585 4**	**0.7085**		**2,208.297 4**

3.2 Grading - 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	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	0.2911	8.3991	1.9080	0.0429	1.3874	0.0330	1.4203	0.3990	0.0315	0.4305		4,525.877 6	4,525.877 6	0.1172		4,528.807 9
Worker	0.0921	0.0639	0.6429	1.9900e-003	0.2280	1.3900e-003	0.2294	0.0605	1.2800e-003	0.0617		198.0582	198.0582	5.3100e-003		198.1909
Total	**0.3832**	**8.4630**	**2.5508**	**0.0449**	**1.6154**	**0.0343**	**1.6497**	**0.4594**	**0.0328**	**0.4922**		**4,723.935 8**	**4,723.935 8**	**0.1225**		**4,726.998 8**

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					0.1379	0.0000	0.1379	0.0149	0.0000	0.0149			0.0000			0.0000
Off-Road	0.2786	1.2072	10.2149	0.0226		0.0371	0.0371		0.0371	0.0371	0.0000	2,190.585 4	2,190.585 4	0.7085		2,208.297 4
Total	**0.2786**	**1.2072**	**10.2149**	**0.0226**	**0.1379**	**0.0371**	**0.1750**	**0.0149**	**0.0371**	**0.0520**	**0.0000**	**2,190.585 4**	**2,190.585 4**	**0.7085**		**2,208.297 4**

3.2 Grading - 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	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	0.2911	8.3991	1.9080	0.0429	1.3874	0.0330	1.4203	0.3990	0.0315	0.4305		4,525.8776	4,525.8776	0.1172		4,528.8079
Worker	0.0921	0.0639	0.6429	1.9900e-003	0.2280	1.3900e-003	0.2294	0.0605	1.2800e-003	0.0617		198.0582	198.0582	5.3100e-003		198.1909
Total	**0.3832**	**8.4630**	**2.5508**	**0.0449**	**1.6154**	**0.0343**	**1.6497**	**0.4594**	**0.0328**	**0.4922**		**4,723.9358**	**4,723.9358**	**0.1225**		**4,726.9988**

3.2 Grading - 2022

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					0.5303	0.0000	0.5303	0.0573	0.0000	0.0573			0.0000			0.0000
Off-Road	0.7525	6.2801	5.3999	0.0227		0.2187	0.2187		0.2012	0.2012		2,192.5461	2,192.5461	0.7091		2,210.2740
Total	**0.7525**	**6.2801**	**5.3999**	**0.0227**	**0.5303**	**0.2187**	**0.7490**	**0.0573**	**0.2012**	**0.2585**		**2,192.5461**	**2,192.5461**	**0.7091**		**2,210.2740**

3.2 Grading - 2022

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	0.2733	7.6035	1.7895	0.0425	1.3874	0.0280	1.4154	0.3990	0.0268	0.4258		4,487.176 8	4,487.176 8	0.1142		4,490.031 4
Worker	0.0865	0.0575	0.5904	1.9200e-003	0.2280	1.3500e-003	0.2294	0.0605	1.2400e-003	0.0617		190.9179	190.9179	4.7700e-003		191.0371
Total	**0.3598**	**7.6610**	**2.3799**	**0.0445**	**1.6154**	**0.0294**	**1.6448**	**0.4594**	**0.0281**	**0.4875**		**4,678.094 7**	**4,678.094 7**	**0.1190**		**4,681.068 5**

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					0.1379	0.0000	0.1379	0.0149	0.0000	0.0149			0.0000			0.0000
Off-Road	0.2786	1.2072	10.2149	0.0227		0.0371	0.0371		0.0371	0.0371	0.0000	2,192.546 1	2,192.546 1	0.7091		2,210.274 0
Total	**0.2786**	**1.2072**	**10.2149**	**0.0227**	**0.1379**	**0.0371**	**0.1750**	**0.0149**	**0.0371**	**0.0520**	**0.0000**	**2,192.546 1**	**2,192.546 1**	**0.7091**		**2,210.274 0**

3.2 Grading - 2022

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	0.2733	7.6035	1.7895	0.0425	1.3874	0.0280	1.4154	0.3990	0.0268	0.4258		4,487.176 8	4,487.176 8	0.1142		4,490.031 4
Worker	0.0865	0.0575	0.5904	1.9200e-003	0.2280	1.3500e-003	0.2294	0.0605	1.2400e-003	0.0617		190.9179	190.9179	4.7700e-003		191.0371
Total	**0.3598**	**7.6610**	**2.3799**	**0.0445**	**1.6154**	**0.0294**	**1.6448**	**0.4594**	**0.0281**	**0.4875**		**4,678.094 7**	**4,678.094 7**	**0.1190**		**4,681.068 5**

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 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 Asphalt Surfaces	16.60	8.40	6.90	0.00	0.00	0.00	0	0	0
Other Non-Asphalt Surfaces	16.60	8.40	6.90	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 Asphalt Surfaces	0.553113	0.036408	0.180286	0.116335	0.016165	0.005101	0.018218	0.063797	0.001357	0.001565	0.005903	0.000808	0.000944
Other Non-Asphalt Surfaces	0.553113	0.036408	0.180286	0.116335	0.016165	0.005101	0.018218	0.063797	0.001357	0.001565	0.005903	0.000808	0.000944

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 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
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 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
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	0.2101	4.5000e-004	0.0488	0.0000		1.7000e-004	1.7000e-004		1.7000e-004	1.7000e-004		0.1045	0.1045	2.8000e-004		0.1114
Unmitigated	0.2101	4.5000e-004	0.0488	0.0000		1.7000e-004	1.7000e-004		1.7000e-004	1.7000e-004		0.1045	0.1045	2.8000e-004		0.1114

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	0.0364					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	0.1691					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Landscaping	4.5400e-003	4.5000e-004	0.0488	0.0000		1.7000e-004	1.7000e-004		1.7000e-004	1.7000e-004		0.1045	0.1045	2.8000e-004		0.1114
Total	**0.2101**	**4.5000e-004**	**0.0488**	**0.0000**		**1.7000e-004**	**1.7000e-004**		**1.7000e-004**	**1.7000e-004**		**0.1045**	**0.1045**	**2.8000e-004**		**0.1114**

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	0.0364					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	0.1691					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Landscaping	4.5400e-003	4.5000e-004	0.0488	0.0000		1.7000e-004	1.7000e-004		1.7000e-004	1.7000e-004		0.1045	0.1045	2.8000e-004		0.1114
Total	**0.2101**	**4.5000e-004**	**0.0488**	**0.0000**		**1.7000e-004**	**1.7000e-004**		**1.7000e-004**	**1.7000e-004**		**0.1045**	**0.1045**	**2.8000e-004**		**0.1114**

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

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APPENDIX 3.6:

CALEEMOD PROJECT CATEGORY 2 CONSTRUCTION MITIGATED EMISSIONS MODEL OUTPUTS

OBMPU - Project Category 2 (Construction - Mitigated)

San Bernardino-South Coast County, Summer

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Other Non-Asphalt Surfaces	1,400.00	1000sqft	32.14	1,400,000.00	0

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	2.2	**Precipitation Freq (Days)**	32
Climate Zone	10			**Operational Year**	2022
Utility Company	Southern California Edison				
CO2 Intensity (lb/MWhr)	702.44	**CH4 Intensity (lb/MWhr)**	0.029	**N2O Intensity (lb/MWhr)**	0.006

1.3 User Entered Comments & Non-Default Data

Project Characteristics -

Land Use - Other Non-Asphalt Surfaces = Conveyance

Construction Phase - Analysis assumes 100,000 LF of Conveyance Pipelines (Recycled and Potable Water) and 100,000 LF of Conveyance Pipelines (Surplus and Supplemental Water Supply) constructed per year

Off-road Equipment - Equipment based on information provided in the Project Description

Trips and VMT - Based on information provided in the Project Description

Grading - Based on the Project Description, the average area of disturbance of each site is anticipated to be half an acre or less.

Construction Off-road Equipment Mitigation - All equipment operating at >150 hp are required to be equipped with Tier 4 or better engines. Increase watering to 4 times per day.

Table Name	Column Name	Default Value	New Value
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	2.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	22.00
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstructionPhase	NumDays	45.00	366.00
tblConstructionPhase	NumDaysWeek	5.00	7.00
tblConstructionPhase	PhaseEndDate	3/4/2021	1/1/2022
tblGrading	AcresOfGrading	0.00	183.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	0.00
tblTripsAndVMT	VendorTripLength	6.90	40.00
tblTripsAndVMT	VendorTripNumber	0.00	20.00
tblTripsAndVMT	WorkerTripLength	14.70	40.00
tblTripsAndVMT	WorkerTripNumber	75.00	28.00

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	15.5074	137.7924	103.9047	0.3534	2.1215	5.1885	7.3100	0.4957	4.7741	5.2698	0.0000	34,437.0342	34,437.0342	10.1620	0.0000	34,691.0840
2022	13.5491	107.2808	98.0385	0.3531	2.1214	3.9813	6.1028	0.4957	3.6634	4.1591	0.0000	34,397.3548	34,397.3548	10.1614	0.0000	34,651.3899
Maximum	**15.5074**	**137.7924**	**103.9047**	**0.3534**	**2.1215**	**5.1885**	**7.3100**	**0.4957**	**4.7741**	**5.2698**	**0.0000**	**34,437.0342**	**34,437.0342**	**10.1620**	**0.0000**	**34,691.0840**

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	5.4027	33.6531	156.3019	0.3534	1.7291	1.2235	2.9526	0.4534	1.1655	1.6189	0.0000	34,437.0341	34,437.0341	10.1620	0.0000	34,691.0839
2022	5.2026	31.3868	155.8728	0.3531	1.7291	1.0897	2.8187	0.4534	1.0423	1.4957	0.0000	34,397.3548	34,397.3548	10.1614	0.0000	34,651.3899
Maximum	**5.4027**	**33.6531**	**156.3019**	**0.3534**	**1.7291**	**1.2235**	**2.9526**	**0.4534**	**1.1655**	**1.6189**	**0.0000**	**34,437.0341**	**34,437.0341**	**10.1620**	**0.0000**	**34,691.0839**

	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	**63.50**	**73.46**	**-54.59**	**0.00**	**18.50**	**74.77**	**56.97**	**8.54**	**73.83**	**66.97**	**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	0.6159	1.3100e-003	0.1432	1.0000e-005		5.1000e-004	5.1000e-004		5.1000e-004	5.1000e-004		0.3064	0.3064	8.1000e-004		0.3266
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	**0.6159**	**1.3100e-003**	**0.1432**	**1.0000e-005**	**0.0000**	**5.1000e-004**	**5.1000e-004**	**0.0000**	**5.1000e-004**	**5.1000e-004**		**0.3064**	**0.3064**	**8.1000e-004**	**0.0000**	**0.3266**

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	0.6159	1.3100e-003	0.1432	1.0000e-005		5.1000e-004	5.1000e-004		5.1000e-004	5.1000e-004		0.3064	0.3064	8.1000e-004		0.3266
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	**0.6159**	**1.3100e-003**	**0.1432**	**1.0000e-005**	**0.0000**	**5.1000e-004**	**5.1000e-004**	**0.0000**	**5.1000e-004**	**5.1000e-004**		**0.3064**	**0.3064**	**8.1000e-004**	**0.0000**	**0.3266**

	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	Grading	Grading	1/1/2021	1/1/2022	7	366	

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 183

Acres of Paving: 32.14

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
Grading	Excavators	2	8.00	158	0.38
Grading	Graders	0	8.00	187	0.41
Grading	Off-Highway Trucks	22	8.00	402	0.38
Grading	Pavers	2	8.00	130	0.42
Grading	Rollers	2	8.00	80	0.38
Grading	Rubber Tired Dozers	0	8.00	247	0.40
Grading	Scrapers	0	8.00	367	0.48
Grading	Tractors/Loaders/Backhoes	2	8.00	97	0.37

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
Grading	30	28.00	20.00	0.00	40.00	40.00	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

Use Cleaner Engines for Construction Equipment

Water Exposed Area

3.2 Grading - 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					0.5303	0.0000	0.5303	0.0573	0.0000	0.0573			0.0000			0.0000
Off-Road	15.0342	132.9310	99.9303	0.3218		5.1658	5.1658		4.7525	4.7525		31,147.9895	31,147.9895	10.0739		31,399.8367
Total	**15.0342**	**132.9310**	**99.9303**	**0.3218**	**0.5303**	**5.1658**	**5.6961**	**0.0573**	**4.7525**	**4.8098**		**31,147.9895**	**31,147.9895**	**10.0739**		**31,399.8367**

3.2 Grading - 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	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	0.1578	4.6373	1.0191	0.0234	0.7401	0.0176	0.7576	0.2128	0.0168	0.2296		2,466.232 1	2,466.232 1	0.0654		2,467.867 9
Worker	0.3154	0.2240	2.9553	8.2600e-003	0.8512	5.1400e-003	0.8563	0.2257	4.7300e-003	0.2304		822.8126	822.8126	0.0227		823.3793
Total	**0.4732**	**4.8614**	**3.9745**	**0.0317**	**1.5912**	**0.0227**	**1.6139**	**0.4385**	**0.0215**	**0.4600**		**3,289.044 7**	**3,289.044 7**	**0.0881**		**3,291.247 2**

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					0.1379	0.0000	0.1379	0.0149	0.0000	0.0149			0.0000			0.0000
Off-Road	4.9295	28.7918	152.3275	0.3218		1.2008	1.2008		1.1440	1.1440	0.0000	31,147.98 94	31,147.98 94	10.0739		31,399.83 67
Total	**4.9295**	**28.7918**	**152.3275**	**0.3218**	**0.1379**	**1.2008**	**1.3386**	**0.0149**	**1.1440**	**1.1589**	**0.0000**	**31,147.98 94**	**31,147.98 94**	**10.0739**		**31,399.83 67**

3.2 Grading - 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	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	0.1578	4.6373	1.0191	0.0234	0.7401	0.0176	0.7576	0.2128	0.0168	0.2296		2,466.232 1	2,466.232 1	0.0654		2,467.867 9
Worker	0.3154	0.2240	2.9553	8.2600e-003	0.8512	5.1400e-003	0.8563	0.2257	4.7300e-003	0.2304		822.8126	822.8126	0.0227		823.3793
Total	**0.4732**	**4.8614**	**3.9745**	**0.0317**	**1.5912**	**0.0227**	**1.6139**	**0.4385**	**0.0215**	**0.4600**		**3,289.044 7**	**3,289.044 7**	**0.0881**		**3,291.247 2**

3.2 Grading - 2022

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					0.5303	0.0000	0.5303	0.0573	0.0000	0.0573			0.0000			0.0000
Off-Road	13.1057	102.8564	94.3667	0.3219		3.9614	3.9614		3.6445	3.6445		31,158.90 84	31,158.90 84	10.0774		31,410.84 40
Total	**13.1057**	**102.8564**	**94.3667**	**0.3219**	**0.5303**	**3.9614**	**4.4917**	**0.0573**	**3.6445**	**3.7018**		**31,158.90 84**	**31,158.90 84**	**10.0774**		**31,410.84 40**

3.2 Grading - 2022

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	0.1480	4.2227	0.9536	0.0232	0.7400	0.0149	0.7550	0.2128	0.0143	0.2271		2,445.3546	2,445.3546	0.0636		2,446.9455
Worker	0.2953	0.2017	2.7182	7.9600e-003	0.8512	4.9800e-003	0.8561	0.2257	4.5900e-003	0.2303		793.0918	793.0918	0.0204		793.6004
Total	**0.4434**	**4.4244**	**3.6718**	**0.0311**	**1.5912**	**0.0199**	**1.6111**	**0.4385**	**0.0189**	**0.4574**		**3,238.4464**	**3,238.4464**	**0.0840**		**3,240.5459**

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					0.1379	0.0000	0.1379	0.0149	0.0000	0.0149			0.0000			0.0000
Off-Road	4.7592	26.9625	152.2009	0.3219		1.0697	1.0697		1.0235	1.0235	0.0000	31,158.9084	31,158.9084	10.0774		31,410.8439
Total	**4.7592**	**26.9625**	**152.2009**	**0.3219**	**0.1379**	**1.0697**	**1.2076**	**0.0149**	**1.0235**	**1.0383**	**0.0000**	**31,158.9084**	**31,158.9084**	**10.0774**		**31,410.8439**

3.2 Grading - 2022

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	0.1480	4.2227	0.9536	0.0232	0.7400	0.0149	0.7550	0.2128	0.0143	0.2271		2,445.3546	2,445.3546	0.0636		2,446.9455
Worker	0.2953	0.2017	2.7182	7.9600e-003	0.8512	4.9800e-003	0.8561	0.2257	4.5900e-003	0.2303		793.0918	793.0918	0.0204		793.6004
Total	**0.4434**	**4.4244**	**3.6718**	**0.0311**	**1.5912**	**0.0199**	**1.6111**	**0.4385**	**0.0189**	**0.4574**		**3,238.4464**	**3,238.4464**	**0.0840**		**3,240.5459**

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		
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	16.60	8.40	6.90	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	0.553113	0.036408	0.180286	0.116335	0.016165	0.005101	0.018218	0.063797	0.001357	0.001565	0.005903	0.000808	0.000944

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**

5.2 Energy by Land Use - NaturalGas

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	0.6159	1.3100e-003	0.1432	1.0000e-005		5.1000e-004	5.1000e-004		5.1000e-004	5.1000e-004		0.3064	0.3064	8.1000e-004		0.3266
Unmitigated	0.6159	1.3100e-003	0.1432	1.0000e-005		5.1000e-004	5.1000e-004		5.1000e-004	5.1000e-004		0.3064	0.3064	8.1000e-004		0.3266

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	0.1067					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	0.4959					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Landscaping	0.0133	1.3100e-003	0.1432	1.0000e-005		5.1000e-004	5.1000e-004		5.1000e-004	5.1000e-004		0.3064	0.3064	8.1000e-004		0.3266
Total	**0.6159**	**1.3100e-003**	**0.1432**	**1.0000e-005**		**5.1000e-004**	**5.1000e-004**		**5.1000e-004**	**5.1000e-004**		**0.3064**	**0.3064**	**8.1000e-004**		**0.3266**

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	0.1067					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	0.4959					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Landscaping	0.0133	1.3100e-003	0.1432	1.0000e-005		5.1000e-004	5.1000e-004		5.1000e-004	5.1000e-004		0.3064	0.3064	8.1000e-004		0.3266
Total	**0.6159**	**1.3100e-003**	**0.1432**	**1.0000e-005**		**5.1000e-004**	**5.1000e-004**		**5.1000e-004**	**5.1000e-004**		**0.3064**	**0.3064**	**8.1000e-004**		**0.3266**

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

OBMPU - Project Category 2 (Construction - Mitigated)

San Bernardino-South Coast County, Winter

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Other Non-Asphalt Surfaces	1,400.00	1000sqft	32.14	1,400,000.00	0

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	2.2	**Precipitation Freq (Days)**	32
Climate Zone	10			**Operational Year**	2022
Utility Company	Southern California Edison				
CO2 Intensity (lb/MWhr)	702.44	**CH4 Intensity (lb/MWhr)**	0.029	**N2O Intensity (lb/MWhr)**	0.006

1.3 User Entered Comments & Non-Default Data

Project Characteristics -

Land Use - Other Non-Asphalt Surfaces = Conveyance

Construction Phase - Analysis assumes 100,000 LF of Conveyance Pipelines (Recycled and Potable Water) and 100,000 LF of Conveyance Pipelines (Surplus and Supplemental Water Supply) constructed per year

Off-road Equipment - Equipment based on information provided in the Project Description

Trips and VMT - Based on information provided in the Project Description

Grading - Based on the Project Description, the average area of disturbance of each site is anticipated to be half an acre or less.

Construction Off-road Equipment Mitigation - All equipment operating at >150 hp are required to be equipped with Tier 4 or better engines. Increase watering to 4 times per day.

OBMPU - Project Category 2 (Construction - Mitigated) - San Bernardino-South Coast County, Winter

Table Name	Column Name	Default Value	New Value
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	2.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	22.00
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstructionPhase	NumDays	45.00	366.00
tblConstructionPhase	NumDaysWeek	5.00	7.00
tblConstructionPhase	PhaseEndDate	3/4/2021	1/1/2022
tblGrading	AcresOfGrading	0.00	183.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	0.00
tblTripsAndVMT	VendorTripLength	6.90	40.00
tblTripsAndVMT	VendorTripNumber	0.00	20.00
tblTripsAndVMT	WorkerTripLength	14.70	40.00
tblTripsAndVMT	WorkerTripNumber	75.00	28.00

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	15.5294	137.9096	103.3607	0.3523	2.1215	5.1886	7.3101	0.4957	4.7742	5.2699	0.0000	34,329.5150	34,329.5150	10.1627	0.0000	34,583.5835
2022	13.5706	107.3807	97.5378	0.3520	2.1214	3.9814	6.1029	0.4957	3.6635	4.1592	0.0000	34,292.9718	34,292.9718	10.1624	0.0000	34,547.0324
Maximum	**15.5294**	**137.9096**	**103.3607**	**0.3523**	**2.1215**	**5.1886**	**7.3101**	**0.4957**	**4.7742**	**5.2699**	**0.0000**	**34,329.5150**	**34,329.5150**	**10.1627**	**0.0000**	**34,583.5835**

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	5.4246	33.7703	155.7579	0.3523	1.7291	1.2236	2.9526	0.4534	1.1656	1.6190	0.0000	34,329.5150	34,329.5150	10.1627	0.0000	34,583.5835
2022	5.2241	31.4867	155.3721	0.3520	1.7291	1.0897	2.8188	0.4534	1.0424	1.4958	0.0000	34,292.9718	34,292.9718	10.1624	0.0000	34,547.0324
Maximum	**5.4246**	**33.7703**	**155.7579**	**0.3523**	**1.7291**	**1.2236**	**2.9526**	**0.4534**	**1.1656**	**1.6190**	**0.0000**	**34,329.5150**	**34,329.5150**	**10.1627**	**0.0000**	**34,583.5835**

	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	**63.41**	**73.40**	**-54.87**	**0.00**	**18.50**	**74.77**	**56.97**	**8.54**	**73.83**	**66.97**	**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	0.6159	1.3100e-003	0.1432	1.0000e-005		5.1000e-004	5.1000e-004		5.1000e-004	5.1000e-004		0.3064	0.3064	8.1000e-004		0.3266
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	**0.6159**	**1.3100e-003**	**0.1432**	**1.0000e-005**	**0.0000**	**5.1000e-004**	**5.1000e-004**	**0.0000**	**5.1000e-004**	**5.1000e-004**		**0.3064**	**0.3064**	**8.1000e-004**	**0.0000**	**0.3266**

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	0.6159	1.3100e-003	0.1432	1.0000e-005		5.1000e-004	5.1000e-004		5.1000e-004	5.1000e-004		0.3064	0.3064	8.1000e-004		0.3266
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	**0.6159**	**1.3100e-003**	**0.1432**	**1.0000e-005**	**0.0000**	**5.1000e-004**	**5.1000e-004**	**0.0000**	**5.1000e-004**	**5.1000e-004**		**0.3064**	**0.3064**	**8.1000e-004**	**0.0000**	**0.3266**

	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	Grading	Grading	1/1/2021	1/1/2022	7	366	

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 183

Acres of Paving: 32.14

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
Grading	Excavators	2	8.00	158	0.38
Grading	Graders	0	8.00	187	0.41
Grading	Off-Highway Trucks	22	8.00	402	0.38
Grading	Pavers	2	8.00	130	0.42
Grading	Rollers	2	8.00	80	0.38
Grading	Rubber Tired Dozers	0	8.00	247	0.40
Grading	Scrapers	0	8.00	367	0.48
Grading	Tractors/Loaders/Backhoes	2	8.00	97	0.37

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
Grading	30	28.00	20.00	0.00	40.00	40.00	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

Use Cleaner Engines for Construction Equipment

Water Exposed Area

3.2 Grading - 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					0.5303	0.0000	0.5303	0.0573	0.0000	0.0573			0.0000			0.0000
Off-Road	15.0342	132.9310	99.9303	0.3218		5.1658	5.1658		4.7525	4.7525		31,147.9895	31,147.9895	10.0739		31,399.8367
Total	**15.0342**	**132.9310**	**99.9303**	**0.3218**	**0.5303**	**5.1658**	**5.6961**	**0.0573**	**4.7525**	**4.8098**		**31,147.9895**	**31,147.9895**	**10.0739**		**31,399.8367**

3.2 Grading - 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	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	0.1618	4.7430	1.0754	0.0232	0.7401	0.0177	0.7577	0.2128	0.0169	0.2297		2,444.1238	2,444.1238	0.0693		2,445.8553
Worker	0.3334	0.2355	2.3551	7.4000e-003	0.8512	5.1400e-003	0.8563	0.2257	4.7300e-003	0.2304		737.4018	737.4018	0.0196		737.8915
Total	**0.4952**	**4.9785**	**3.4304**	**0.0306**	**1.5912**	**0.0228**	**1.6140**	**0.4385**	**0.0216**	**0.4601**		**3,181.5256**	**3,181.5256**	**0.0889**		**3,183.7468**

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					0.1379	0.0000	0.1379	0.0149	0.0000	0.0149			0.0000			0.0000
Off-Road	4.9295	28.7918	152.3275	0.3218		1.2008	1.2008		1.1440	1.1440	0.0000	31,147.9894	31,147.9894	10.0739		31,399.8367
Total	**4.9295**	**28.7918**	**152.3275**	**0.3218**	**0.1379**	**1.2008**	**1.3386**	**0.0149**	**1.1440**	**1.1589**	**0.0000**	**31,147.9894**	**31,147.9894**	**10.0739**		**31,399.8367**

3.2 Grading - 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	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	0.1618	4.7430	1.0754	0.0232	0.7401	0.0177	0.7577	0.2128	0.0169	0.2297		2,444.1238	2,444.1238	0.0693		2,445.8553
Worker	0.3334	0.2355	2.3551	7.4000e-003	0.8512	5.1400e-003	0.8563	0.2257	4.7300e-003	0.2304		737.4018	737.4018	0.0196		737.8915
Total	**0.4952**	**4.9785**	**3.4304**	**0.0306**	**1.5912**	**0.0228**	**1.6140**	**0.4385**	**0.0216**	**0.4601**		**3,181.5256**	**3,181.5256**	**0.0889**		**3,183.7468**

3.2 Grading - 2022

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					0.5303	0.0000	0.5303	0.0573	0.0000	0.0573			0.0000			0.0000
Off-Road	13.1057	102.8564	94.3667	0.3219		3.9614	3.9614		3.6445	3.6445		31,158.9084	31,158.9084	10.0774		31,410.8440
Total	**13.1057**	**102.8564**	**94.3667**	**0.3219**	**0.5303**	**3.9614**	**4.4917**	**0.0573**	**3.6445**	**3.7018**		**31,158.9084**	**31,158.9084**	**10.0774**		**31,410.8440**

3.2 Grading - 2022

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	0.1518	4.3124	1.0077	0.0230	0.7400	0.0150	0.7551	0.2128	0.0144	0.2272		2,423.2520	2,423.2520	0.0674		2,424.9371
Worker	0.3131	0.2119	2.1635	7.1300e-003	0.8512	4.9800e-003	0.8561	0.2257	4.5900e-003	0.2303		710.8114	710.8114	0.0176		711.2514
Total	**0.4649**	**4.5243**	**3.1711**	**0.0301**	**1.5912**	**0.0200**	**1.6112**	**0.4385**	**0.0190**	**0.4574**		**3,134.0634**	**3,134.0634**	**0.0850**		**3,136.1884**

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					0.1379	0.0000	0.1379	0.0149	0.0000	0.0149			0.0000			0.0000
Off-Road	4.7592	26.9625	152.2009	0.3219		1.0697	1.0697		1.0235	1.0235	0.0000	31,158.9084	31,158.9084	10.0774		31,410.8439
Total	**4.7592**	**26.9625**	**152.2009**	**0.3219**	**0.1379**	**1.0697**	**1.2076**	**0.0149**	**1.0235**	**1.0383**	**0.0000**	**31,158.9084**	**31,158.9084**	**10.0774**		**31,410.8439**

3.2 Grading - 2022

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	0.1518	4.3124	1.0077	0.0230	0.7400	0.0150	0.7551	0.2128	0.0144	0.2272		2,423.2520	2,423.2520	0.0674		2,424.9371
Worker	0.3131	0.2119	2.1635	7.1300e-003	0.8512	4.9800e-003	0.8561	0.2257	4.5900e-003	0.2303		710.8114	710.8114	0.0176		711.2514
Total	**0.4649**	**4.5243**	**3.1711**	**0.0301**	**1.5912**	**0.0200**	**1.6112**	**0.4385**	**0.0190**	**0.4574**		**3,134.0634**	**3,134.0634**	**0.0850**		**3,136.1884**

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		
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	16.60	8.40	6.90	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	0.553113	0.036408	0.180286	0.116335	0.016165	0.005101	0.018218	0.063797	0.001357	0.001565	0.005903	0.000808	0.000944

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**

5.2 Energy by Land Use - NaturalGas

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	0.6159	1.3100e-003	0.1432	1.0000e-005		5.1000e-004	5.1000e-004		5.1000e-004	5.1000e-004		0.3064	0.3064	8.1000e-004		0.3266
Unmitigated	0.6159	1.3100e-003	0.1432	1.0000e-005		5.1000e-004	5.1000e-004		5.1000e-004	5.1000e-004		0.3064	0.3064	8.1000e-004		0.3266

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	0.1067					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	0.4959					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Landscaping	0.0133	1.3100e-003	0.1432	1.0000e-005		5.1000e-004	5.1000e-004		5.1000e-004	5.1000e-004		0.3064	0.3064	8.1000e-004		0.3266
Total	**0.6159**	**1.3100e-003**	**0.1432**	**1.0000e-005**		**5.1000e-004**	**5.1000e-004**		**5.1000e-004**	**5.1000e-004**		**0.3064**	**0.3064**	**8.1000e-004**		**0.3266**

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	0.1067					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	0.4959					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Landscaping	0.0133	1.3100e-003	0.1432	1.0000e-005		5.1000e-004	5.1000e-004		5.1000e-004	5.1000e-004		0.3064	0.3064	8.1000e-004		0.3266
Total	**0.6159**	**1.3100e-003**	**0.1432**	**1.0000e-005**		**5.1000e-004**	**5.1000e-004**		**5.1000e-004**	**5.1000e-004**		**0.3064**	**0.3064**	**8.1000e-004**		**0.3266**

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

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APPENDIX 3.7:

CALEEMOD PROJECT CATEGORY 3 CONSTRUCTION MITIGATED EMISSIONS MODEL OUTPUTS

OBMPU - Project Category 3 (Construction - Mitigated)

San Bernardino-South Coast County, Summer

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Other Asphalt Surfaces	100.00	Acre	100.00	4,356,000.00	0
Other Non-Asphalt Surfaces	420.00	1000sqft	9.64	420,000.00	0

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	2.2	**Precipitation Freq (Days)**	32
Climate Zone	10			**Operational Year**	2022
Utility Company	Southern California Edison				
CO2 Intensity (lb/MWhr)	702.44	**CH4 Intensity (lb/MWhr)**	0.029	**N2O Intensity (lb/MWhr)**	0.006

1.3 User Entered Comments & Non-Default Data

Project Characteristics -

Land Use - Other Non-Asphalt Surfaces = Conveyance; Other Asphalt Surfaces = Storage Basin

Construction Phase - As a conservative measure, analysis assumes the construction of one New Storage Basin (Chino Institute for Men + the associated pipeline)

Off-road Equipment - Equipment based on information provided in the Project Description

Trips and VMT - Based on information provided in the Project Description

Grading - Based on the Project Description, the average area of disturbance of each site is anticipated to be 2 acres on any given day.

Construction Off-road Equipment Mitigation - All equipment operating at >150 hp are required to be equipped with Tier 4 or better engines. Increase watering to 4 times per day.

Table Name	Column Name	Default Value	New Value
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	2.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	6.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	2.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	7.00
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstructionPhase	NumDays	310.00	550.00
tblConstructionPhase	NumDaysWeek	5.00	7.00
tblGrading	AcresOfGrading	3,850.00	1,100.00
tblGrading	MaterialExported	0.00	333,333.33
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	2.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	7.00
tblTripsAndVMT	HaulingTripLength	20.00	30.00
tblTripsAndVMT	HaulingTripNumber	41,667.00	370.00
tblTripsAndVMT	VendorTripLength	6.90	40.00
tblTripsAndVMT	VendorTripNumber	0.00	6.00
tblTripsAndVMT	WorkerTripLength	14.70	40.00
tblTripsAndVMT	WorkerTripNumber	48.00	6.00

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	13.1875	138.1734	90.7701	0.2285	14.6625	5.5774	20.2399	6.9786	5.1314	12.1099	0.0000	22,197.2633	22,197.2633	6.8856	0.0000	22,369.4036
2022	11.4263	112.6650	83.8332	0.2286	14.6821	4.5125	19.1946	6.9834	4.1517	11.1350	0.0000	22,202.8864	22,202.8864	6.8907	0.0000	22,375.1537
Maximum	**13.1875**	**138.1734**	**90.7701**	**0.2286**	**14.6821**	**5.5774**	**20.2399**	**6.9834**	**5.1314**	**12.1099**	**0.0000**	**22,202.8864**	**22,202.8864**	**6.8907**	**0.0000**	**22,375.1537**

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	3.1058	16.7387	104.4056	0.2285	4.1296	0.5787	4.7083	1.9023	0.5605	2.4627	0.0000	22,197.2633	22,197.2633	6.8856	0.0000	22,369.4036
2022	3.0532	16.1513	104.2896	0.2286	4.1491	0.5345	4.6836	1.9071	0.5197	2.4268	0.0000	22,202.8864	22,202.8864	6.8907	0.0000	22,375.1537
Maximum	**3.1058**	**16.7387**	**104.4056**	**0.2286**	**4.1491**	**0.5787**	**4.7083**	**1.9071**	**0.5605**	**2.4627**	**0.0000**	**22,202.8864**	**22,202.8864**	**6.8907**	**0.0000**	**22,375.1537**

	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	**74.98**	**86.89**	**-19.53**	**0.00**	**71.79**	**88.97**	**76.18**	**72.72**	**88.36**	**78.97**	**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	2.0605	4.9000e-004	0.0532	0.0000		1.9000e-004	1.9000e-004		1.9000e-004	1.9000e-004		0.1138	0.1138	3.0000e-004		0.1213
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	**2.0605**	**4.9000e-004**	**0.0532**	**0.0000**	**0.0000**	**1.9000e-004**	**1.9000e-004**	**0.0000**	**1.9000e-004**	**1.9000e-004**		**0.1138**	**0.1138**	**3.0000e-004**	**0.0000**	**0.1213**

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	2.0605	4.9000e-004	0.0532	0.0000		1.9000e-004	1.9000e-004		1.9000e-004	1.9000e-004		0.1138	0.1138	3.0000e-004		0.1213
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	**2.0605**	**4.9000e-004**	**0.0532**	**0.0000**	**0.0000**	**1.9000e-004**	**1.9000e-004**	**0.0000**	**1.9000e-004**	**1.9000e-004**		**0.1138**	**0.1138**	**3.0000e-004**	**0.0000**	**0.1213**

	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	Grading	Grading	1/1/2021	7/4/2022	7	550	

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 1100

Acres of Paving: 109.64

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
Grading	Excavators	2	8.00	158	0.38
Grading	Graders	0	8.00	187	0.41
Grading	Off-Highway Trucks	6	8.00	402	0.38
Grading	Rubber Tired Dozers	2	8.00	247	0.40
Grading	Scrapers	7	8.00	367	0.48
Grading	Tractors/Loaders/Backhoes	2	8.00	97	0.37

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
Grading	19	6.00	6.00	370.00	40.00	40.00	30.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

Use Cleaner Engines for Construction Equipment

Water Exposed Area

3.2 Grading - 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					14.2337	0.0000	14.2337	6.8599	0.0000	6.8599			0.0000			0.0000
Off-Road	13.0673	136.5407	89.7986	0.2190		5.5703	5.5703		5.1247	5.1247		21,203.4071	21,203.4071	6.8576		21,374.8474
Total	**13.0673**	**136.5407**	**89.7986**	**0.2190**	**14.2337**	**5.5703**	**19.8041**	**6.8599**	**5.1247**	**11.9846**		**21,203.4071**	**21,203.4071**	**6.8576**		**21,374.8474**

3.2 Grading - 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	lb/day										lb/day					
Hauling	5.3200e-003	0.1935	0.0324	7.3000e-004	0.0244	6.4000e-004	0.0251	6.5000e-003	6.1000e-004	7.1100e-003		77.6696	77.6696	3.5100e-003		77.7574
Vendor	0.0473	1.3912	0.3057	7.0200e-003	0.2220	5.2700e-003	0.2273	0.0639	5.0400e-003	0.0689		739.8696	739.8696	0.0196		740.3604
Worker	0.0676	0.0480	0.6333	1.7700e-003	0.1824	1.1000e-003	0.1835	0.0484	1.0100e-003	0.0494		176.3170	176.3170	4.8600e-003		176.4384
Total	**0.1203**	**1.6327**	**0.9714**	**9.5200e-003**	**0.4288**	**7.0100e-003**	**0.4358**	**0.1187**	**6.6600e-003**	**0.1254**		**993.8563**	**993.8563**	**0.0280**		**994.5562**

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					3.7008	0.0000	3.7008	1.7836	0.0000	1.7836			0.0000			0.0000
Off-Road	2.9856	15.1060	103.4342	0.2190		0.5717	0.5717		0.5538	0.5538	0.0000	21,203.4071	21,203.4071	6.8576		21,374.8474
Total	**2.9856**	**15.1060**	**103.4342**	**0.2190**	**3.7008**	**0.5717**	**4.2725**	**1.7836**	**0.5538**	**2.3374**	**0.0000**	**21,203.4071**	**21,203.4071**	**6.8576**		**21,374.8474**

3.2 Grading - 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	lb/day										lb/day					
Hauling	5.3200e-003	0.1935	0.0324	7.3000e-004	0.0244	6.4000e-004	0.0251	6.5000e-003	6.1000e-004	7.1100e-003		77.6696	77.6696	3.5100e-003		77.7574
Vendor	0.0473	1.3912	0.3057	7.0200e-003	0.2220	5.2700e-003	0.2273	0.0639	5.0400e-003	0.0689		739.8696	739.8696	0.0196		740.3604
Worker	0.0676	0.0480	0.6333	1.7700e-003	0.1824	1.1000e-003	0.1835	0.0484	1.0100e-003	0.0494		176.3170	176.3170	4.8600e-003		176.4384
Total	**0.1203**	**1.6327**	**0.9714**	**9.5200e-003**	**0.4288**	**7.0100e-003**	**0.4358**	**0.1187**	**6.6600e-003**	**0.1254**		**993.8563**	**993.8563**	**0.0280**		**994.5562**

3.2 Grading - 2022

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					14.2337	0.0000	14.2337	6.8599	0.0000	6.8599			0.0000			0.0000
Off-Road	11.3136	111.1793	82.9331	0.2192		4.5064	4.5064		4.1459	4.1459		21,222.5482	21,222.5482	6.8638		21,394.1433
Total	**11.3136**	**111.1793**	**82.9331**	**0.2192**	**14.2337**	**4.5064**	**18.7401**	**6.8599**	**4.1459**	**11.0057**		**21,222.5482**	**21,222.5482**	**6.8638**		**21,394.1433**

3.2 Grading - 2022

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	5.0300e-003	0.1757	0.0315	7.2000e-004	0.0440	5.3000e-004	0.0445	0.0113	5.1000e-004	0.0118		76.7835	76.7835	3.4400e-003		76.8695
Vendor	0.0444	1.2668	0.2861	6.9500e-003	0.2220	4.4800e-003	0.2265	0.0638	4.2800e-003	0.0681		733.6064	733.6064	0.0191		734.0837
Worker	0.0633	0.0432	0.5825	1.7100e-003	0.1824	1.0700e-003	0.1835	0.0484	9.8000e-004	0.0493		169.9482	169.9482	4.3600e-003		170.0572
Total	**0.1127**	**1.4857**	**0.9000**	**9.3800e-003**	**0.4484**	**6.0800e-003**	**0.4545**	**0.1235**	**5.7700e-003**	**0.1293**		**980.3382**	**980.3382**	**0.0269**		**981.0104**

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					3.7008	0.0000	3.7008	1.7836	0.0000	1.7836			0.0000			0.0000
Off-Road	2.9404	14.6656	103.3896	0.2192		0.5284	0.5284		0.5140	0.5140	0.0000	21,222.5482	21,222.5482	6.8638		21,394.1433
Total	**2.9404**	**14.6656**	**103.3896**	**0.2192**	**3.7008**	**0.5284**	**4.2291**	**1.7836**	**0.5140**	**2.2975**	**0.0000**	**21,222.5482**	**21,222.5482**	**6.8638**		**21,394.1433**

3.2 Grading - 2022

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	5.0300e-003	0.1757	0.0315	7.2000e-004	0.0440	5.3000e-004	0.0445	0.0113	5.1000e-004	0.0118		76.7835	76.7835	3.4400e-003		76.8695
Vendor	0.0444	1.2668	0.2861	6.9500e-003	0.2220	4.4800e-003	0.2265	0.0638	4.2800e-003	0.0681		733.6064	733.6064	0.0191		734.0837
Worker	0.0633	0.0432	0.5825	1.7100e-003	0.1824	1.0700e-003	0.1835	0.0484	9.8000e-004	0.0493		169.9482	169.9482	4.3600e-003		170.0572
Total	**0.1127**	**1.4857**	**0.9000**	**9.3800e-003**	**0.4484**	**6.0800e-003**	**0.4545**	**0.1235**	**5.7700e-003**	**0.1293**		**980.3382**	**980.3382**	**0.0269**		**981.0104**

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 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 Asphalt Surfaces	16.60	8.40	6.90	0.00	0.00	0.00	0	0	0
Other Non-Asphalt Surfaces	16.60	8.40	6.90	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 Asphalt Surfaces	0.553113	0.036408	0.180286	0.116335	0.016165	0.005101	0.018218	0.063797	0.001357	0.001565	0.005903	0.000808	0.000944
Other Non-Asphalt Surfaces	0.553113	0.036408	0.180286	0.116335	0.016165	0.005101	0.018218	0.063797	0.001357	0.001565	0.005903	0.000808	0.000944

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 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
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 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
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	2.0605	4.9000e-004	0.0532	0.0000		1.9000e-004	1.9000e-004		1.9000e-004	1.9000e-004		0.1138	0.1138	3.0000e-004		0.1213
Unmitigated	2.0605	4.9000e-004	0.0532	0.0000		1.9000e-004	1.9000e-004		1.9000e-004	1.9000e-004		0.1138	0.1138	3.0000e-004		0.1213

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	0.3639					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	1.6917					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Landscaping	4.9500e-003	4.9000e-004	0.0532	0.0000		1.9000e-004	1.9000e-004		1.9000e-004	1.9000e-004		0.1138	0.1138	3.0000e-004		0.1213
Total	**2.0605**	**4.9000e-004**	**0.0532**	**0.0000**		**1.9000e-004**	**1.9000e-004**		**1.9000e-004**	**1.9000e-004**		**0.1138**	**0.1138**	**3.0000e-004**		**0.1213**

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	0.3639					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	1.6917					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Landscaping	4.9500e-003	4.9000e-004	0.0532	0.0000		1.9000e-004	1.9000e-004		1.9000e-004	1.9000e-004		0.1138	0.1138	3.0000e-004		0.1213
Total	**2.0605**	**4.9000e-004**	**0.0532**	**0.0000**		**1.9000e-004**	**1.9000e-004**		**1.9000e-004**	**1.9000e-004**		**0.1138**	**0.1138**	**3.0000e-004**		**0.1213**

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

OBMPU - Project Category 3 (Construction - Mitigated)

San Bernardino-South Coast County, Winter

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Other Asphalt Surfaces	100.00	Acre	100.00	4,356,000.00	0
Other Non-Asphalt Surfaces	420.00	1000sqft	9.64	420,000.00	0

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	2.2	**Precipitation Freq (Days)**	32
Climate Zone	10			**Operational Year**	2022
Utility Company	Southern California Edison				
CO2 Intensity (lb/MWhr)	702.44	**CH4 Intensity (lb/MWhr)**	0.029	**N2O Intensity (lb/MWhr)**	0.006

1.3 User Entered Comments & Non-Default Data

Project Characteristics -

Land Use - Other Non-Asphalt Surfaces = Conveyance; Other Asphalt Surfaces = Storage Basin

Construction Phase - As a conservative measure, analysis assumes the construction of one New Storage Basin (Chino Institute for Men + the associated pipeline)

Off-road Equipment - Equipment based on information provided in the Project Description

Trips and VMT - Based on information provided in the Project Description

Grading - Based on the Project Description, the average area of disturbance of each site is anticipated to be 2 acres on any given day.

Construction Off-road Equipment Mitigation - All equipment operating at >150 hp are required to be equipped with Tier 4 or better engines. Increase watering to 4 times per day.

Table Name	Column Name	Default Value	New Value
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	2.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	6.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	2.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	7.00
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstructionPhase	NumDays	310.00	550.00
tblConstructionPhase	NumDaysWeek	5.00	7.00
tblGrading	AcresOfGrading	3,850.00	1,100.00
tblGrading	MaterialExported	0.00	333,333.33
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	2.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	7.00
tblTripsAndVMT	HaulingTripLength	20.00	30.00
tblTripsAndVMT	HaulingTripNumber	41,667.00	370.00
tblTripsAndVMT	VendorTripLength	6.90	40.00
tblTripsAndVMT	VendorTripNumber	0.00	6.00
tblTripsAndVMT	WorkerTripLength	14.70	40.00
tblTripsAndVMT	WorkerTripNumber	48.00	6.00

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	13.1927	138.2100	90.6616	0.2282	14.6625	5.5774	20.2399	6.9786	5.1314	12.1100	0.0000	22,170.8737	22,170.8737	6.8864	0.0000	22,343.0325
2022	11.4315	112.6959	83.7337	0.2283	14.6821	4.5125	19.1946	6.9834	4.1517	11.1350	0.0000	22,177.1700	22,177.1700	6.8915	0.0000	22,349.4571
Maximum	**13.1927**	**138.2100**	**90.6616**	**0.2283**	**14.6821**	**5.5774**	**20.2399**	**6.9834**	**5.1314**	**12.1100**	**0.0000**	**22,177.1700**	**22,177.1700**	**6.8915**	**0.0000**	**22,349.4571**

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	3.1110	16.7753	104.2972	0.2282	4.1296	0.5787	4.7083	1.9023	0.5605	2.4628	0.0000	22,170.8737	22,170.8737	6.8864	0.0000	22,343.0325
2022	3.0583	16.1823	104.1902	0.2283	4.1491	0.5345	4.6836	1.9071	0.5198	2.4268	0.0000	22,177.1700	22,177.1700	6.8915	0.0000	22,349.4571
Maximum	**3.1110**	**16.7753**	**104.2972**	**0.2283**	**4.1491**	**0.5787**	**4.7083**	**1.9071**	**0.5605**	**2.4628**	**0.0000**	**22,177.1700**	**22,177.1700**	**6.8915**	**0.0000**	**22,349.4571**

	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	**74.95**	**86.86**	**-19.55**	**0.00**	**71.79**	**88.97**	**76.18**	**72.72**	**88.36**	**78.97**	**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	2.0605	4.9000e-004	0.0532	0.0000		1.9000e-004	1.9000e-004		1.9000e-004	1.9000e-004		0.1138	0.1138	3.0000e-004		0.1213
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	**2.0605**	**4.9000e-004**	**0.0532**	**0.0000**	**0.0000**	**1.9000e-004**	**1.9000e-004**	**0.0000**	**1.9000e-004**	**1.9000e-004**		**0.1138**	**0.1138**	**3.0000e-004**	**0.0000**	**0.1213**

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	2.0605	4.9000e-004	0.0532	0.0000		1.9000e-004	1.9000e-004		1.9000e-004	1.9000e-004		0.1138	0.1138	3.0000e-004		0.1213
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	**2.0605**	**4.9000e-004**	**0.0532**	**0.0000**	**0.0000**	**1.9000e-004**	**1.9000e-004**	**0.0000**	**1.9000e-004**	**1.9000e-004**		**0.1138**	**0.1138**	**3.0000e-004**	**0.0000**	**0.1213**

	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	Grading	Grading	1/1/2021	7/4/2022	7	550	

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 1100

Acres of Paving: 109.64

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
Grading	Excavators	2	8.00	158	0.38
Grading	Graders	0	8.00	187	0.41
Grading	Off-Highway Trucks	6	8.00	402	0.38
Grading	Rubber Tired Dozers	2	8.00	247	0.40
Grading	Scrapers	7	8.00	367	0.48
Grading	Tractors/Loaders/Backhoes	2	8.00	97	0.37

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
Grading	19	6.00	6.00	370.00	40.00	40.00	30.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

Use Cleaner Engines for Construction Equipment

Water Exposed Area

3.2 Grading - 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					14.2337	0.0000	14.2337	6.8599	0.0000	6.8599			0.0000			0.0000
Off-Road	13.0673	136.5407	89.7986	0.2190		5.5703	5.5703		5.1247	5.1247		21,203.4071	21,203.4071	6.8576		21,374.8474
Total	**13.0673**	**136.5407**	**89.7986**	**0.2190**	**14.2337**	**5.5703**	**19.8041**	**6.8599**	**5.1247**	**11.9846**		**21,203.4071**	**21,203.4071**	**6.8576**		**21,374.8474**

3.2 Grading - 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	lb/day										lb/day					
Hauling	5.5000e-003	0.1959	0.0357	7.2000e-004	0.0244	6.5000e-004	0.0251	6.5000e-003	6.2000e-004	7.1200e-003		76.2148	76.2148	3.7700e-003		76.3090
Vendor	0.0485	1.4229	0.3226	6.9500e-003	0.2220	5.3000e-003	0.2273	0.0639	5.0700e-003	0.0689		733.2371	733.2371	0.0208		733.7566
Worker	0.0714	0.0505	0.5047	1.5900e-003	0.1824	1.1000e-003	0.1835	0.0484	1.0100e-003	0.0494		158.0147	158.0147	4.2000e-003		158.1196
Total	**0.1255**	**1.6693**	**0.8630**	**9.2600e-003**	**0.4288**	**7.0500e-003**	**0.4359**	**0.1187**	**6.7000e-003**	**0.1254**		**967.4666**	**967.4666**	**0.0288**		**968.1852**

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					3.7008	0.0000	3.7008	1.7836	0.0000	1.7836			0.0000			0.0000
Off-Road	2.9856	15.1060	103.4342	0.2190		0.5717	0.5717		0.5538	0.5538	0.0000	21,203.4071	21,203.4071	6.8576		21,374.8474
Total	**2.9856**	**15.1060**	**103.4342**	**0.2190**	**3.7008**	**0.5717**	**4.2725**	**1.7836**	**0.5538**	**2.3374**	**0.0000**	**21,203.4071**	**21,203.4071**	**6.8576**		**21,374.8474**

3.2 Grading - 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	lb/day										lb/day					
Hauling	5.5000e-003	0.1959	0.0357	7.2000e-004	0.0244	6.5000e-004	0.0251	6.5000e-003	6.2000e-004	7.1200e-003		76.2148	76.2148	3.7700e-003		76.3090
Vendor	0.0485	1.4229	0.3226	6.9500e-003	0.2220	5.3000e-003	0.2273	0.0639	5.0700e-003	0.0689		733.2371	733.2371	0.0208		733.7566
Worker	0.0714	0.0505	0.5047	1.5900e-003	0.1824	1.1000e-003	0.1835	0.0484	1.0100e-003	0.0494		158.0147	158.0147	4.2000e-003		158.1196
Total	**0.1255**	**1.6693**	**0.8630**	**9.2600e-003**	**0.4288**	**7.0500e-003**	**0.4359**	**0.1187**	**6.7000e-003**	**0.1254**		**967.4666**	**967.4666**	**0.0288**		**968.1852**

3.2 Grading - 2022

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					14.2337	0.0000	14.2337	6.8599	0.0000	6.8599			0.0000			0.0000
Off-Road	11.3136	111.1793	82.9331	0.2192		4.5064	4.5064		4.1459	4.1459		21,222.5482	21,222.5482	6.8638		21,394.1433
Total	**11.3136**	**111.1793**	**82.9331**	**0.2192**	**14.2337**	**4.5064**	**18.7401**	**6.8599**	**4.1459**	**11.0057**		**21,222.5482**	**21,222.5482**	**6.8638**		**21,394.1433**

3.2 Grading - 2022

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	5.2100e-003	0.1775	0.0347	7.1000e-004	0.0440	5.4000e-004	0.0445	0.0113	5.1000e-004	0.0118		75.3295	75.3295	3.6900e-003		75.4217
Vendor	0.0455	1.2937	0.3023	6.8900e-003	0.2220	4.5000e-003	0.2265	0.0638	4.3100e-003	0.0682		726.9756	726.9756	0.0202		727.4811
Worker	0.0671	0.0454	0.4636	1.5300e-003	0.1824	1.0700e-003	0.1835	0.0484	9.8000e-004	0.0493		152.3167	152.3167	3.7700e-003		152.4110
Total	**0.1179**	**1.5166**	**0.8006**	**9.1300e-003**	**0.4484**	**6.1100e-003**	**0.4545**	**0.1235**	**5.8000e-003**	**0.1293**		**954.6218**	**954.6218**	**0.0277**		**955.3139**

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					3.7008	0.0000	3.7008	1.7836	0.0000	1.7836			0.0000			0.0000
Off-Road	2.9404	14.6656	103.3896	0.2192		0.5284	0.5284		0.5140	0.5140	0.0000	21,222.5482	21,222.5482	6.8638		21,394.1433
Total	**2.9404**	**14.6656**	**103.3896**	**0.2192**	**3.7008**	**0.5284**	**4.2291**	**1.7836**	**0.5140**	**2.2975**	**0.0000**	**21,222.5482**	**21,222.5482**	**6.8638**		**21,394.1433**

3.2 Grading - 2022

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	5.2100e-003	0.1775	0.0347	7.1000e-004	0.0440	5.4000e-004	0.0445	0.0113	5.1000e-004	0.0118		75.3295	75.3295	3.6900e-003		75.4217
Vendor	0.0455	1.2937	0.3023	6.8900e-003	0.2220	4.5000e-003	0.2265	0.0638	4.3100e-003	0.0682		726.9756	726.9756	0.0202		727.4811
Worker	0.0671	0.0454	0.4636	1.5300e-003	0.1824	1.0700e-003	0.1835	0.0484	9.8000e-004	0.0493		152.3167	152.3167	3.7700e-003		152.4110
Total	**0.1179**	**1.5166**	**0.8006**	**9.1300e-003**	**0.4484**	**6.1100e-003**	**0.4545**	**0.1235**	**5.8000e-003**	**0.1293**		**954.6218**	**954.6218**	**0.0277**		**955.3139**

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 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 Asphalt Surfaces	16.60	8.40	6.90	0.00	0.00	0.00	0	0	0
Other Non-Asphalt Surfaces	16.60	8.40	6.90	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 Asphalt Surfaces	0.553113	0.036408	0.180286	0.116335	0.016165	0.005101	0.018218	0.063797	0.001357	0.001565	0.005903	0.000808	0.000944
Other Non-Asphalt Surfaces	0.553113	0.036408	0.180286	0.116335	0.016165	0.005101	0.018218	0.063797	0.001357	0.001565	0.005903	0.000808	0.000944

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 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
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 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
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	2.0605	4.9000e-004	0.0532	0.0000		1.9000e-004	1.9000e-004		1.9000e-004	1.9000e-004		0.1138	0.1138	3.0000e-004		0.1213
Unmitigated	2.0605	4.9000e-004	0.0532	0.0000		1.9000e-004	1.9000e-004		1.9000e-004	1.9000e-004		0.1138	0.1138	3.0000e-004		0.1213

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	0.3639					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	1.6917					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Landscaping	4.9500e-003	4.9000e-004	0.0532	0.0000		1.9000e-004	1.9000e-004		1.9000e-004	1.9000e-004		0.1138	0.1138	3.0000e-004		0.1213
Total	**2.0605**	**4.9000e-004**	**0.0532**	**0.0000**		**1.9000e-004**	**1.9000e-004**		**1.9000e-004**	**1.9000e-004**		**0.1138**	**0.1138**	**3.0000e-004**		**0.1213**

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	0.3639					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	1.6917					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Landscaping	4.9500e-003	4.9000e-004	0.0532	0.0000		1.9000e-004	1.9000e-004		1.9000e-004	1.9000e-004		0.1138	0.1138	3.0000e-004		0.1213
Total	**2.0605**	**4.9000e-004**	**0.0532**	**0.0000**		**1.9000e-004**	**1.9000e-004**		**1.9000e-004**	**1.9000e-004**		**0.1138**	**0.1138**	**3.0000e-004**		**0.1213**

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

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APPENDIX 3.8:

CALEEMOD PROJECT CATEGORY 4 CONSTRUCTION MITIGATED EMISSIONS MODEL OUTPUTS

OBMPU - Project Category 4 (Construction - Mitigated)

San Bernardino-South Coast County, Summer

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
General Light Industry	871.20	1000sqft	20.00	871,200.00	0
Other Non-Asphalt Surfaces	420.00	1000sqft	9.64	420,000.00	0

1.2 Other Project Characteristics

Urbanization Urban

Wind Speed (m/s) 2.2

Precipitation Freq (Days) 32

Climate Zone 10

Operational Year 2022

Utility Company Southern California Edison

CO2 Intensity (lb/MWhr) 702.44

CH4 Intensity (lb/MWhr) 0.029

N2O Intensity (lb/MWhr) 0.006

1.3 User Entered Comments & Non-Default Data

Project Characteristics -

Land Use - General Light Industry = Water Treatment and Regional Water Treatment Facility; Other Non-Asphalt Surfaces = Conveyance

Construction Phase - Analysis assumes construction of a single Water Treatment and Regional Water Treatment Facility and Pipelines that would be constructed within an 18-month period

Off-road Equipment - Based on information provided in the Project Description

Trips and VMT - Based on information provided in the Project Description

Grading - Based on the Project Description, the average area of disturbance of each site is anticipated to be 2 acres on any given day.

Vehicle Trips - Construction Run Only.

Energy Use - Construction Run Only.

Water And Wastewater - Construction Run Only.

Solid Waste - Construction Run Only.

Construction Off-road Equipment Mitigation - All equipment operating at >150 hp are required to be equipped with Tier 3 or better engines. Increase watering to 4 times per day.

Table Name	Column Name	Default Value	New Value
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	3.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	15.00
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstructionPhase	NumDays	45.00	547.00
tblConstructionPhase	NumDaysWeek	5.00	7.00
tblConstructionPhase	PhaseEndDate	3/4/2021	7/1/2022
tblEnergyUse	LightingElect	2.93	0.00
tblEnergyUse	NT24E	5.02	0.00
tblEnergyUse	NT24NG	17.13	0.00
tblEnergyUse	T24E	2.20	0.00

tblEnergyUse	T24NG	15.36	0.00
tblGrading	AcresOfGrading	273.50	1,092.00
tblOffRoadEquipment	OffRoadEquipmentType		Off-Highway Trucks
tblOffRoadEquipment	OffRoadEquipmentType		Cranes
tblOffRoadEquipment	OffRoadEquipmentType		Plate Compactors
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	6.00
tblSolidWaste	SolidWasteGenerationRate	1,080.29	0.00
tblTripsAndVMT	VendorTripLength	6.90	40.00
tblTripsAndVMT	VendorTripNumber	0.00	15.00
tblTripsAndVMT	WorkerTripLength	14.70	40.00
tblTripsAndVMT	WorkerTripNumber	70.00	30.00
tblVehicleTrips	CC_TTP	28.00	0.00
tblVehicleTrips	CNW_TTP	13.00	0.00
tblVehicleTrips	CW_TTP	59.00	0.00
tblVehicleTrips	DV_TP	5.00	0.00
tblVehicleTrips	PB_TP	3.00	0.00
tblVehicleTrips	PR_TP	92.00	0.00
tblVehicleTrips	ST_TR	1.32	0.00
tblVehicleTrips	SU_TR	0.68	0.00
tblVehicleTrips	WD_TR	6.97	0.00
tblWater	IndoorWaterUseRate	201,465,000.00	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	12.4805	115.2699	79.9046	0.2685	3.5841	4.3929	7.9770	0.6300	4.0443	4.6743	0.0000	26,135.8430	26,135.8430	7.6202	0.0000	26,326.3470
2022	10.9962	92.2069	75.4663	0.2682	3.5841	3.4643	7.0484	0.6300	3.1899	3.8199	0.0000	26,097.1784	26,097.1784	7.6192	0.0000	26,287.6580
Maximum	**12.4805**	**115.2699**	**79.9046**	**0.2685**	**3.5841**	**4.3929**	**7.9770**	**0.6300**	**4.0443**	**4.6743**	**0.0000**	**26,135.8430**	**26,135.8430**	**7.6202**	**0.0000**	**26,326.3470**

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	4.4189	27.6274	117.8058	0.2685	2.0174	1.0811	3.0985	0.4609	1.0265	1.4873	0.0000	26,135.8430	26,135.8430	7.6202	0.0000	26,326.3470
2022	4.2546	25.9715	117.3689	0.2682	2.0174	0.9490	2.9665	0.4608	0.9049	1.3657	0.0000	26,097.1784	26,097.1784	7.6192	0.0000	26,287.6580
Maximum	**4.4189**	**27.6274**	**117.8058**	**0.2685**	**2.0174**	**1.0811**	**3.0985**	**0.4609**	**1.0265**	**1.4873**	**0.0000**	**26,135.8430**	**26,135.8430**	**7.6202**	**0.0000**	**26,326.3470**

	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	**63.05**	**74.17**	**-51.36**	**0.00**	**43.71**	**74.16**	**59.63**	**26.85**	**73.30**	**66.41**	**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	19.6554	1.2100e-003	0.1320	1.0000e-005		4.7000e-004	4.7000e-004		4.7000e-004	4.7000e-004		0.2826	0.2826	7.5000e-004		0.3012
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	**19.6554**	**1.2100e-003**	**0.1320**	**1.0000e-005**	**0.0000**	**4.7000e-004**	**4.7000e-004**	**0.0000**	**4.7000e-004**	**4.7000e-004**		**0.2826**	**0.2826**	**7.5000e-004**	**0.0000**	**0.3012**

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	19.6554	1.2100e-003	0.1320	1.0000e-005		4.7000e-004	4.7000e-004		4.7000e-004	4.7000e-004		0.2826	0.2826	7.5000e-004		0.3012
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	**19.6554**	**1.2100e-003**	**0.1320**	**1.0000e-005**	**0.0000**	**4.7000e-004**	**4.7000e-004**	**0.0000**	**4.7000e-004**	**4.7000e-004**		**0.2826**	**0.2826**	**7.5000e-004**	**0.0000**	**0.3012**

	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	Grading	Grading	1/1/2021	7/1/2022	7	547	

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 1092

Acres of Paving: 9.64

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
Grading	Off-Highway Trucks	15	8.00	402	0.38
Grading	Excavators	0	8.00	158	0.38
Grading	Graders	1	8.00	187	0.41
Grading	Cranes	3	8.00	231	0.29
Grading	Plate Compactors	3	8.00	8	0.43
Grading	Rubber Tired Dozers	0	8.00	247	0.40
Grading	Scrapers	0	8.00	367	0.48
Grading	Tractors/Loaders/Backhoes	6	8.00	97	0.37

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
Grading	28	30.00	15.00	0.00	40.00	40.00	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

Use Cleaner Engines for Construction Equipment

Water Exposed Area

3.2 Grading - 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					2.1171	0.0000	2.1171	0.2286	0.0000	0.2286			0.0000			0.0000
Off-Road	12.0241	111.5518	75.9738	0.2421		4.3742	4.3742		4.0266	4.0266		23,404.58 40	23,404.58 40	7.5468		23,593.25 40
Total	**12.0241**	**111.5518**	**75.9738**	**0.2421**	**2.1171**	**4.3742**	**6.4913**	**0.2286**	**4.0266**	**4.2552**		**23,404.58 40**	**23,404.58 40**	**7.5468**		**23,593.25 40**

3.2 Grading - 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	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	0.1184	3.4780	0.7643	0.0175	0.5550	0.0132	0.5682	0.1596	0.0126	0.1722		1,849.674 1	1,849.674 1	0.0491		1,850.901 0
Worker	0.3380	0.2400	3.1664	8.8500e-003	0.9120	5.5000e-003	0.9175	0.2418	5.0700e-003	0.2469		881.5849	881.5849	0.0243		882.1921
Total	**0.4563**	**3.7180**	**3.9308**	**0.0264**	**1.4670**	**0.0187**	**1.4857**	**0.4014**	**0.0177**	**0.4191**		**2,731.259 0**	**2,731.259 0**	**0.0734**		**2,733.093 0**

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					0.5505	0.0000	0.5505	0.0594	0.0000	0.0594			0.0000			0.0000
Off-Road	3.9626	23.9094	113.8751	0.2421		1.0624	1.0624		1.0088	1.0088	0.0000	23,404.58 39	23,404.58 39	7.5468		23,593.25 40
Total	**3.9626**	**23.9094**	**113.8751**	**0.2421**	**0.5505**	**1.0624**	**1.6129**	**0.0594**	**1.0088**	**1.0682**	**0.0000**	**23,404.58 39**	**23,404.58 39**	**7.5468**		**23,593.25 40**

3.2 Grading - 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	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	0.1184	3.4780	0.7643	0.0175	0.5550	0.0132	0.5682	0.1596	0.0126	0.1722		1,849.6741	1,849.6741	0.0491		1,850.9010
Worker	0.3380	0.2400	3.1664	8.8500e-003	0.9120	5.5000e-003	0.9175	0.2418	5.0700e-003	0.2469		881.5849	881.5849	0.0243		882.1921
Total	**0.4563**	**3.7180**	**3.9308**	**0.0264**	**1.4670**	**0.0187**	**1.4857**	**0.4014**	**0.0177**	**0.4191**		**2,731.2590**	**2,731.2590**	**0.0734**		**2,733.0930**

3.2 Grading - 2022

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					2.1171	0.0000	2.1171	0.2286	0.0000	0.2286			0.0000			0.0000
Off-Road	10.5687	88.8238	71.8388	0.2423		3.4477	3.4477		3.1743	3.1743		23,413.4212	23,413.4212	7.5497		23,602.1627
Total	**10.5687**	**88.8238**	**71.8388**	**0.2423**	**2.1171**	**3.4477**	**5.5648**	**0.2286**	**3.1743**	**3.4029**		**23,413.4212**	**23,413.4212**	**7.5497**		**23,602.1627**

3.2 Grading - 2022

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	0.1110	3.1670	0.7152	0.0174	0.5550	0.0112	0.5662	0.1596	0.0107	0.1703		1,834.0160	1,834.0160	0.0477		1,835.2091
Worker	0.3164	0.2161	2.9124	8.5300e-003	0.9120	5.3400e-003	0.9173	0.2418	4.9200e-003	0.2467		849.7412	849.7412	0.0218		850.2862
Total	**0.4275**	**3.3831**	**3.6276**	**0.0259**	**1.4670**	**0.0165**	**1.4835**	**0.4014**	**0.0156**	**0.4170**		**2,683.7571**	**2,683.7571**	**0.0695**		**2,685.4953**

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					0.5505	0.0000	0.5505	0.0594	0.0000	0.0594			0.0000			0.0000
Off-Road	3.8272	22.5884	113.7413	0.2423		0.9325	0.9325		0.8892	0.8892	0.0000	23,413.4212	23,413.4212	7.5497		23,602.1627
Total	**3.8272**	**22.5884**	**113.7413**	**0.2423**	**0.5505**	**0.9325**	**1.4830**	**0.0594**	**0.8892**	**0.9487**	**0.0000**	**23,413.4212**	**23,413.4212**	**7.5497**		**23,602.1627**

3.2 Grading - 2022

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	0.1110	3.1670	0.7152	0.0174	0.5550	0.0112	0.5662	0.1596	0.0107	0.1703		1,834.016 0	1,834.016 0	0.0477		1,835.209 1
Worker	0.3164	0.2161	2.9124	8.5300e-003	0.9120	5.3400e-003	0.9173	0.2418	4.9200e-003	0.2467		849.7412	849.7412	0.0218		850.2862
Total	**0.4275**	**3.3831**	**3.6276**	**0.0259**	**1.4670**	**0.0165**	**1.4835**	**0.4014**	**0.0156**	**0.4170**		**2,683.757 1**	**2,683.757 1**	**0.0695**		**2,685.495 3**

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
General Light Industry	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
General Light Industry	16.60	8.40	6.90	0.00	0.00	0.00	0	0	0
Other Non-Asphalt Surfaces	16.60	8.40	6.90	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
General Light Industry	0.553113	0.036408	0.180286	0.116335	0.016165	0.005101	0.018218	0.063797	0.001357	0.001565	0.005903	0.000808	0.000944
Other Non-Asphalt Surfaces	0.553113	0.036408	0.180286	0.116335	0.016165	0.005101	0.018218	0.063797	0.001357	0.001565	0.005903	0.000808	0.000944

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					
General Light Industry	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
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					
General Light Industry	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
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	19.6554	1.2100e-003	0.1320	1.0000e-005		4.7000e-004	4.7000e-004		4.7000e-004	4.7000e-004		0.2826	0.2826	7.5000e-004		0.3012
Unmitigated	19.6554	1.2100e-003	0.1320	1.0000e-005		4.7000e-004	4.7000e-004		4.7000e-004	4.7000e-004		0.2826	0.2826	7.5000e-004		0.3012

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	2.2446					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	17.3985					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Landscaping	0.0123	1.2100e-003	0.1320	1.0000e-005		4.7000e-004	4.7000e-004		4.7000e-004	4.7000e-004		0.2826	0.2826	7.5000e-004		0.3012
Total	**19.6554**	**1.2100e-003**	**0.1320**	**1.0000e-005**		**4.7000e-004**	**4.7000e-004**		**4.7000e-004**	**4.7000e-004**		**0.2826**	**0.2826**	**7.5000e-004**		**0.3012**

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	2.2446					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	17.3985					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Landscaping	0.0123	1.2100e-003	0.1320	1.0000e-005		4.7000e-004	4.7000e-004		4.7000e-004	4.7000e-004		0.2826	0.2826	7.5000e-004		0.3012
Total	**19.6554**	**1.2100e-003**	**0.1320**	**1.0000e-005**		**4.7000e-004**	**4.7000e-004**		**4.7000e-004**	**4.7000e-004**		**0.2826**	**0.2826**	**7.5000e-004**		**0.3012**

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

OBMPU - Project Category 4 (Construction - Mitigated)

San Bernardino-South Coast County, Winter

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
General Light Industry	871.20	1000sqft	20.00	871,200.00	0
Other Non-Asphalt Surfaces	420.00	1000sqft	9.64	420,000.00	0

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	2.2	**Precipitation Freq (Days)**	32
Climate Zone	10			**Operational Year**	2022
Utility Company	Southern California Edison				
CO2 Intensity (lb/MWhr)	702.44	**CH4 Intensity (lb/MWhr)**	0.029	**N2O Intensity (lb/MWhr)**	0.006

1.3 User Entered Comments & Non-Default Data

Project Characteristics -

Land Use - General Light Industry = Water Treatment and Regional Water Treatment Facility; Other Non-Asphalt Surfaces = Conveyance

Construction Phase - Analysis assumes construction of a single Water Treatment and Regional Water Treatment Facility and Pipelines that would be constructed within an 18-month period

Off-road Equipment - Based on information provided in the Project Description

Trips and VMT - Based on information provided in the Project Description

Grading - Based on the Project Description, the average area of disturbance of each site is anticipated to be 2 acres on any given day.

Vehicle Trips - Construction Run Only.

Energy Use - Construction Run Only.

Water And Wastewater - Construction Run Only.

Solid Waste - Construction Run Only.

Construction Off-road Equipment Mitigation - All equipment operating at >150 hp are required to be equipped with Tier 3 or better engines. Increase watering to 4 times per day.

Table Name	Column Name	Default Value	New Value
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	3.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	15.00
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstructionPhase	NumDays	45.00	547.00
tblConstructionPhase	NumDaysWeek	5.00	7.00
tblConstructionPhase	PhaseEndDate	3/4/2021	7/1/2022
tblEnergyUse	LightingElect	2.93	0.00
tblEnergyUse	NT24E	5.02	0.00
tblEnergyUse	NT24NG	17.13	0.00
tblEnergyUse	T24E	2.20	0.00

tblEnergyUse	T24NG	15.36	0.00
tblGrading	AcresOfGrading	273.50	1,092.00
tblOffRoadEquipment	OffRoadEquipmentType		Off-Highway Trucks
tblOffRoadEquipment	OffRoadEquipmentType		Cranes
tblOffRoadEquipment	OffRoadEquipmentType		Plate Compactors
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	6.00
tblSolidWaste	SolidWasteGenerationRate	1,080.29	0.00
tblTripsAndVMT	VendorTripLength	6.90	40.00
tblTripsAndVMT	VendorTripNumber	0.00	15.00
tblTripsAndVMT	WorkerTripLength	14.70	40.00
tblTripsAndVMT	WorkerTripNumber	70.00	30.00
tblVehicleTrips	CC_TTP	28.00	0.00
tblVehicleTrips	CNW_TTP	13.00	0.00
tblVehicleTrips	CW_TTP	59.00	0.00
tblVehicleTrips	DV_TP	5.00	0.00
tblVehicleTrips	PB_TP	3.00	0.00
tblVehicleTrips	PR_TP	92.00	0.00
tblVehicleTrips	ST_TR	1.32	0.00
tblVehicleTrips	SU_TR	0.68	0.00
tblVehicleTrips	WD_TR	6.97	0.00
tblWater	IndoorWaterUseRate	201,465,000.00	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	12.5027	115.3614	79.3036	0.2674	3.5841	4.3929	7.9770	0.6300	4.0443	4.6743	0.0000	26,027.7501	26,027.7501	7.6197	0.0000	26,218.2435
2022	11.0180	92.2851	74.9125	0.2671	3.5841	3.4643	7.0484	0.6300	3.1899	3.8199	0.0000	25,992.4439	25,992.4439	7.6191	0.0000	26,182.9206
Maximum	**12.5027**	**115.3614**	**79.3036**	**0.2674**	**3.5841**	**4.3929**	**7.9770**	**0.6300**	**4.0443**	**4.6743**	**0.0000**	**26,027.7501**	**26,027.7501**	**7.6197**	**0.0000**	**26,218.2435**

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	4.4411	27.7190	117.2049	0.2674	2.0174	1.0812	3.0986	0.4609	1.0265	1.4874	0.0000	26,027.7501	26,027.7501	7.6197	0.0000	26,218.2435
2022	4.2765	26.0497	116.8151	0.2671	2.0174	0.9491	2.9665	0.4608	0.9049	1.3658	0.0000	25,992.4439	25,992.4439	7.6191	0.0000	26,182.9206
Maximum	**4.4411**	**27.7190**	**117.2049**	**0.2674**	**2.0174**	**1.0812**	**3.0986**	**0.4609**	**1.0265**	**1.4874**	**0.0000**	**26,027.7501**	**26,027.7501**	**7.6197**	**0.0000**	**26,218.2435**

	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	**62.94**	**74.11**	**-51.75**	**0.00**	**43.71**	**74.16**	**59.63**	**26.85**	**73.30**	**66.41**	**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	19.6554	1.2100e-003	0.1320	1.0000e-005		4.7000e-004	4.7000e-004		4.7000e-004	4.7000e-004		0.2826	0.2826	7.5000e-004		0.3012
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	**19.6554**	**1.2100e-003**	**0.1320**	**1.0000e-005**	**0.0000**	**4.7000e-004**	**4.7000e-004**	**0.0000**	**4.7000e-004**	**4.7000e-004**		**0.2826**	**0.2826**	**7.5000e-004**	**0.0000**	**0.3012**

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	19.6554	1.2100e-003	0.1320	1.0000e-005		4.7000e-004	4.7000e-004		4.7000e-004	4.7000e-004		0.2826	0.2826	7.5000e-004		0.3012
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	**19.6554**	**1.2100e-003**	**0.1320**	**1.0000e-005**	**0.0000**	**4.7000e-004**	**4.7000e-004**	**0.0000**	**4.7000e-004**	**4.7000e-004**		**0.2826**	**0.2826**	**7.5000e-004**	**0.0000**	**0.3012**

	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	Grading	Grading	1/1/2021	7/1/2022	7	547	

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 1092

Acres of Paving: 9.64

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
Grading	Off-Highway Trucks	15	8.00	402	0.38
Grading	Excavators	0	8.00	158	0.38
Grading	Graders	1	8.00	187	0.41
Grading	Cranes	3	8.00	231	0.29
Grading	Plate Compactors	3	8.00	8	0.43
Grading	Rubber Tired Dozers	0	8.00	247	0.40
Grading	Scrapers	0	8.00	367	0.48
Grading	Tractors/Loaders/Backhoes	6	8.00	97	0.37

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
Grading	28	30.00	15.00	0.00	40.00	40.00	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

Use Cleaner Engines for Construction Equipment

Water Exposed Area

3.2 Grading - 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					2.1171	0.0000	2.1171	0.2286	0.0000	0.2286			0.0000			0.0000
Off-Road	12.0241	111.5518	75.9738	0.2421		4.3742	4.3742		4.0266	4.0266		23,404.58 40	23,404.58 40	7.5468		23,593.25 40
Total	**12.0241**	**111.5518**	**75.9738**	**0.2421**	**2.1171**	**4.3742**	**6.4913**	**0.2286**	**4.0266**	**4.2552**		**23,404.58 40**	**23,404.58 40**	**7.5468**		**23,593.25 40**

3.2 Grading - 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	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	0.1213	3.5572	0.8065	0.0174	0.5550	0.0132	0.5683	0.1596	0.0127	0.1723		1,833.092 8	1,833.092 8	0.0520		1,834.391 5
Worker	0.3572	0.2524	2.5233	7.9300e-003	0.9120	5.5000e-003	0.9175	0.2418	5.0700e-003	0.2469		790.0733	790.0733	0.0210		790.5980
Total	**0.4786**	**3.8096**	**3.3298**	**0.0253**	**1.4670**	**0.0187**	**1.4857**	**0.4014**	**0.0177**	**0.4191**		**2,623.166 2**	**2,623.166 2**	**0.0729**		**2,624.989 5**

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					0.5505	0.0000	0.5505	0.0594	0.0000	0.0594			0.0000			0.0000
Off-Road	3.9626	23.9094	113.8751	0.2421		1.0624	1.0624		1.0088	1.0088	0.0000	23,404.58 39	23,404.58 39	7.5468		23,593.25 40
Total	**3.9626**	**23.9094**	**113.8751**	**0.2421**	**0.5505**	**1.0624**	**1.6129**	**0.0594**	**1.0088**	**1.0682**	**0.0000**	**23,404.58 39**	**23,404.58 39**	**7.5468**		**23,593.25 40**

3.2 Grading - 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	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	0.1213	3.5572	0.8065	0.0174	0.5550	0.0132	0.5683	0.1596	0.0127	0.1723		1,833.092 8	1,833.092 8	0.0520		1,834.391 5
Worker	0.3572	0.2524	2.5233	7.9300e-003	0.9120	5.5000e-003	0.9175	0.2418	5.0700e-003	0.2469		790.0733	790.0733	0.0210		790.5980
Total	**0.4786**	**3.8096**	**3.3298**	**0.0253**	**1.4670**	**0.0187**	**1.4857**	**0.4014**	**0.0177**	**0.4191**		**2,623.166 2**	**2,623.166 2**	**0.0729**		**2,624.989 5**

3.2 Grading - 2022

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					2.1171	0.0000	2.1171	0.2286	0.0000	0.2286			0.0000			0.0000
Off-Road	10.5687	88.8238	71.8388	0.2423		3.4477	3.4477		3.1743	3.1743		23,413.42 12	23,413.42 12	7.5497		23,602.16 27
Total	**10.5687**	**88.8238**	**71.8388**	**0.2423**	**2.1171**	**3.4477**	**5.5648**	**0.2286**	**3.1743**	**3.4029**		**23,413.42 12**	**23,413.42 12**	**7.5497**		**23,602.16 27**

3.2 Grading - 2022

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	0.1139	3.2343	0.7557	0.0172	0.5550	0.0113	0.5663	0.1596	0.0108	0.1704		1,817.4390	1,817.4390	0.0506		1,818.7028
Worker	0.3355	0.2271	2.3180	7.6400e-003	0.9120	5.3400e-003	0.9173	0.2418	4.9200e-003	0.2467		761.5837	761.5837	0.0189		762.0550
Total	**0.4493**	**3.4613**	**3.0738**	**0.0249**	**1.4670**	**0.0166**	**1.4836**	**0.4014**	**0.0157**	**0.4171**		**2,579.0227**	**2,579.0227**	**0.0694**		**2,580.7579**

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					0.5505	0.0000	0.5505	0.0594	0.0000	0.0594			0.0000			0.0000
Off-Road	3.8272	22.5884	113.7413	0.2423		0.9325	0.9325		0.8892	0.8892	0.0000	23,413.4212	23,413.4212	7.5497		23,602.1627
Total	**3.8272**	**22.5884**	**113.7413**	**0.2423**	**0.5505**	**0.9325**	**1.4830**	**0.0594**	**0.8892**	**0.9487**	**0.0000**	**23,413.4212**	**23,413.4212**	**7.5497**		**23,602.1627**

3.2 Grading - 2022

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	0.1139	3.2343	0.7557	0.0172	0.5550	0.0113	0.5663	0.1596	0.0108	0.1704		1,817.439 0	1,817.439 0	0.0506		1,818.702 8
Worker	0.3355	0.2271	2.3180	7.6400e-003	0.9120	5.3400e-003	0.9173	0.2418	4.9200e-003	0.2467		761.5837	761.5837	0.0189		762.0550
Total	**0.4493**	**3.4613**	**3.0738**	**0.0249**	**1.4670**	**0.0166**	**1.4836**	**0.4014**	**0.0157**	**0.4171**		**2,579.022 7**	**2,579.022 7**	**0.0694**		**2,580.757 9**

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
General Light Industry	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
General Light Industry	16.60	8.40	6.90	0.00	0.00	0.00	0	0	0
Other Non-Asphalt Surfaces	16.60	8.40	6.90	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
General Light Industry	0.553113	0.036408	0.180286	0.116335	0.016165	0.005101	0.018218	0.063797	0.001357	0.001565	0.005903	0.000808	0.000944
Other Non-Asphalt Surfaces	0.553113	0.036408	0.180286	0.116335	0.016165	0.005101	0.018218	0.063797	0.001357	0.001565	0.005903	0.000808	0.000944

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					
General Light Industry	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
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					
General Light Industry	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
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	19.6554	1.2100e-003	0.1320	1.0000e-005		4.7000e-004	4.7000e-004		4.7000e-004	4.7000e-004		0.2826	0.2826	7.5000e-004		0.3012
Unmitigated	19.6554	1.2100e-003	0.1320	1.0000e-005		4.7000e-004	4.7000e-004		4.7000e-004	4.7000e-004		0.2826	0.2826	7.5000e-004		0.3012

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	2.2446					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	17.3985					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Landscaping	0.0123	1.2100e-003	0.1320	1.0000e-005		4.7000e-004	4.7000e-004		4.7000e-004	4.7000e-004		0.2826	0.2826	7.5000e-004		0.3012
Total	**19.6554**	**1.2100e-003**	**0.1320**	**1.0000e-005**		**4.7000e-004**	**4.7000e-004**		**4.7000e-004**	**4.7000e-004**		**0.2826**	**0.2826**	**7.5000e-004**		**0.3012**

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	2.2446					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	17.3985					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Landscaping	0.0123	1.2100e-003	0.1320	1.0000e-005		4.7000e-004	4.7000e-004		4.7000e-004	4.7000e-004		0.2826	0.2826	7.5000e-004		0.3012
Total	**19.6554**	**1.2100e-003**	**0.1320**	**1.0000e-005**		**4.7000e-004**	**4.7000e-004**		**4.7000e-004**	**4.7000e-004**		**0.2826**	**0.2826**	**7.5000e-004**		**0.3012**

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

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APPENDIX 3

Program Biological Resources Report

Program Biological Resources Report
Optimum Basin Management Program Update

March 15, 2020

Chino Basin Watermaster and Inland Empire Utilities Agency

Jacobs

Jacobs

Program Biological Resources Report

March 2020

STATE OF CALIFORNIA
Chino Basin Watermaster and Inland Empire Utilities Agency

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Contents

List of Abbreviated Terms

amsl	average mean sea level
APE	Area of Potential Effect
BAA	Biological Analysis Area
BNSF	BNSF Railway Company
BSA	Biological Study Area
Caltrans	California Department of Transportation
CDFW	California Department of Fish and Wildlife
CEQ	Council on Environmental Quality
CEQA	California Environmental Quality Act
CESA	California Endangered Species Act
CFGC	California Fish and Game Code
CFR	Code of Federal Regulations
CNDDB	California Natural Diversity Database
CRLF	California red-legged frogs
CWA	Clean Water Act
DCH	Designated Critical Habitats
Eagle Act	The Bald and Golden Eagle Protection Act
EFH	Essential Fish Habitat
EIR	Environmental Impact Report
EIS	Environmental Impact Statement
EO	Executive Orders
EOC	Emergency Operations Center
EPA	U.S. Environmental Protection Agency
ESA	Endangered Species Act
FE	Federally Endangered
FESA	Federal Endangered Species Act
FMPs	Fishery Management Plans
FT	Federally Threatened
ITC	Intermodal Transit Center
ITP	Incidental Take Permit
MBTA	Migratory Bird Treaty Act
MSHCP	Multiple Species Habitat Conservation Plan

List of Abbreviated Terms

NCCP	Natural Community Conservation Plans
NEPA	National Environmental Policy Act
NMFS	National Marine Fisheries Service
NOP	Notice of Preparation
NPPA	Native Plant Protect Act
PEIR	Program Environmental Impact Report
PNES	Program Natural Environmental Study
RWQCB	Regional Water Quality Control Board
SSC	Species of Special Concern
ST	State Threatened
SWRCB	State Water Resources Control Board
TDA	Tom Dodson & Associates
U.S.	United States
USACE	U.S. Army Corps of Engineers
USC	United States Code
USFWS	U.S. Fish and Wildlife Services
USGS	U.S. Geological Survey
VFR	Valley foothill riparian
VOW	Valley oak woodland

Chapter 1. Project Description

1.1 Introduction

This chapter contains a detailed description of the proposed project, the Optimum Basin Management Program Update (OBMPU), with focus on those program characteristics and activities that can cause physical changes in the environment. As discussed in Chapter 2, this project description focuses on the relationship between OBMPU Program Elements and activities and facilities proposed by the overall OBMPU programs that may be implemented if the proposed program is approved by the Chino Basin Watermaster (CBWM). Actual implementation of the OBMPU activities described herein may be carried out by the CBWM or any of its member agencies/stakeholders in the Chino Groundwater Basin (Chino Basin) through the planning period, 2020 through 2050.

The description of the OBMPU's scope in this document is of necessity expansive as it covers nine (9) Program Elements (PEs) and attempts to address all of the possible program activities and projects at a programmatic level over the next 30 years, with some site-specific detail where near-term future locations of facilities are known. The CBWM and stakeholders have been meeting to review Program Elements and define potential project activities and facilities for about the past two years. Since the Inland Empire Utilities Agency (IEUA) has jurisdiction throughout most of the Chino Basin, it has agreed to serve as the Lead Agency for purposes of complying with the California Environmental Quality Act (CEQA). The CBWM and stakeholders of the OBMPU Peace Agreement and regulatory agencies that will function as CEQA Responsible Agencies will have the option of relying upon a certified Final OBMPU Program Environmental Impact Report (PEIR) for any future actions they take in support of the proposed program or an individual project described in this PEIR.

The 2000 OBMP contains a set of management programs (the PEs) that improve the reliability and long-term sustainability of the Chino Basin and the water supply reliability of the Judgment Parties. The framework for developing the OBMPU—including the goals of the Parties, the hydrologic understanding of the basin, the institutional and regulatory environment, an assessment of the impediments to achieving the Parties' goals, and the actions required to remove the impediments and achieve the goals—were all based on 1998-1999 conditions and valid planning assumptions at that time. Below is a summary of the PE's

1.2 Summary of Findings

The

1.2.1 Project Category 1: Well Development and Monitoring Devices (PEs 1-9)

This Project Category includes the development of ASR, injection, pumping, groundwater level monitoring, and groundwater quality wells, associated well housing, as well as monitoring devices such as flow meters and extensometers. The proposed wells and monitoring devices will be installed throughout the Chino Basin.

Since the proposed project is at the programmatic level, specific locations for the proposed wells have not been have yet to be determined. As such, impacts to specific species or sensitive habitat resources are speculative, and greatly depend on the previous uses of the proposed monitoring sites. Previously unknown and unrecorded biological resources may be present on or within close proximity to an individual project. Therefore, mitigation will be implemented that would require site-specific studies to identify potentially suitable habitat for sensitive species, nesting sites, or critical habitat. The project biologist will work with the project design team to minimize impacts to sensitive resources by avoiding or minimizing direct impacts where feasible. If impacts are unavoidable and permitting is required; the project proponent will obtain required permitting and conduct required mitigation measures.

Due to the probability for these PEs to involve federal funding or work within biologically sensitive areas; it is anticipated that many future projects will require species specific studies, regulatory permitting, and follow-on mitigation monitoring.

1.2.1.1 Proposed Mitigation and Minimization Measures for Pes 1-9:

- ***Where future project-related impacts will affect undeveloped land, site surveys shall be conducted by a qualified biologist/ecologist. If sensitive species are identified as a result of the survey for which mitigation/compensation must be provided in accordance with regulatory requirements, the following subsequent mitigation actions will be taken:***
  - ***The project proponent shall provide compensation for sensitive habitat acreage lost by acquiring and protecting in perpetuity (through property or mitigation bank credit acquisition) habitat for the sensitive species at a ratio of not less than 1:1 for habitat lost. The property acquisition shall include the presence of at least one animal or plant per animal or plant lost at the development site to compensate for the loss of individual sensitive species.***
  - ***b.The final mitigation may differ from the above values based on negotiations between the project proponent and USFWS and CDFW for any incidental take permits for listed species. The project proponent shall retain a copy of the incidental take permit as verification that the mitigation of significant biological resource impacts at a project site with sensitive biological resources has been accomplished.***
  - ***c. Preconstruction botanical surveys for special-status plant communities and special-status plant species will be conducted. in areas that were not previously surveyed because of access or timing issues or project design changes, pre-construction surveys for special-status plant communities and special-status plant species will be conducted before the start of ground-disturbing activities during the appropriate blooming period(s) for the species.***

- ***Biological Resources Management Plan: During final design, a BRMP will be prepared to assemble the biological resources mitigation measures for each specific infrastructure improvement in the future. The BRMP will include terms and conditions from applicable permits and agreements and make provisions for monitoring assignments, scheduling, and responsibility. The BRMP will also discuss habitat replacement and revegetation, protection during ground-disturbing activities, performance (growth) standards, maintenance criteria, and monitoring requirements for temporary and permanent native plant community impacts. The parameters of the BRMP will be formed with the mitigation measures from the project-level EIR/EIS, including terms and conditions as applicable from the USFWS, USACE, SWRCB/RWQCB, and CDFW.***

- ***To reduce or prevent activities that may adversely affect rivers, streambeds or wetlands, the following mitigation measures will be incorporated into any specific projects and/or contractor specifications for future project-related impacts to protect sensitive resources and habitat.***
  - ***Prior to discharge of fill or streambed alteration of jurisdictional areas, the project proponent shall obtain regulatory permits from the U.S. Army Corps of Engineers, local Regional Water Quality Control Board and the California Department of Fish and Wildlife. Any future project that must discharge fill into a channel or otherwise alter a streambed shall be minimized to the extent feasible, and any discharge of fill not avoidable shall be mitigated through compensatory mitigation. Mitigation can be provided by restoration of temporary impacts, enhancement of existing resources, or purchasing into any authorized mitigation bank or in-lieu fee program; by selecting a site of comparable acreage near the site and enhancing it with a native riparian habitat or invasive species removal in accordance with a habitat mitigation plan approved by regulatory agencies; or by acquiring sufficient compensating habitat to meet regulatory agency requirements. Typically, regulatory agencies require mitigation for jurisdictional waters without any riparian or wetland habitat to be mitigated at a 1:1 ratio. For loss of any riparian or other wetland areas, the mitigation ratio will begin at 2:1 and the ratio will rise based on the type of habitat, habitat quality, and presence of sensitive or listed plants or animals in the affected area. A Habitat Mitigation and Monitoring Proposal shall be prepared and reviewed and approved by the appropriate regulatory agencies. The project proponent will also obtain permits from the regulatory agencies (U.S. Army Corps of Engineers, Regional Water Quality Control Board, CDFW and any other applicable regulatory agency with jurisdiction over the proposed facility improvement) if any impacts to jurisdictional areas will occur. These agencies can impose greater mitigation requirements in their***

permits, but Caltrans will utilize the ratios outlined above as the minimum required to offset or compensate for impacts to jurisdictional waters, riparian areas or other wetlands.

- ***Jurisdictional Water Preconstruction Surveys:** A jurisdictional water preconstruction survey will be conducted at least six months before the start of ground-disturbing activities to identify and map all jurisdictional waters in the project footprint and if possible within a 250-foot buffer. The purpose of this survey is to confirm the extent of jurisdictional waters in areas where permission to enter was not previously granted and where aerial photograph interpretation was used to estimate the extent of these features. If possible, surveys would be performed during the spring, when plant species are in bloom and hydrological indicators are most readily identifiable. These results would then be used to calculate impact acreages and determine the amount of compensatory mitigation required to offset the loss of wetland functions and values.*

❖ ***Regarding active bird nests, the following mitigation measure will be applied to this program.***

- ***It is illegal to "take" active bird nests of native birds, and if such nests are present at a project site, no take is allowed. To avoid an illegal take of active bird nests, any grubbing, brushing or tree removal will be conducted outside of the State identified nesting season (nesting season is approximately from February 15 through September 1 of a given calendar year). Alternatively, coordination with the CDFW to conduct nesting bird surveys will be completed, and methodology of surveys will be agreed upon. All nesting bird surveys will be conducted by a qualified biologist prior to initiation of ground disturbance to demonstrate that no bird nests will be disturbed by project construction activities.***

❖ ***The following mitigation can reduce the impact to burrowing owl to a less than significant level.***

- ***Prior to commencement of construction activity in locations that are not fully developed, protocol burrowing owl survey will be conducted using the 2012 survey protocol methodology identified in the "Staff Report on Burrowing Owl Mitigation, State of California, Natural Resources Agency, Department of Fish and Game, March 7, 2012", or the most recent CDFW survey protocol available. Protocol surveys shall be conducted by a qualified biologist to determine if any burrowing owl burrows are located within the potential area of impact. If occupied burrows may be impacted, an impact minimization plan shall be developed and approved by CDFW that will protect the burrow in place or provide for passive relocation to an alternate burrow within the vicinity but outside of the project footprint in accordance with current CDFW guidelines. Active nests must be avoided with a 250-foot buffer until all nestlings have fledged.***

❖ ***The following mitigation can ensure consistency with any HCP or MSHCP.***

- ***Prior to commencement of construction activity on a project facility within a MSHCP/HCP plan area, consistency with that plan, or take authorization through that plan, shall be obtained. Through avoidance, compensation or a comparable mitigation alternative, each project shall be shown to be consistent with a MSHCP/HCP.***

❖ ***Implementation of the above measures is protective of the environment. Should the regulatory agencies determine an alternative, equivalent mitigation program during acquisition of regulatory permits, such measure shall be deemed equivalent to the above measures and no additional environmental documentation shall be required to implement a measure different than outlined above. Note that if impacts cannot be mitigated or avoided in the manner outlined in the measures above, then subsequent environmental documentation would have to be prepared in accordance with procedures outlined in Section 15162 of the State CEQA Guidelines. Implementation of the following mitigation measures will ensure that project design and site selection reduce impacts to sensitive biological resources to the extent feasible.***

- ***Place primary emphasis on the preservation of large, unbroken blocks of natural open space and wildlife habitat area, and protect the integrity of habitat linkages. As part of this emphasis, incorporate programs for purchase of lands, clustering of development to increase the amount of preserved open space, and assurances that the construction of facilities or infrastructure improvements meet standards identical to the environmental protection policies applicable to the specific facilities improvement.***

- ***Require facility designs and maintenance activities to be planned to protect habitat values and to preserve significant, viable habitat areas and habitat connection in their natural conditions.***
    - ***Within designated habitat areas of rare, threatened or endangered species, prohibit disturbance of protected biotic resources.***
    - ***Within riparian areas and wetlands subject to state or federal regulations, riparian woodlands, oak and walnut woodland, and habitat linkages, require that the vegetative resources which contribute to habitat carrying capacity (vegetative diversity, faunal resting sites, foraging areas, and food sources) are preserved in place or replaced so as not to result in an measurable reduction in the reproductive capacity of sensitive biotic resources.***
    - ***Within habitats of plants listed by the CNDDB or CNPS as "special" or "of concern," require that new facilities not result in a reduction in the number of these plants, if they are present.***
- ***Maximize the preservation of individual oak, sycamore and walnut trees within proposed development sites.***
- ***Require the establishment of buffer zones adjacent to areas of preserved biological resources. Such buffer zones shall be of adequate width to protect biological resources from grading and construction activities, as well as from the long-term use of adjacent lands. Permitted land modification activities with preservation and buffer areas are to be limited to those that are consistent with the maintenance of the reproductive capacity of the identified resources. The land uses and design of project facilities adjacent to a vegetative preservation area, as well as activities within the designated buffer area are not to be permitted to disturb natural drainage patterns to the point that vegetative resources receive too much or too little water to permit their ongoing health. In addition, landscape adjacent to areas of preserved biological resources shall be designed so as to avoid invasive species which could negatively impact the value of the preserved resource.***

❖ ***Implementation of the following mitigation measures will ensure that project construction impacts to sensitive biological resources, including the potential effects of invasive species, are reduced to the extent feasible.***

- ***4.2-12 Following construction activities within or adjacent to any natural area, the disturbed areas shall be revegetated using a plant mix of native plant species that are suitable for long term vegetation management at the specific site, which shall be implemented in cooperation with regulatory agencies and with oversight from a qualified biologist. The seeds mix shall be verified to contain the minimum amount of invasive plant species seeds reasonably available for the project area.***
- ***4.2-13 Clean Construction Equipment. During construction, equipment will be washed before entering the project footprint to reduce potential indirect impacts from inadvertent introduction of nonnative invasive plant species. Mud and plant materials will be removed from construction equipment when working in native plant communities, near special-status plant communities, or in areas where special-status plant species have been identified.***
- ***Contractor Education and Environmental Training.***
    - ***Personnel who work onsite will attend a Contractor Education and Environmental Training session. The environmental training is likely to be required by the regulatory agencies and will cover general and specific biological information on the special-status plant species, including the distribution of the resources, the recovery efforts, the legal status of the resources, and the penalties for violation of project permits and laws.***
    - ***The Contractor Education and Environmental Training sessions will be given before the initiation of construction activities and repeated, as needed, when new personnel begin work within the project limits. Daily updates and synopsis of the training will be performed during the daily safety ("tailgate") meeting. All personnel who attend the training will be required to sign an attendance list stating that they have received the Contractor Education and Environmental Training.***
- ***Biological Monitor to Be Present during Construction Activities in areas where impacts to Riparian, Riverine, Wetland, Endangered Species or Endangered Species Critical habitat occurs. A biological monitor (or monitors) will be present onsite during construction activities that could result in direct or indirect impacts on sensitive***

biological resources (including listed species) and to oversee permit compliance and monitoring efforts for all special-status resources.

- *A biological monitor (qualified biologist) is any person who has a bachelor's degree in biological sciences, zoology, botany, ecology, or a closely related field and/or has demonstrated field experience in and knowledge about the identification and life history of the special-status species or jurisdictional waters that could be affected by project activities. The biological monitor(s) will be responsible for monitoring the Contractor to ensure compliance with the Section 404 Individual Permit, Section 401 Water Quality Certification and the Lake and Streambed Alteration Agreement. Activities to ensure compliance would include performing construction-monitoring activities, including monitoring environmental fencing, identifying areas where special-status plant species are or may be present, and advising the Contractor of methods that may minimize or avoid impacts on these resources. Biological monitor(s) will be required to be present in all areas during ground disturbance activities and for all construction activities conducted within or adjacent to identified Environmentally Sensitive Areas, Wildlife Exclusion Fencing, and Non-Disturbance Zones.*

- *Food and Trash: All food-related trash items (e.g., wrappers, cans, bottles, food scraps) will be disposed of in closed containers and removed at least once a week from the construction site.*
- *Rodenticides and Herbicides: Use of rodenticides and herbicides in the project footprint will be restricted. This measure is necessary to prevent poisoning of special-status species and the potential reduction or depletion of the prey populations of special–status wildlife species.*
- *Wildlife Exclusion Fencing: Exclusion barriers (e.g., silt fences) will be installed at the edge of the construction footprint and along the outer perimeter of Environmentally Sensitive Areas and Environmentally Restricted Areas to restrict special-status species from entering the construction area. The design specifications of the exclusion fencing will be determined through consultation with the USFWS and/or CDFW. Clearance surveys will be conducted for special-status species after the exclusion fence is installed. If necessary, clearance surveys will be conducted daily.*
- *Equipment Staging Areas: Staging areas for construction equipment will be located outside sensitive biological resources areas, including habitat for special-status species, jurisdictional waters, and wildlife movement corridors, to the maximum extent possible.*
- *Plastic mono-filament netting (erosion-control matting) or similar material will <u>not</u> be used in erosion control materials to prevent potential harm to wildlife. Materials such as coconut coir matting or tackified hydroseeding compounds will be used as substitutes.*
- *Vehicle Traffic: During ground-disturbing activities, project-related vehicle traffic will be restricted within the construction area to established roads, construction areas, and other designated areas to prevent avoidable impacts. Access routes will be clearly flagged and off-road traffic will be prohibited.*
- *Entrapment Prevention: All excavated, steep-sided holes or trenches more than 8 inches deep will be covered at the close of each working day with plywood or similar materials, or a minimum of one escape ramp constructed of earth fill for every 10 feet of trenching will be provided to prevent the entrapment of wildlife. Before such holes or trenches are filled, they will be thoroughly inspected for trapped animals.*
  - *All culverts or similar enclosed structures with a diameter of 4 inches or greater will be covered, screened, or stored more than 1 foot off the ground to prevent use by wildlife. Stored material will be cleared for common and special-status wildlife species before the pipe is subsequently used or moved.*
- *Weed Control Plan: A Weed Control Plan will be prepared and implemented to minimize or avoid the spread of weeds during ground-disturbing activities. In the Weed Control Plan, the following topics will be addressed:*
  - *Schedule for noxious weed surveys.*
  - *Weed control treatments, including permitted herbicides, and manual and mechanical methods for application; herbicide application will be restricted in Environmentally Sensitive Areas.*
  - *Timing of the weed control treatment for each plant species.*
  - *Fire prevention measures.*
- *Dewatering/Water Diversion: Open or flowing water may be present during construction. If construction occurs where there is open or flowing water, a strategy that is approved by the resource agencies (e.g., USACE, SWRCB/RWQCB, and CDFW), such as the creation of cofferdams, will be used to dewater or divert water from*

the work area. If cofferdams are constructed, implementation of the following cofferdam or water diversion measures is recommended to avoid and lessen impacts on jurisdictional waters during construction:

- ***The cofferdams, filter fabric, and corrugated steel pipe are to be removed from the creek bed after completion of the project.***
- ***The timing of work within all channelized waters is to be coordinated with the regulatory agencies.***
- ***The cofferdam is to be placed upstream of the work area to direct base flows through an appropriately sized diversion pipe. The diversion pipe will extend through the Contractor's work area, where possible, and outlet through a sandbag dam at the downstream end.***
- ***Sediment catch basins immediately below the construction site are to be constructed when performing in-channel construction to prevent silt- and sediment-laden water from entering the main stream flow. Accumulated sediments will be periodically removed from the catch basins.***

1.2.2 Project Category 2: Conveyance Facilities and Ancillary Facilities (PEs 2, 4-9)

This category includes the construction of 550,000 LF of new pipelines, booster pump stations, reservoirs and minor appurtenances whose number. The proposed conveyance facilities and ancillary facilities would be implemented throughout the entire Chino Basin.

Potential Impacts, follow-on biological studies, and potential permitting requirements would be the same as Project Category 1.

1.2.3 Project Category 3: Storage Basins, Recharge Facilities, and Storage Bands (PEs 2, 4-5, 8/9)

This Project Category includes the construction of 310 acres of new storage basins—several locations for which are within existing facilities, improvements to existing storage basin(s), 200 acres of flood MAR facilities, new MS4-compliance facilities, and expansion of the maximum storage space (safe storage capacity) to be used within the Chino Basin from 600,000 af (through June 30, 2021) to between 700,000 af and 1,000,000 af going forward with various impacts that may result for each 100,000 af between this range of storage. The specific locations of the storage basins are described in the Project Description above; however, the locations of the flood MAR facilities and MS4 compliant projects are presently unknown.

Potential Impacts, follow-on biological studies, and potential permitting requirements would be the same as Project Category 1.

1.2.4 Project Category 4: Desalters and Water Treatment Facilities (PEs 2, 4-9)

The projects proposed under this category are: upgrades at IEUA's existing Treatment Plants (discussed in IEUA's 2017 FMP PEIR), a new advanced water treatment plant (discussed in IEUA's 2017 FMP PEIR), improvements to the WFA Agua de Lejos Treatment Plant, upgrades to the Chino Desalters, new groundwater treatment facilities at or near well sites and at regionally located sites, and improvements to existing groundwater treatment facilities. Cultural Resource impacts related to the facilities thoroughly analyzed as part of the IEUA's 2017 FMP PEIR will not be analyzed further as part of this Initial Study.

Potential Impacts, follow-on biological studies, and potential permitting requirements would be the same as Project Category 1.

1.2.5 Operational Scenarios

As part of this summary of all facilities, possible operational scenarios are provided as part of the discussion of each type of facility. The future modes of operation (activities) are provided to enable evaluation of the physical impacts that would result from OBMPU implementation. These are representative scenarios that describe a range of plausible future operations and activities. They are not intended to be exhaustive but they represent future operations based on the past activities carried out in the Chino Basin to implement the original OBMP Program Elements.

In the event that a given facility will require periodic or routine operation maintenance, the maintenance will need to be identified, permitted if needed, and best management measures should be identified to minimize impacts to biological resources. Best Management Practices include but are not limited to 1) timing of maintenance out side nesting, flouring, breeding, or other biologically sensitive period 2) minimizing impacts to native habitats, 3) minimize impacts to special aquatic sites including wetlands 3) trash control, 4) spread of invasive species.

1.2.6 Construction Scenarios

Secondarily, as part of this summary of all facilities, possible construction scenarios are provided as part of the discussion of each type of facility. The purpose of the following general construction scenarios is to assist the reviewer to understand how the proposed facilities will be installed and the amount of time required for their construction. This information also provides essential data for making the program air quality impact forecasts using the most current CalEEMod emission forecast model.

In general, the types, configuration and exact location of future specific projects that will be constructed in support of the OBMPU have not been determined. However, there are a few specific Projects that have been identified at a sufficient level of detail that a location has been pinpointed in which a specific project will be developed. For instance, the CIM Storage Basin Project is proposed to be located at the CIM; however, the Project specifications at that site have not yet been identified. For the remaining projects listed below, it is possible to foresee some of the infrastructure that is likely to be constructed and to project the maximum expected impacts that would result from construction and operation of the infrastructure. Impacts associated with specific future projects would be evaluated in second-tier CEQA evaluations to determine if the actual impacts fall within the impacts forecast by this analysis, or require subsequent CEQA evaluations and determinations. These evaluations would be conducted under Section 15162 of the State CEQA Guidelines.

1.2.7 PBHSP Biological Monitoring (PE1)

The objective of PE 1 under the OBMPU includes continuing the ongoing monitoring and reporting program and developing and updating an OBMPU Monitoring and Reporting Work Plan. Watermaster's biological monitoring program is conducted pursuant to the adaptive monitoring program (AMP) for the Prado Basin Habitat Sustainability Program (PBHSP). The objective of the PBHSP is to ensure that the groundwater-dependent ecosystem in Prado Basin will not incur unforeseeable significant adverse impacts due to implementation of the Peace II Agreement. The monitoring program produces time series data and information on the extent and quality of the riparian habitat in the Prado Basin over a historical period that includes both pre- and post-Peace II implementation. Two types of monitoring and assessment are performed: regional and site-specific. Regional monitoring and assessment of the riparian habitat is performed by mapping the extent and quality of riparian habitat over time using multi-spectral remote-sensing data and air photos. Site-specific monitoring performed in the Prado Basin includes field vegetation surveys and seasonal ground-based photo monitoring. Under the OBMPU, Watermaster will continue these efforts.

1.3 Project Location

The Chino Basin is one of the largest groundwater basins in Southern California and has an unused storage capacity of over 1,000,000 acre-feet. The Chino Basin covers approximately 235 square miles within the Upper Santa Ana River Watershed and lies within portions of San Bernardino, Riverside, and Los Angeles counties. Exhibit 1 shows the location of the Chino Basin within the Upper Santa Ana River Watershed. The Chino Basin consists of an alluvial valley that is relatively flat from east to west, sloping from north to south at a one to two percent grade. Basin elevation ranges from about 2,000 feet adjacent to the San Gabriel foothills to about 500 feet near Prado Dam. As shown in Exhibit 2, the Chino Basin is bounded:

- on the north by the San Gabriel Mountains and the Cucamonga Basin;
- on the east by the Rialto-Colton Basin, Jurupa Hills, and the Pedley Hills;

- on the south by the La Sierra Hills and the Temescal Basin; and
- on the west by the Chino Hills, Puente Hills, and the Spadra, Pomona, and Claremont Basins.

The Optimum Basin Management Program (OBMP), which was based on the Peace I Agreement in the Chino Basin, focuses on management actions within the Chino Groundwater Basin (Chino Basin or the Basin) as shown on the inset on Exhibit 1. Exhibit 2 illustrates the boundary of the Chino Basin as it is legally defined in the stipulated Judgment in the case of Chino Basin Municipal Water District *vs.* the City of Chino *et al.* Exhibit 2 also shows the Regional Water Quality Control Board, Santa Ana Region (Regional Board) management zones as established in the Water Quality Control Plan for the Santa Ana River Basin (Basin Plan).

The principal drainage course for the Santa Ana River watershed is the Santa Ana River. It flows 69 miles across the Santa Ana Watershed from its origin in the eastern San Bernardino Mountains to the Pacific Ocean. The Santa Ana River enters the Chino Basin at the Riverside Narrows and flows along the southern boundary to the Prado Flood Control Reservoir, where it is eventually discharged through the outlet at Prado Dam and flows the remainder of its course to the Pacific Ocean. The Basin is traversed by a series of ephemeral and perennial streams that include: San Antonio Creek, Chino Creek, Cucamonga Creek, Deer Creek, Day Creek, Etiwanda Creek and San Sevaine Creek. Please refer to Exhibit 2 for the location of drainages.

These creeks flow primarily north to south and carry significant natural flows only during, and for a short time after, the passage of Pacific storm fronts that typically occur from November through April. IEUA discharges year-round flows to Chino Creek and to Cucamonga Channel from its Regional Plants. The actual volume of wastewater discharges varies seasonally and is expected to attenuated in the future by a combination of water conservation measures being implemented by water users and through diversion of flows for delivery as recycled water to future users that can utilize this source of water, including landscape irrigation, industrial operations, and recharge into the Chino Basin groundwater aquifer.

The Chino Basin is mapped within the USGS – Corona North, Cucamonga Peak, Devore, Fontana, Guasti, Mount Baldy, Ontario, Prado Dam, Riverside West and San Dimas Quadrangles, 7.5 Minute Series topographic maps. The center of the Basin is located near the intersection of Haven Avenue and Mission Boulevard at Longitude 34.038040N, and Latitude 117.575954W.

Chapter 2. Study Methods

This chapter presents the methods used to identify biological resources in the project region. In addition, this chapter provides an overview of the various regulatory requirements, definitions of terms used, background review conducted, field surveys, post-field data processing, personnel and survey dates, and coordination efforts with agency and professional contacts. It also summarizes the study limitations and how they may influence the results presented in this report.

Because this is a program level document with individual facilities improvements expected to occur over the next 22 years, only cursory level surveys were conducted throughout the project Study Area. Before conducting field surveys, existing background information was reviewed to identify the locations of jurisdictional waters, special-status plant and wildlife species, special-status plant communities, natural lands, and federally designated or proposed critical habitat units recorded or potentially occurring in the proposed infrastructure improvement areas. This section summarizes the background information that was reviewed.

2.1 Regulatory Requirements

2.1.1 Federal

Clean Water Act

The purpose of the Clean Water Act (CWA) (1977) 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 United States" without a permit from the United States Army Corps of Engineers (USACE). The definition of waters of the United States 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 Code of Federal Regulations [CFR] 328.3 7b). *Section 401* of the CWA is required for Section 404 permit actions; in California this certification or waiver is issued by the RWQCB.

In addition to the Section 404 and 401 regulating discharge of dredge or fill into Waters of the United States; 33 USC 408 (Chapter 9.1), Navigation and Navigable Waters*. Section 408* states it is unlawful for any person(s) to build upon, alter, deface, destroy, move, injure, obstruct or… impair the usefulness of any levee or other work built by the U.S. That the Secretary may, on the recommendation of the Chief of Engineers, grant permission for the alteration or permanent occupation or use of any of the public works when in the judgment of the Secretary such occupation or use will not be injurious to the public interest and will not impair the usefulness of such work.

Rivers and Harbors Act 1899

Section 10 of the Rivers and Harbors Act of 1899 requires authorization from the USACE for the construction of any structure in or over any navigable waters of the U.S.

Endangered Species Act

The Federal Endangered Species Act (FESA) (1973) protects plants and wildlife that are listed by the United States Fish and Wildlife Service (USFWS) and the National Marine Fisheries Service (NMFS) as endangered or threatened. Section 9 of FESA (USA) prohibits the taking of endangered wildlife, where taking is defined as any effort to "harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, collect, or attempt to engage in such conduct" (50 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 United States Code [USC] 1538). Under Section 7 of FESA, federal agencies are required to consult with the USFWS if their actions, including permit approvals or funding, could adversely affect an endangered 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 action will not jeopardize the continued existence of the species. FESA specifies that the USFWS designate habitat for a species at the time of its listing in which are found the physical or biological features "essential to the conservation of the species," or which may require "special Management consideration or protection..." (16 USC § 1533[a][3].2; 16 USC § 1532[a]). This designated Critical Habitat is then afforded the same protection under the FESA as individuals of the species itself, requiring issuance of an Incidental Take Permit prior to any activity that results in "the destruction or adverse modification of habitat .... determined .... to be critical" (16 USC § 1536[a][2]).

Interagency Consultation and Biological Assessments

Section 7 of ESA provides a means for authorizing the "take" of threatened or endangered species by federal agencies, and applies to actions that are conducted, permitted, or funded by a federal agency. The statute requires federal agencies to consult with the USFWS or NMFS, as appropriate, to ensure that actions they authorize, fund, or carry out are not likely to jeopardize the continued existence of threatened or endangered species or result in the destruction or adverse modification of critical habitat for these species. If a proposed project "may affect" a listed species or destroy or modify critical habitat, the lead agency is required to prepare a biological assessment evaluating the nature and severity of the potential effect.

Habitat Conservation Plans

Section 10 of the federal ESA requires the acquisition of an Incidental Take Permit (ITP) from the USFWS by non-federal landowners for activities that might incidentally harm (or "take") endangered or threatened wildlife on their land. To obtain a permit, an applicant must develop a Habitat Conservation Plan that is designed to offset any harmful impacts the proposed activity might have on the species.

Fish and Wildlife Coordination Act

The Fish and Wildlife Coordination Act (16 U.S.C. Sections 661 to 667e et seq.) applies to any federal project where any body of water is impounded, diverted, deepened, or otherwise modified. Project proponents are required to consult with the USFWS and the appropriate state wildlife agency.

Magnuson-Stevens Fishery Conservation and Management Act

The Magnuson-Stevens Fishery Conservation and Management Act (16 U.S.C. Section 1801 et seq.) requires all federal agencies to consult with the NMFS on all actions or proposed actions (permitted, funded, or undertaken by the agency) that may adversely affect fish habitats. It also requires cooperation among NMFS, the councils, fishing participants, and federal and state agencies to protect, conserve, and enhance essential fish habitat, which is defined as those waters and substrates needed by fish for spawning, breeding, feeding, and growth to maturity.

Bald and Golden Eagle Protection Act

The Bald and Golden Eagle Protection Act (The Eagle Act) (1940), amended in 1962, was originally implemented for the protection of bald eagles (Haliaeetus leucocephalus). In 1962, Congress amended the Eagle Act to cover golden eagles (Aquila chrysaetos), a move that was partially an attempt to strengthen protection of bald eagles, since the latter were often killed by people mistaking them for golden eagles. This act makes it illegal to import, export, take (molest or disturb), sell, purchase, or barter any bald eagle or golden eagle or part thereof. The golden eagle, however, is accorded somewhat lighter protection under the Eagle Act than that of the bald eagle.

Migratory Bird Treaty Act

The Migratory Bird Treaty Act (MBTA) (1918) implements international treaties between the United States and other nations created 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 (CFGC).

Executive Orders (EO)

Invasive Species—Executive Order 13112 (1999)

Issued on February 3, 1999, promotes the prevention and introduction of invasive species and provides for their control and minimizes the economic, ecological, and human health impacts that invasive species cause through the creation of the Invasive Species Council and Invasive Species Management Plan.

Protection of Wetlands—Executive Order 11990 (1977)

Issued on May 24, 1977, helps avoid the long-term and short-term adverse impacts associated with destroying or modifying wetlands and avoiding direct or indirect support of new construction in wetlands when there is a practicable alternative.

Migratory Bird—EO 13186 (2001)

Issued on January 10, 2001, promotes the conservation of migratory birds and their habitats and directs federal agencies to implement the Migratory Bird Treaty Act. Protection and Enhancement of Environmental Quality—EO 11514 (1970a), issued on March 5, 1970, supports the purpose and policies of the National Environmental Policy Act (NEPA) and directs federal agencies to take measures to meet national environmental goals.

Migratory Bird Treaty Reform Act

The Migratory Bird Treaty Reform Act (Division E, Title I, Section 143 of the Consolidated Appropriations Act, 2005, PL 108–447) amends the Migratory Bird Treaty Act (16 U.S.C. Sections 703 to 712) such that nonnative birds or birds that have been introduced by humans to the United States or its territories are excluded from protection under the Act. It defines a native migratory bird as a species present in the United States and its territories as a result of natural biological or ecological processes. This list excluded two additional species commonly observed in the United States, the rock pigeon (Columba livia) and domestic goose (Anser domesticus).

2.1.2 State

Sections 1600 through 1606 of the California Fish and Game Code (CFGC)

This section requires that a Streambed Alteration Application be submitted to the 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 the Department and the applicant is the Streambed Alteration Agreement. Often, projects that require a Streambed Alteration Agreement 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 Streambed Alteration Agreement may overlap.

California Endangered Species Act

The California Endangered Species Act (CESA) (Sections 2050 to 2085) establishes the policy of the state to conserve, protect, restore, and enhance threatened or endangered species and their habitats by protecting “all native species of fishes, amphibians, reptiles, birds, mammals, invertebrates, and plants, and their habitats, threatened with extinction and those experiencing a significant decline which, if not halted, would lead to a threatened or endangered designation.” Animal species are listed by the CDFW as threatened or endangered, and plants are listed as rare, threatened, or endangered. However, only those plant species listed as threatened or endangered receive protection under the California ESA.

CESA mandates that state agencies do not approve a project that would jeopardize the continued existence of these species if reasonable and prudent alternatives are available that would avoid a jeopardy finding. There are no state agency consultation procedures under the California ESA. For projects that would affect a species that is federally and state listed, compliance with ESA satisfies the California ESA if the California Department of Fish and Wildlife (CDFW) determines that the federal incidental take authorization is consistent with the California ESA under Section 2080.1. For projects that would result in take of a species that is state listed only, the project sponsor must apply for a take permit, in accordance with Section 2081(b).

Fully Protected Species

Four sections of the California Fish and Game Code (CFGC) list 37 fully protected species (CFGC Sections 3511, 4700, 5050, and 5515). These sections prohibit take or possession "at any time" of the species listed, with few exceptions, and state that "no provision of this code or any other law will be construed to authorize the issuance of permits or licenses to 'take' the species," and that no previously issued permits or licenses for take of the species "shall have any force or effect" for authorizing take or possession.

Bird Nesting Protections

Bird nesting protections (Sections 3503, 3503.5, 3511, and 3513) in the CFGC include the following:

- Section 3503 prohibits the take, possession, or needless destruction of the nest or eggs of any bird.
- Section 3503.5 prohibits the take, possession, or needless destruction of any nests, eggs, or birds in the orders Falconiformes (new world vultures, hawks, eagles, ospreys, and falcons, among others), or Strigiformes (owls).
- Section 3511 prohibits the take or possession of fully protected birds.
- Section 3513 prohibits the take or possession of any migratory nongame bird or part thereof, as designated in the MBTA. To avoid violation of the take provisions, it is generally required that project-related disturbance at active nesting territories be reduced or eliminated during the nesting cycle.

CA Migratory Bird Act -Assembly Bill 454

Existing federal law, the Migratory Bird Treaty Act, provides for the protection of migratory birds, as specified. The federal act also authorizes states and territories of the United States to make and enforce laws or regulations that give further protection to migratory birds, their nests, and eggs. Existing state law makes unlawful the taking or possession of any migratory nongame bird, or part of any migratory nongame bird, as designated in the federal act, except as provided by rules and regulations adopted by the United States Secretary of the Interior under provisions of the federal act……. (a) It is unlawful to take or possess any migratory nongame bird as designated in the federal Migratory Bird Treaty Act (16 U.S.C. Sec. 703 et seq.), or any part of a migratory nongame bird described in this section, except as provided by rules and regulations adopted by the United States Secretary of the Interior under that federal act.

Native Plant Protection Act

The Native Plant Protect Act (NPPA) (1977) (CFGC Sections 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 Game Commission has the authority to designate native plants as endangered or rare and to protect endangered and rare plants from take. CESA (CFGC 2050-2116) provided further protection for rare and endangered plant species, but the NPPA remains part of the Fish and Game Code.

Natural Communities Conservation Planning Act

This act was enacted to encourage broad-based planning to provide for effective protection and conservation of the state's wildlife resources while continuing to allow appropriate development and growth (CFGC Sections 2800 to 2835). Natural Community Conservation Plans (NCCP) may be implemented, which identify measures necessary to conserve and manage natural biological diversity within the planning area, while allowing compatible and appropriate economic development, growth, and other human uses.

Senate Concurrent Resolution No. 17 – Oak Woodlands

State Senate Concurrent Resolution No. 17 is legislation that requests state agencies having land use planning duties and responsibilities to assess and determine the effects of their decisions or actions within any oak woodlands containing Blue, Engleman, Valley, or Coast Live Oak. The measure requests those state agencies to preserve and protect native oak woodlands to the maximum extent feasible or provide replacement plantings where designated oak species are removed from oak woodlands. The mitigation measures, as described above, will ensure that impacts to oak woodlands are less than significant.

2.2 Studies Required

In order to develop this programmatic Biological Resource Report, available information was reviewed from resource management plans and other relevant documents to determine locations and types of biological resources that have the potential to exist within and adjacent to the Study Area. Field studies were conducted as part of OBMP in 2013. Focused field studies will be completed once specific project activities and a schedule for those activities is determined.

The California Natural Diversity Database (CDFW, January 2020), U.S. Fish and Wildlife Service County lists (USFWS, 2020), California Native Plant Society Electronic Inventory of Rare and Endangered Plants of California (January 2020), and National Wetlands Inventory (USFWR, January 2020) were queried for occurrence of special status species and habitats within the Chino Basin. CDFW BIOS database was also queried for general habitat types and potential features subject to environmental regulations (e.g., Clean Water Act [CWA], Porter-Cologne Water Quality Control Act [Porter-Cologne] and California Department of Fish and Wildlife's Fish and Game Code 1600 et seq. jurisdictional features) that may exist within or adjacent to the Study Area.

Additionally, studies conducted for previous facility improvements within Chino Basin were reviewed. These studies include the Draft San Bernardino County Countywide Plan Biological Resources Existing Conditions Report (Dudek, May 2019)

In addition to the aforementioned literature reviews, reconnaissance-based field surveys of the Study Area were performed in 2013 to assess general and dominant vegetation types, habitat types, and the potential for special status wildlife and plant species to occur within the project areas. Community types were based on observed dominant vegetation composition and density. Vegetation classifications of plant communities in the Study Area were derived from the criteria and definitions of Holland (1986).

2.2.1 Limitations That May Influence Results

Several limitations that may influence the results of the studies presented in this report were identified. These limitations are beyond IEUA and Chino Basin Watermaster's control and are associated with permission to enter private property and physical access limitation. Several areas will require future access via a high-rail vehicle. Once these future development areas are designed and a BSA can be established, focused surveys and high-rail access will be required.

Additionally, the programmatic nature of the project with facilities being proposed over the next 20 years does not warrant focused surveys for each of the proposed locations. Typically, biological surveys are valid for one year. Any focused biological surveys conducted would need to be redone once a specific facility is designed and the second-tier level environmental process is initiated.

Estimations and assumptions regarding the potential for jurisdictional waters and special-status species were based on assessments from previous projects, and existing resource information. In some instances, these assessments are based solely on aerial photography, which provides an adequate level of detail for a programmatic environmental document.

Chapter 3. Results: Environmental Setting

3.1 Descriptions of the Existing Biological and Physical Conditions of the Study Area

3.1.1 Study Area

The Chino Basin is one of the largest groundwater basins in Southern California and has an unused storage capacity of over 1,000,000 acre-feet. The Chino Basin covers approximately 235 square miles within the Upper Santa Ana River Watershed and lies within portions of San Bernardino, Riverside, and Los Angeles counties. The Chino Basin consists of an alluvial valley that is relatively flat from east to west, sloping from north to south at a one to two percent grade. Basin elevation ranges from about 2,000 feet adjacent to the San Gabriel foothills to about 500 feet near Prado Dam. The Chino Basin is bounded:

- on the north by the San Gabriel Mountains and the Cucamonga Basin;
- on the east by the Rialto-Colton Basin, Jurupa Hills, and the Pedley Hills;
- on the south by the La Sierra Hills and the Temescal Basin; and
- on the west by the Chino Hills, Puente Hills, and the Spadra, Pomona, and Claremont Basins.

The principal drainage course for the Santa Ana River watershed is the Santa Ana River. It flows 69 miles across the Santa Ana Watershed from its origin in the eastern San Bernardino Mountains to the Pacific Ocean. The Santa Ana River enters the Chino Basin at the Riverside Narrows and flows along the southern boundary to the Prado Flood Control Reservoir, where it is eventually discharged through the outlet at Prado Dam and flows the remainder of its course to the Pacific Ocean. The Basin is traversed by a series of ephemeral and perennial streams that include: San Antonio Creek, Chino Creek, Cucamonga Creek, Deer Creek, Day Creek, Etiwanda Creek and San Sevaine Creek. Please refer to Exhibit 2 for the location of drainages.

These creeks flow primarily north to south and carry significant natural flows only during, and for a short time after, the passage of Pacific storm fronts that typically occur from November through April. IEUA discharges year-round flows to Chino Creek and to Cucamonga Channel from its Regional Plants. The actual volume of wastewater discharges varies seasonally and is expected to attenuated in the future by a combination of water conservation measures being implemented by water users and through diversion of flows for delivery as recycled water to future users that can utilize this source of water, including landscape irrigation, industrial operations, and recharge into the Chino Basin groundwater aquifer.

The Chino Basin is mapped within the USGS – Corona North, Cucamonga Peak, Devore, Fontana, Guasti, Mount Baldy, Ontario, Prado Dam, Riverside West and San Dimas Quadrangles, 7.5 Minute Series topographic maps. The center of the Basin is located near the intersection of Haven Avenue and Mission Boulevard at Longitude 34.038040N, and Latitude 117.575954W.

Data contained in these reports, where applicable, are summarized herein with editing to conform to the EIR format.

The proposed OBMPU would be require to comply with the following federal and state regulations and laws:

1. NEPA and CEQA guidelines that apply to sensitive biological resources
2. U.S. Army Corps of Engineers (COE) Clean Water Act Section 404 Permit and
3. U.S. Environmental Protection Agency (EPA) 404 (b)1 Alternatives Analysis
4. Section 7 and/or 10 of U.S. Endangered Species Act of 1973, as amended
5. U.S. Migratory Bird Treaty Act
6. U.S. Bald Eagle Act
7. California Endangered Species Act
8. California Department of Fish and Game (CDFG) Streambed Alteration Agreement
9. (Section 1600 of the Fish and Game Code)
10. State of California Native Plant Protection Act

11. Plant Protection and Management Ordinances (County Code Title 8, Div. 11)

Both the California and Federal endangered species acts provide legislation to protect the habitats of listed species as well as the species itself. If a state or federally listed endangered species was determined to be present, the proposed project may be constrained to avoid or minimize effects to the species. Species specific mitigation measures would thus need to be agreed upon and implemented to the satisfaction of all jurisdictional agencies. These jurisdictional agencies may be some or all of the following: U.S. Fish and Wildlife Service (USFWS), CDFG, and/or COE.

The project area is comprised of a primarily urban setting, as indicated on Figure 4.8-1. The vast majority of the approximately 225,000 acres that comprises the Chino Basin has been previously developed or disturbed by human activity. Relatively speaking, very few pristine areas of undisturbed natural habitat remain. The following is a discussion of areas within the Chino Basin that have the largest areas of extant habitat communities or have the most significant biological resources:

The Prado Reservoir area comprises 9,741 acres northwest of Corona and south of Chino. Approximately 4,000 acres of this area can be classified as riparian woodland vegetation, of which 2,000 to 2,500 acres is dense riparian habitat dominated by large stands of willow woodland. This is one of the largest remaining riparian woodland in southern California. This area supports a wide array of sensitive species, both floral and faunal. According to the Biological Resources section for the Chino Basin Groundwater storage Program Draft Environmental Impact Report for MWDSC, a total of 311 species of vascular plants, belonging to 65 families, were identified in the Basin area. Three major vegetational communities occur in this area. First is riparian habitat which occurs in low lying sections of the Basin and along the Santa Ana River and streams running into the Basin.

The riparian habitat is dominated by extensive stands of black willow, and smaller stands of arroyo willow. Several stands of tall cottonwoods and a single stand of sycamore have been identified. The second habitat type is upland habitat characteristic of coastal sage scrub, plus grasses and exotic weeds. This upland area has been heavily impacted by agriculture and grazing activities. The third major vegetational type is the aquatic and semi-aquatic communities occurring in permanent streams and artificial duck ponds, and intermittently filled reservoirs and streams within the Basin. The wildlife in the riparian area includes a variety of amphibians, mammals, and birds. For an additional discussion of the biological resources identified in the area, please refer to MWDSC Chino Basin Groundwater Storage EIR's biological resource section.

The Santa Ana River and its tributaries within the Chino Basin are also significant areas for biological resources as they provide refugia and breeding grounds for neotropical migrant species as well as provide habitat linkages and movement corridors connecting various large blocks of relatively undisturbed habitat areas. The MWDSC Chino Basin EIR also reports that many of these tributary streams will be fully lined as part of flood control activities in the future.

Another significant area for biological resources that lies adjacent to the Chino Basin is Chino Hills State Park has approximately 13,000 acres of wild land situated in the hills north of Santa Ana Canyon. Although Chino Hill State Park containing large blocks of non-native grasslands, it is also contains riparian habitat comprised of coast live oak and sycamore woodlands. Additionally, this park contains one of the largest remaining stands of Southern California black walnut. This park functions as an important area for connectivity to and movement between the park the boundary of the project area.

Based on the most recent field surveys of the area and desktop review for Peace II, the proposed action area traverses vacant, public land designated as flood control, water conservation and open space. Patches of agricultural, industrial and commercial land uses are evident north of the Prado Dam inundation area.

Prado Basin is dominated by flood plain riparian plant communities, with upland habitats primarily restricted to the perimeter of the Basin. The hydrological conditions in the project area promote the establishment of riparian vegetation. A freshwater marsh habitat component is also present in the project area because standing water is seasonally abundant in the Prado Basin upstream of the Prado Dam.

The present biological condition of Prado Basin was created by the construction of Prado Dam in 1941. Prado Dam was built where Chino Creek, Cucamonga Creek (also known as Mill Creek, south of Pine Avenue) and Temescal Wash have their confluence with the Santa Ana River. Due to a combination of the high groundwater table, storm flow accumulation held in the reservoir, sewage treatment plant effluent and irrigation runoff, a resultant perennial river flow exists that has created and sustains the extensive wetland habitat in the Basin. Presently, the riparian woodlands in the Basin comprise the largest single stand of this habitat in southern California. Prado Basin supports a myriad of habitat types, including but not exclusive to cottonwood/willow riparian forest, riparian scrubland, herbaceous riparian, freshwater ponds, freshwater marsh, riverine, sandy wash, fallow fields, agricultural land, ruderal, coastal sage scrub, and oak woodland.

The riparian habitat within the project area is in various seral stages and generally consists of tall, multilayered, open, canopy riparian forests. The dominant vegetative species within this riparian forest include: Eucalyptus, Freemont cottonwood (*Populus fremontii*), black cottonwood, (*P. tremuloides*) and several tree willows (*Salix spp*). Characteristic species, in addition to the eucalyptus and cottonwood, include black willow (*S. goodingii*) narrow-leved willow (*S. exigua*), arroyo willow (*S. lasiolepis*), red willow (*S. laevigata*), sandbar willow (*S. hindsiana*), mulefat (*Baccharis salicifolia*) Sycamore (*Platanus recemosa*) and elderberry (*Sambucus mexicana*).

In addition to the riparian community, there are also freshwater marsh, eucalyptus groves, coastal sage scrub, riverine, grassland, and ruderal communities found within the project area. Cattails and reeds are the dominant species within the freshwater marsh habitat.

Plant Communities

Additionally, a review of San Bernardino and Riverside County general plan documents listed the plant communities shown below as being present in the project area. The general characteristics of the plant communities described below were extracted from San Bernardino County's Biological Resources Report.

> ***Chaparral***
> *Several different chaparral subtypes occur in San Bernardino County. The most common subtypes in the valley region are southern mixed chaparral, chamise chaparral and scrub oak chaparral. These associations are located predominantly along the lower slopes of the mountains and in the interface zone between valley and mountain regions.*
>
> *Southern mixed chaparral is composed of broad-leaved sclerophyllous shrubs that grow to about 8-12 feet tall and form dense, often nearly impenetrable stands. The plants of this association are typically deep-rooted. There is usually little or no understory, except in openings; however, considerable leaf litter accumulates. This habitat occurs on dry, rocky often steep north-facing slopes with little soil. It may grade into Riversidean coastal sage scrub at lower elevations, but generally grown on moister and rockier sites. Characteristic shrub species include chamise, toyon and lemonadeberry.*
>
> *Chamise chaparral is dominated by chamise, almost to the exclusion of all other plants. This habitat occurs on shallower, drier soils or at somewhat low er elevations than mixed chaparral. Chamise has adapted to the characteristic fire cycles of this habitat by stump sprouting. In mature stands, the shrubs are densely interwoven and there is very little herbaceous understory or leaf litter.*
>
> *Scrub oak chaparral is a dense evergreen association that grown to twenty feet tall and is dominated by scrub oak. This habitat occurs on wetter sites than other chaparral associations, often at slightly higher elevations. These more favorable sites recover from fire more quickly than other chaparral subtypes and substantial leaf litter accumulates. Additional shrub species found in scrub oak chaparral include eastwood manzanita, toyon and mountain mahogany, poison oak and narrow leaf bedstraw.*
>
> *Other chaparral associations may occur in the Valley region but are more predominant at higher elevations. Such associations include buck brush chaparral, bigpod ceanothus chaparral and interior live oak chaparral.*

Chaparral habitats are suitable for burrows and soil nests of many mammal species. Another important feature of this habitat are rock outcrops, which are important for reptiles and as raptor perch sites. No sensitive species of San Bernardino county are directly dependent upon chaparral habitat. However, sensitive faunal species from adjacent coastal sage scrub habitat may utilize chaparral as a corridor or for foraging. These species may include Stephens' kangaroo rat, Los Angeles pocket mouse, and San Diego horned lizard.

According to the California Native Plant Society (CNPS) database,

Coastal sage scrub
Coastal sage scrub in the valley region is classified as Riversidean sage scrub, the most xeric expression of coastal sage scrub south of Point Concepcion (Holland 1986). This habitat grows on steep slopes with everely drained soil and dominant species are relatively shallow-rooted shrubs, seldom over four feet tall.

Riversidean Alluvial Sage Scrub is a variation of Riversidean sage scrub which also exists in the valley region. This vegetation type is the dominant habitat of the Upper Santa Ana River floodplain and also occurs in the Cajon and Lytle washes (CNDDB, 2020)...

Coastal sage scrub habitat in Southern California is decreasing rapidly as a result of urbanization. Evidence of its decline is the growing number of declining plants often associated with it. In the valley region of San Bernardino county, three state and/or federally listed endangered species are known to occur in association with the coastal sage scrub: slender-horned spineflower (Centrostegia lepoceras), Santa Ana River woolly star (Eriastrum densifolium spp. sanctorum), and Nevin's barberry (Berberis nevinii). Additionally, Pringles monardella is federally listed as a Category I species, while Payson's jewelflower and California bedstraw are category 2 species.

San Bernardino kangaroo rat, a federally listed endangered species; and Stephens' kangaroo rat, a state-listed threatened species and federally listed endangered species are also known to have its habitat associate with this community type in the Valley area. Los Angeles pocket mouse is federally listed as a category 2 species and a species of special concern by the state. The Los Angeles pocket mouse has been found in San Bernardino county near the Cajon Wash, north of Etiwanda and San Bernardino and in Reche Canyon...The Valley region of San Bernardino county represents the northern limit of the range of the whiptail and coastal California gnatcatcher, a federally listed threatened species. Currently the U.S. Fish and Wildlife Service has proposed critical habitat for this species.

Deciduous woodlands
California walnut woodland is a rather specialized woodland habitat restricted to the Chino Hills and tiwanda area within the Valley region. This woodland, which occurs among rocky outcrops integrating with scrub habitat or on more mesic sites integrating with canyon live oak woodland, is dominated by California walnut; associated species include canyon live oak, Engelman oak, sugar bush, and squaw bush. California walnut woodland is considered a sensitive habitat due to its small acreage and limited distribution in the county; no sensitive floral species are solely dependent on this woodland habitat for their life cycle, however. No federal or state sensitivity listing exists for the live oak walnut or for any other species associated with California walnut woodland. Animals associates with California walnut woodland are similar to the species that would utilize oak woodland. These include Anna's hummingbird, acorn woodpecker, Nuttall's woodpecker, deer mouse, California ground squirrel, striped skunk, and coyote. No sensitive animals as listed by the USFWS or CDFG are dependent on California walnut woodland within the valley region in San Bernardino County.

Grasslands
The disturbed grasslands of the valley region of San Bernardino county are a heterogeneous complex that may be associated with shrubs or trees on land that has been disturbed or altered by development or fire. Non-native weedy vegetation is common in this habitat and includes slender wild oats, foxtail fescue, ripgutgrass, short-podmustard, red-stem filaree, and pin-clover. On sensitive plant species may occur in the grassland areas of the

northern Valley area of San Bernardino County, Orcutt's brodiaea. This species, which is seriously threatened by development, may be found in valley/foothill grasslands, cismontane woodlands and vernal pool habitats. Birds or prey utilize grassland areas for foraging. Locally breeding raptor species include black-shouldered kite, red-tailed hawk, red-shouldered hawk, great horned owl, and barn owl, Other faunal associates include house mouse, southern grasshopper mouse, and gopher snake. No sensitive animal species are expected to utilize the grassland areas of the valley region of San Bernardino County.

Wetlands

Wetland communities are areas of land which are either permanently or seasonally wet and support vegetation that is specifically adapted for saturated soil conditions. These areas include riparian areas and marshes, where moisture is at or near the surface, and often include intermittent drainages. In southern California, wetland habitats are declining and are considered sensitive. Wetlands are further subject to state and federal regulations that include the federal Clean water Act (Section 404) and the CDFG Streambed Alteration Agreement (Section 1600 of the Fish and Game Code). A number of stream channels flow through the valley region of San Bernardino County including Cucamonga Creek, Cajon and Lytle creek washes, and Santa Ana River. Where water is present near the surface in stream channels, a riparian woodland community can be maintained. In stream channels with intermittent surface or groundwater availability, a riparian scrub community may also develop. Both of these communities exist in the valley region. Dominant woodland tree species include Fremont cottonwood, arroyo willow and black willow with western sycamore on the upper terraces. Common shrubs include mulefat, California mugwort, poison oak and the coyote bush. A well-developed stand of riparian woodland occurs in the Prado Basin of San Bernardino County and extends into Riverside county. Remnant riparian woodlands also occur in less frequently flooded areas such as the Santa Ana Wash area.

A freshwater marsh is located north of Etiwanda in the Day Canyon wash area. Freshwater marsh also occurs in the Prado Basin and may occur in the other drainages of the valley region, wherever moisture is at or near the surface for a long duration during the growing season. This habitat is usually dominated by perennial emergent species 4 to 7 feet tall. Stands of bulrushes or cattails often characterize this habitat. Also, large stands of the non-native pest plant giant reed grass (Arundo) occur along much of the basin's riparian areas. This giant reed grass not only takes over native riparian communities, but it also uses a tremendous amount of water.

These Riparian resources serve as important habitat, as water sources, and as movement corridors for wildlife. This habitat type also supports numerous sensitive animal species including least Bell's vireo, a state and federally listed endangered species; southwestern willow flycatcher, a state and federally listed endangered species; bald eagle, a state and federally endangered species; western yellow-billed cuckoo, a state listed threatened species; long eared own, a species of special concern and the California black rail, a state listed threatened species. The cuckoo and vireo occur in the dense riparian habitat of the Prado Basin in Riverside county but apparently have been extirpated from the valley region of San Bernardino County. The black rail, dependent on marshes, was recorded long ago at Chino but is not known to occur currently in San Bernardino County. (San Bernardino County Plan Biological Background Report, 1987)

3.1.2 Physical Conditions

The local climate is characterized by hot summers, mild winters and rainfall, which occurs almost entirely in the winter and early spring months. The average annual rainfall is about 19 inches. The climate is somewhat affected by the moderating effects of the Pacific Ocean. Average temperatures range from a minimum of 39 degrees Fahrenheit in January to an average of 91 degrees Fahrenheit in July. Winds occur from all directions, and onshore winds from the west/southwest occur during the day. At night, wind patterns reverse with an offshore flow generally coming from the east/northeast.

The five Management Zones are bordered by various waterways, such as the Santa Ana River along the southeast alignment of Management Zone 5, Chino Creek coursing northwest to southeast along the western border of Management Zone 1 and confluencing with the Santa Ana River in Prado Basin in the southern portions of MZ's 1-5, and St. Antonio Creek, which passes through MZ's 1 and 2.

Mt. Baldy to the north of the project area channels alluvial and perennial flows through several smaller waterways, which fill reservoirs (Puddingstone Reservoir in the northeast of MZ 1, Live Oak Reservoir north of MZ 1) and continue their flows into several of the creeks running north to south along the project alignment.

3.1.3 Topography and Soils

The majority of the program area is characterized by flat topography through the basin, bordered by hilly to mountainous terrain. The elevation ranges from approximately 500 feet above mean sea level (amsl) at the extreme southern portion of the Basin to 1,200 feet amsl along the foothills leading to the adjacent mountains. General soil maps (NRCS, Web Soil Survey, January 2020) identify numerous soil associations (distinctive patterns of soils in defined proportions) in the program area. An overview of topography and soil is presented in the following section. Once specific program elements are designed or proposed a more specific soil map would be prepared for those specific activities.

The following list summarizes the general soil types identified in the program area, which consists of disturbed urban land, alluvial, sedimentary sources, and distinct soil series along the more rocky terrain. Most of the soils in the inventory area formed from alluvial, sedimentary, and meta-sedimentary sources and have been formed in concert with the complex geologic history of the area. Many areas to the south of the program area have been urbanized and/or altered to produce crops.

Table 3.1
SOIL TYPES IN THE PROGRAM AREA

Management Zone	Map Unit Name	Map Unit Name
1	Urban land-Monserate-Exeter-Arlington (moderately well to well drained, slow to rapid runoff, slow to moderate permeability, 0 to 9% slope)	Ramona-Hanford-Greenfield-Gorgonio (well- to excessively drained, low to medium runoff, moderately slow to rapid permeability, 0-30% slope)
	Soper-Fontana-Calleguas-Balcom-Anaheim (well-drained, low to high runoff, slow to moderate permeability, 5 to 75% slope)	
2	Urban land-Monserate-Exeter-Arlington (moderately well to well drained, slow to rapid runoff, slow to moderate permeability, 0 to 9% slope)	Ramona-Hanford-Greenfield-Gorgonio (well- to excessively drained, low to medium runoff, moderately slow to rapid permeability, 0-30% slope)
	Urban land-Tujunga-Soboba-Hanford (well to somewhat excessively drained, negligible to low runoff, moderate to rapid permeability, 0-15% slope)	
3	Urban land-Monserate-Exeter-Arlington (moderately well to well drained, slow to rapid runoff, slow to moderate permeability, 0 to 9% slope)	Sesame-Rock outcrop-Cieneba (well to excessively drained, low to very rapid runoff, moderate to slow permeability, 0-85% slope)
	Urban land-Tujunga-Soboba-Hanford (well to somewhat excessively drained, negligible to low runoff, moderate to rapid permeability, 0-15% slope)	
4	Sesame-Rock outcrop-Cieneba (well to excessively drained, low to very rapid runoff, moderate to slow permeability, 0-85% slope)	Urban land-Tujunga-Soboba-Hanford (well to somewhat excessively drained, negligible to low runoff, moderate to rapid permeability, 0-15% slope)
5	Urban land-Monserate-Exeter-Arlington (moderately well to well drained, slow to rapid runoff, slow to moderate permeability, 0 to 9% slope)	Urban land-Tujunga-Soboba-Hanford (well to somewhat excessively drained, negligible to low runoff, moderate to rapid permeability, 0-15% slope)

3.1.4 Biological and Physical Conditions of the Study Areas

This section describes the existing biological and physical conditions of the Study Areas. The descriptions are general in nature, and specific resources are addressed in more detail in Chapter 4, Discussion of Impacts and Mitigation.

Areas with natural vegetation and wetlands are most prevalent in the lower 20 percent of the management zones, in particular Chino Creek to the southwest of and within MZ 1 and the Santa Ana River to the southeast and within MZ 1 and MZ 5. Native plants are uncommon in the program area and are generally limited to the wetland and streambed areas in the program area. Most of the land area in the five Management Zones is developed. The lack of native vegetation throughout the majority of the program area is a result of a history of industrial, commercial, agricultural and residential housing development within the program area and associated maintenance and continued construction within the program area.

3.1.5 Regional Habitat and Land Use in the Assessment Areas

This section describes the general biological conditions in and around the assessment areas, with particular emphasis on the wildlife habitats. Most of the discussion focuses specifically on the habitats adjacent to and within the program area, which is synonymous with the area slated for future program activities. The rationale for this approach is habitat conditions are particularly relevant to wildlife presence and use.

The assessment areas are located in the Southwestern California subregion (SW) of the California Floristic Province (i.e., a geographic area, made of six regions, defined by the continuity of its vegetational, topographic, geologic, and climatic features) of this subregion (Hickman 1993). Like other Mediterranean-type ecosystems, the California Floristic Province is distinguished more by the endemism of its plants than its animals. Of nearly 3,500 species of vascular plants in the hotspot, more than 2,120 (61 percent) are found nowhere else in the world. Around 52 plant genera are also endemic. The high levels of plant species endemism are due to its varied topography, climate zones, geology and soils.

Overall, the Study Areas are highly disturbed and fragmented because of historic man-made changes to the landscape, including urban, agricultural, industrial, railroad, and highways/road development. In a few areas native vegetation and quality wildlife habitat remain relatively undisturbed. The majority of land in the Study Areas is an active urban area with mixed residential, commercial, and industrial use. Urban areas are the second greatest land use, including large cities such as Chino Hills, Chino, Montclair, Ontario, Upland, Rancho Cucamonga, Fontana, Rialto, Eastvale, Norco, and Jurupa Valley. In these areas native vegetation is absent or highly disturbed, and the more typical vegetation consists of a variety of planted landscape trees and other nonnative or ornamental vegetation.

3.1.6 General Wildlife Resources in the Project Area

The riparian forest in the Prado Basin is noted for its very high bird species diversity and abundance. Neotropical migrants depend on the deciduous trees and shrubs for foraging during migration. The mature trees provide numerous cavities for cavity-dependent wildlife and the tall trees are used by nesting raptors. The emergent vegetation rooted at the water's edge provides escape cover, shade and food for fish.

The wildlife resources in Prado Basin are important due, in part, to their high diversity and the large numbers of certain wetland species that occur there. The extensive and continuous riparian woodland, unique for southern California, supports several rare and declining species, particularly birds. A robust raptor population occurs within the project area. The raptors have a wealth of resources to draw on for foraging and nesting. They use the tall eucalyptus for nesting, roosting and perching. There are records of eleven raptor species breeding successfully in Prado Basin, including the white-tailed kite (*Elanus leucurus*), Cooper's hawk, golden eagle (Aquila chrysaetos), western screech-owl (*Otus asio*), and long-eared owl (*Asio otus*). A moderate number of raptor species from other regions winter in Prado Basin along with the resident raptors. Two of the rarer wintering raptor species include the peregrine falcon (*Falco peregrinus*) and merlin (*Falco columbarius*).

The double-crested cormorant (*Phalacrocorax auritus*), great blue heron (*Ardea herodias*), and blackcrowned night-heron (*Nycticorax nycticorax*) are conspicuous breeders among the larger water birds. The tree swallow (*Tachycinera bicolor*) is abundant locally, especially in the vicinity of dead trees with cavities where it nests. The red-winged blackbird (*Agelaius* *phoeniceus*) and marsh wren (*Cistothorus palustris*) are locally abundant nesters, as is piedbilled grebe (*Podilymbus podiceps*), ruddy duck (*Oxyura jamaicensis*), and American coot (*Fulica americana*). The mallard (*Anas platyrhynchos*) and cinnamon teal (*Anas cyanoptera*) are more widely scattered. Shorebirds known to nest in the Basin include: the killdeer (*Charadrius voci/erus*), American avocet (*Recurvirostra americana*), black-necked stilt (*Himantopus mexicanus*), and spotted sandpiper (*Actitis macularia*). Marsh-nesting birds include: the American bittern (Botaurus lentiginosus), Virginia rail (*Rallus limicola*), common moorhen (*Gallinula chloropus*), common yellowthroat, song sparrow, and tricolored blackbird (*Agelaius tricolor*).

Species that nest in the eucalyptus groves include: the Anna's hummingbird (*Calypte anna*), northern flicker (*Colaples auratus*), Cassin's kingbird (*Tyrannus vociferans*), American crow, European starling, Bullock's oriole (*Icterus bullockii*), and house finch. Nests of the red-tailedhawk (*Buteo jamaicensis*) and red-shouldered hawk are regularly found in the eucalyptus trees as well, probably because they are often the tallest trees available. Oriole and kingbird nests are locally concentrated in eucalyptus trees. The commonly encountered winter visitors in the riparian forests are the ruby-crowned kinglet (*Regulus calendula*), white-crownedsparrow (*Zonotrichia leucophrys*), American pipit (*Anthus rubescens*) and savannah sparrow (*Passerculus sandwichensis*).

Winter concentrations of waterfowl in the Prado Basin are at least as large as those on any of the southern California coastal lagoons, and the Basin may hold the largest wintering populations of some species. The wintering waterfowl resources in the Basin are vast and are exploited by several waterfowl hunt club operators. Sixteen species of waterfowl have been found in the Basin, many numbering in the thousands. The most abundant are green-winged teal (*Anas clecca*), mallard, cinnamon teal, Northern shoveler (*Anas clypeata*), American wigeon (*Anas americana*), ring-necked duck (*Aythya collaris*), and ruddy duck. Twenty-three species of mammals including three non-native species have been observed in the Prado Basin. Six species of mammals found in the Basin are listed in the California Hunting Regulations with seasons and limits set by the State Fish and Game Commission.

The mule deer is a big game animal, the Audubon cottontail and black-tailed jackrabbit (*Lepus califomicus*) are resident small game animals, the gray fox (*Urocyon cinereoargenteus*) and raccoon are fur-bearing mammals, and the bobcat is a regulated non-game mammal.

There are seven amphibians species known to occur in the Prado Basin and surrounding areas (Glaser 1970, Robertson and Shipman 1974, and Zembal et al. 1985). The bullfrog (*Rana catesbeiana*), and African clawed frog (*Xenopus laevis*) are two invasive, non-native species commonly observed in the basin. There are 13 reptile species documented in the basin. The western fence lizard is the most frequently encountered reptile within the Basin. The side-blotched lizard is concentrated in upland areas. The western whiptail (*Cnemidophorus tigris*) is also found primarily in upland scrubland habitats around the perimeter of the Basin. The western skink (*Eumeces skiltonianus*) inhabits remnant scrublands. The gopher snake (*Piruophis melanoleucus*) is the snake most frequently observed in the Basin and is found in both uplands and in drier riparian habitats.

At least 15 species of fish have been found in the Prado Basin within the Santa Ana River. Most of these occur in the affected area, at least seasonally. Two, the SASU and arroyo chub, are native to southern California; the rest are non-native introductions. According to Cam Swift, the most abundant species in the Basin are the flathead minnow and mosquitofish. These two, along with the carp (*Cyprinus carpio*), comprise about 95 percent of all fish species in the Basin (Swift unpubl. data).

Common wildlife in the project area include coyote (*Canis latrans*), raccoon (*Procyon lotor*), striped skunk (*Mephitis mephitis*), rattlesnake (Crotalus sp), western fence lizard (*Sceloporus occidentalis*), desert wood rat (*Neotoma lepida*), and deer mouse (*Peromyscus maniculatus*).

3.2 Regional Special Status Species and Habitats of Concern

Special status species are plants or animals that are legally protected under the federal ESA, the California ESA, or other regulations, as well as species considered sufficiently rare by the scientific community to qualify for such listing. Special-status species include the following:

- Species listed or proposed for listing as threatened or endangered under the federal ESA (50 CFR 17.12 [listed plants]); 50 CFR 17.11 (listed animals); and various notices in the *Federal Register* (proposed species).
- Species that are candidates for possible future listing as threatened or endangered under the federal ESA (76 Fed. Reg. 66370, October 26, 2011).
- Species listed or proposed for listing by the State of California as threatened or endangered under the California ESA (14 California Code of Regulations [C.C.R.] 670.5).
- Species that meet the definitions of "rare" or "endangered" under the California Environmental Quality Act (CEQA Guidelines Sections 15380 and 15125).
- Plants presumed by the California Native Plant Society (CNPS) to be “extinct in California” (Lists 1A, CNPS 2020).
- Plants considered by the CNPS to be “rare, threatened, or endangered in California” (Lists 1B and 2, CNPS 2020).
- Plants listed by CNPS as plants about which more information is needed to determine their status (List 3, CNPS 2020), and which may be included as special-status species on the basis of local significance or recent biological information.
- Plants listed by CNPS as plants of limited distribution or infrequent throughout a broader area in California (List 4, CNPS 2020); these plants are not “rare” from a statewide perspective but are uncommon enough that they are recommended for inclusion in environmental documents.
- Plant species listed as rare under the California Native Plant Protection Act (California Fish and Game Code 1900, et seq.).
- Animal species of special concern to the CDFW (CDFW 2019).
- Bird species of conservation concern as identified by USFWS in *Birds of Conservation Concern 2008* (USFWS 2008).
- Animals that are fully protected in California (California Fish and Game Code Sections 3511 [birds], 4,700 [mammals], 5050 [amphibians and reptiles], and 5515 [fish]) (CDFW 2011).

The following table identifies the habitat types and land uses identified within the Study Areas of the proposed project.

Table 3.2
PROJECT AREA WILDLIFE HABITAT TYPES, LAND USES, AND TYPICAL VEGETATION

Wildlife Habitat Type/ Land Use Type	Typical Vegetation
Tree-Dominated Habitats	
Montane Hardwood (MHW)	Jeffrey pine, ponderosa pine, sugar pine, incense-cedar, California white fir, bigcone Douglas-fir, California black oak, and Coulter pine. At lower elevations, associates are white alder, coast live oak, bigleaf maple, Californialaurel, bigcone Douglas-fir, and occasionally valley oak, foothill pine, and blue oak (Cheatham and Haller 1975, McDonald and Littrell 1976).
Desert Riparian (DR)	Tamarisk, velvet ash, mesquite, screwbean mesquite, Fremont cottonwood, and willows such as Gooding, Hinds, and arroyo (Bradley and Deacon 1967, Cheatham and Haller 1975, Küchler 1977, Paysen et al. 1980, Parker and Matyas 1981). The subcanopy includes smaller individuals of the canopy species as well as quailbush, Mojave seablight, desert lavender, seep willow, and arrowweed (Bradley and Deacon 1967, Küchler 1977. Paysen et al. 1980, Parker and Matyas 1981).

Wildlife Habitat Type/ Land Use Type	Typical Vegetation
Valley Foothill Riparian (VRI)	Cottonwood, California sycamore and valley oak. Subcanopy trees are white alder, boxelder and Oregon ash. Typical understory shrub layer plants include wild grape, wild rose, California blackberry, blue elderberry, poison oak, buttonbrush, and willows. The herbaceous layer consists of sedges, rushes, grasses, miner's lettuce, Douglas sagewort, poison-hemlock, and hoary nettle. (CDFW, 2020)
Shrub/Herbaceous-Dominated Habitats	
Riversidean Alluvial Fan Sage Scrub	Predominantly of drought-deciduous soft-leaved shrubs, but with significant cover of larger perennial species typically found in chaparral (Kirkpatrick and Hutchinson, 1977). Scalebroom (*Lepidospartum squamatum*) generally is regarded as an indicator of Riversidean alluvial scrub (Smith, 1980; Hanes, et al., 1989). In addition to scalebroom, alluvial scrub typically is composed of white sage (*Salvia apiana*), redberry (*Rhamnus crocea*), California buckwheat, Spanish bayonet, California croton (*Croton californicus*), cholla (*Opuntia spp*.), tarragon (*Artemisia dracunculus*), yerba santa (*Eriodictyon spp*.), mule fat, and mountain-mahogany (Hanes, et al., 1989; Smith, 1980). Annual species composition has not been studied but is probably similar to that found in understories of neighboring shrubland vegetation. Two sensitive annual species are endemic to alluvial scrub vegetation in the proposed Plan Area: slender-horned spineflower (*Dodecahema leptocerus*) and Santa Ana River woollystar (*Eriastrum densifolium ssp. sanctorum*). (Western Riverside County MSHCP, Chapter 3)
Mixed Chaparral (MCh)	Scrub oak, chaparral oak, and several species of ceanothus and manzanita. Individual sites may support pure stands of these shrubs or diverse mixtures of several species. Commonly associated shrubs include chamise, birchleaf mountain mahogany, silk-tassel, toyon, yerba-santa, California buckeye, poison-oak, sumac, California buckthorn, hollyleaf cherry, Montana chaparral-pea, and California fremontia. Some of these species may be locally dominant. Leather oak and interior silktassel are widely distributed on cismontane serpentine soils, and chamise and toyon may be abundant on these soils. Shrubs such as Jepson, coyote, and dwarf ceanothus and serpentine manzanita are local serpentine endemics (Cheatham and Haller 1975, Thorne 1976, Hanes 1977).
Aquatic Habitats	
Coastal and Valley Freshwater Marsh	Located in Day Canyon wash area and Prado Basin; cattail and bulrush dominated wetlands. Also present is non-native invasive giant reed grass (Arundo), which also occur along the riparian habitat outside of marshland.
Riverine and riparian	Santa Ana River, Cucamonga Creek, Cajon Creek, Lytle Creek that are tributary to the Chino and Prado Basins; this riparian habitat is dominated by Fremont cottonwood, arroyo willow, black willow and western sycamore. Common shrubs include mulefat, California mugwort, poison oak and coyote bush.
Disturbed Habitats	

Wildlife Habitat Type/ Land Use Type	Typical Vegetation
RS, RM, SD-RES	Residential
IC, IR	Community industrial and regional industrial
SD-COM, COM	Special development and commercial
FW	Floodway resource management zone
RL	Rural living
OS	Open Space
KC/SP	Kaiser Commerce Center Specific Plan
Non-vegetated Habitats	
Barren (BAR)	Unvegetated, rock, gravel, soil
Utilities ROW for water distribution	Cement-lined and herbaceous vegetation channels, pipes, culverts, pump stations, reservoirs.
HCP/Preserve Lands	
Western Riverside County Multiple-Species Habitat Conservation Plan (MSHCP) June 22, 2004	The MSHCP encompasses 1.26 million acres of land in unincorporated Riverside County west of the San Jacinto Mountains and creates conservation land for 153,000 acres of land. Focal species covered include least Bells vireo, southwestern willow flycatcher, wester yellow-billed cuckoo, Quino checkerspot butterfly, and fairy shrimp. Riparian, riverine, sage scrub and other upland vegetative communities are protected.
Designated Critical Habitat within Proximity to Proposed Project	
Spreading navarretia	19 miles southeast of the Study Area
Arroyo toad	6 miles northeast of Study Area and 9 miles south of the Study Area
Yellow-billed cuckoo	Directly overlapping with all MZ's in the south of the Study Area
Southern mountain yellow-legged frog	3 miles north of the Study Area
Thread-leaved brodiaea	7 miles northwest and 19 miles southeast of the Study Area
San Bernardino Merriam's kangaroo rat	Directly overlapping with MZ-2 in the north and within 1 mile northeast to 20 miles southeast of the Study Area
Least Bell's vireo	Directly overlapping all MZ's in the southern portion of the Study Area
Coastal California gnatcatcher	Directly overlapping the eastern portion of MZ-3 and within 1 mile of all MZ's within the Study Area
Southwestern willow flycatcher	Directly overlapping pockets in the southern portions of MZ-1, 2, 3, and 5 and within 1 mile of all MZ's in the Study Area
Santa Ana sucker	Directly overlapping the full southern extent of MZ-5 and within 2 miles of remaining MZ's
Braunton's milk-vetch	3 miles southwest of the 5 MZ's

Wildlife Habitat Type/ Land Use Type	Typical Vegetation
Conservation Banks	
Cajon Creek Habitat Conservation Management Area Contact: Sheri Ortega Property Manager Vulcan Materials Company, Western Division 500 N. Brand Blvd. Suite 500 Glendale, CA 91203 (Division Office) 16013 Foothill Blvd., Irwindale, CA 91702 (626) 633-4236 (Office) (323) 637-2569 (Mobile) ortegas@vmcmail.com	24 T&E species and their associated habitats are covered, including: Riversidian alluvial fan sage scrub; San Bernardino kangaroo rat; Santa Ana woolly star; Slender-horned spineflower. Credits: Riversidian aleuvial fan sage scrub
Soquel Canyon Mitigation Bank Contact: Mitigation Bank Manager (877) 445-8699 bankmanager@landveritas.com	Ephemeral; Intermittent and Permanent stream/riparian; Coastal sage scrub; Chaparral; Native grassland; Walnut woodland; Oak woodland; Mulefat scrub
Chiquita Canyon Conservation Bank **Contact:** Foothill / Eastern Transportation Corridor Agency 201 E. Sandpointe, Ste 200 P.O. Box 28870 Santa Ana, CA 92799-8870 Attn: William Woollett, Jr. Chief Executive Officer	Coastal sage scrub; Riversidian sage scrub; California gnatcatcher
Black Mountain Conservation Bank Contact: WildDesert EM Holdings, LLC 3301 Industrial Avenue Rocklin, CA 95765 (916) 435-3555 Fax: (916) 435-3556	Desert tortoise; Mohave ground squirrel; American badger; Desert kit fox; Loggerhead shrike; LeConte's thrasher; stream

3.2.1 Special Status Plant and Animal Species Potentially Occurring Along or Within the Project Assessment Areas

3.2.1.1 Special Status Plant Species with Potential for Occurrence in the Project Area

Santa Ana River woollystar

Santa Ana River woollystar is a low shrubby perennial which can grow to one meter (3.3 feet) tall, with gray-green stems and leaves. This species blooms from June to August and produces bright blue flowers that are up to 1.4 inches long that occur in flower heads with about 20 blossoms each. There are three primary pollinators: long-tongued digger bee, giant flower-loving fly and hummingbirds. This species is associated with early- to moderate- successional alluvial scrub, and thus requires periodic flooding and silting for the creation of new habitats and colonization. The Santa Ana River woollystar is found only within open washes and early-successional alluvial fan scrub on open slopes above main watercourses on fluvial deposits where flooding and scouring occur at a frequency that allows the persistence of open shrublands. Suitable habitat is comprised of a patchy distribution of gravelly soils, sandy soils, rock mounds and boulder fields (Zembal and Kramer 1984; Zembal and Kramer 1985; U.S. Fish and Wildlife Service 1986). The Santa Ana River woolly-star occurs along the Santa Ana River and Lytle and Cajon Creek flood plains from the base of the San Bernardino Mountains in San Bernardino County southwest along the Santa Ana River through Riverside County into the Santa Ana Canyon of northeastern Orange County from about 150 to 580 meters (Munz 1974; Patterson 1993; Roberts 1998; Zembal and Kramer 1985; Patterson and Tanowitz 1989).

White rabbit-tobacco (Pseudognaphalium leucocephalum)

White rabbit-tobacco is a biennial or short-lived perennial, 30–60 cm; taprooted. Stems are densely and persistently white-tomentose, usually with stipitate-glandular hairs protruding through tomentum. Leaf blades (crowded, internodes mostly 1–3, sometimes to 10 mm) are linear-lanceolate, 3–7 cm × 1–5(–6) mm, bases subclasping, not decurrent, margins strongly revolute, faces bicolor, abaxial densely white-tomentose, adaxial green, densely stipitate-glandular. Heads grow in corymbiform arrays and involucres broadly campanulate, 5–6 mm. Phyllaries are in 5–7 series, are bright white (opaque, dull) and oblong to oblong-ovate, glabrous. Pistillate are in florets of 66–85 and bisexual florets are (6–14, California) are 29–44. Cypselae are ridged and smooth, 2n = 28. Flowering season is Jul–Aug and Nov–Dec. White rabbit-tobacco are grow on/near sandy or gravelly slopes, stream bottoms, arroyos, areas of oak-sycamore, oak-pine, to pine woodlands, commonly in riparian vegetation; 50–2100 m; Ariz., Calif., N.Mex.; Mexico (Baja California, Baja California Sur, Chihuahua, Durango, Sinaloa, Sonora).

3.2.1.2 Special-Status Wildlife Species with Potential for Occurrence in the Project Area

Southwestern pond turtle

These turtles are 3.5 - 8.5 inches in shell length (Stebbins 2003). It is a small to medium-sized drab dark brown, olive-brown, or blackish turtle with a low unkeeled carapace and usually with a pattern of lines or spots radiating from the centers of the scutes. The plastron lacks hinges, and has 6 pairs of shelds which can be cream or yellowish in color with large dark brown markings, or unmarked. The legs have black speckling and may show cream to yellowish coloring. The head usually has a black network or spots may show cream to yellowish coloring. Males usually have a light throat with no markings, a low-domed carapace, and a concave plastron. Females usually have a throat with dark markings, a high-domed carapace, and a flat or convex plastron which tends to be more heavily patterned than the male's. They are diurnal and thoroughly aquatic. This turtle is often seen basking above the water, but will quickly slide into the water when it feels threatened. Southwestern pond turtle is active from around February to November, hibernates underwater, often in the muddy bottom of a pool, and estivates during summer droughts by burying itself in soft bottom mud.

They eat aquatic plants, invertebrates, worms, frog and salamander eggs and larvae, crayfish, carrion, and occasionally frogs and fish. Pond turtles mate in April and May. They are found from the San Francisco Bay south, along the coast ranges into northern Baja California. Isolated populations occur along the Mojave River at Camp Cody and Afton Canyon from sea level to over 5,900 ft in elevation. This turtle is found in ponds, lakes, rivers, streams, creeks, marshes, and irrigation ditches, with abundant vegetation, and either rocky or muddy bottoms, in woodland, forest, and grassland. In streams, it prefers pools to shallower areas. Logs, rocks, cattail mats, and exposed banks are required for basking.

Tricolored blackbird

The CDFG maintains a biodiversity database for tricolors. This database includes records for breeding and non-breeding tricolors during the breeding season and a winter distribution database. The recent breeding records were compiled by U.C. Davis and are included in annual reports to USFWS and CDFG. Since 1980, breeding has occurred in 46 California counties (Beedy and Hamilton 1999). With the exception of a few peripheral sites, the geographic distribution has not declined perceptively. Unlike most species when tricolors settle at high densities, as in flooded willows, territories may be vertically stacked. Arrival date on breeding grounds is mid-March through mid-July. Tricolored Blackbirds are at as high a risk as any of the narrowly endemic North American bird species and are at far greater risk than Swainson's Hawks, Burrowing Owls and other relatively widely distributed California species. But because they are a flocking species, and are in some places abundant, they do not command management attention.

Burrowing Owl

Burrowing owl is a small ground-dwelling Owl with a round head and no ear tufts. They have white eyebrows, yellow eyes, and long legs. The Owl is sandy colored on the head, back, and upperparts of the wings and white-to-cream with barring on the breast and belly and a prominent white chin stripe. They have a rounded head, and yellow eyes with white eyebrows. The young are brown on the head, back, and wings with a white belly and chest. They molt into an adult-like plumage during their first summer. Burrowing Owls are comparatively easy to see because they are often active in daylight and are surprisingly bold and approachable.

The burrowing owl occurs in shortgrass prairies, grasslands, lowland scrub, agricultural lands particularly rangelands), prairies, coastal dunes, desert floors, and some artificial, open areas as a year-long resident (Haug, et al. 1993). They require large open expanses of sparsely vegetated areas on gently rolling or level terrain with an abundance of active small mammal burrows. As a critical habitat feature need, they require the use of rodent or other burrows for roosting and nesting cover. They may also dig their own burrow in soft, friable soil (as found in Florida) and may also use pipes, culverts, and nest boxes where burrows are scarce (Robertson 1929). The mammal burrows are modified and enlarged. One burrow is typically selected for use as the nest, however, satellite burrows are usually found within the immediate vicinity of the nest burrow within the defended territory of the owl.

Yellow-billed cuckoo

The yellow-billed cuckoo is dependent on the combination of a dense willow understory for nesting, a cottonwood overstory for foraging and large patches of habitat in excess of 20 ha. (Laymon and Halterman 1991). It is also not known to utilize non-native vegetation in the majority of its range (Hunter et al. 1984). It is a medium sized bird. Its profile is long and slim. Its legs are short and bluish-gray. Its long tail is gray-brown above and black below with three striking pairs of large white dots visible in flight. Its body is brown above with white under parts. The undersides of its pointed wings are rufous. Adult birds have a long curved bill which is blue-black above and yellow at the base of the mandibles. Juveniles have a completely blue-black bill. While they have been known to take beetles, cicadas, bugs, wasps, flies, katydids, dragonflies, damselflies, praying mantids, lacewings, mosquito hawks, cankerworms, fall webworms (Platyprepia virginalis), and even tree frogs (Beal 1898, Green 1978, Laymon 1980, Ryser 1985, Dillinger 1989), more than three fourths of the yellow-billed cuckoo diet is made up of grasshoppers and caterpillars (Beal 1898). The yellow-billed cuckoo is an "incipient brood parasite," its eggs have been found in the nests of black-billed cuckoos, American robins, black-throated sparrows, mourning doves, house finches and red-winged blackbirds (Ryser 1985).

Black-billed cuckoos have also been known to occasionally parasitize yellow-billed cuckoos. Though they will occupy a variety of marginal habitats, particularly at the edges of their range, yellow-billed cuckoos in the West are overwhelmingly associated with relatively expansive stands of mature cottonwood willow forests. Canopy height ranged from 5-25 m, canopy cover from 20-90%, and nderstory cover from 30-90%. Willows and open water are required and the habitat will vary from dense willow-cottonwood forests to marshy bottomlands with scattered willow thickets. The cuckoo was once common in riparian habitat throughout the western United States. In California the yellow-billed cuckoo has declined from a "fairly common breeding species" throughout most of the state to a current population of less than 50 pairs (Gaines and Laymon 1984; Laymon and Halterman 1991). In 1971 it was listed by the California Department of Fish and Game as Rare. By 1977 it had become "one of the rarest birds" in the state. A 1977 survey of historical sites and suitable habitat at six widely scattered rivers turned up 54 birds in the Sacramento Valley (Tehama, Putte, Glenn, Colusa, and Sutter counties), 9 on the South Fork of the Kern River near Weldon, 3 along the Santa Ana River, Riverside County, 4 in Owens Valley, Inyo County, 6 on the Armargosa River south of Tecopa, Inyo and San Bernardino County, and 65 on both sides of the Colorado River from the Nevada state line to the Mexican border (Gaines 1977).

Arroyo Chub

The Arroyo chub is a cyprinid fish found only in the coastal streams of southern California, United States. The shape of the arroyo chub is somewhat chunky, with a deep body and thick caudal peduncle. The eyes are larger than average for cyprinids. Coloration ranges from silver to gray to olive green above, shading to white below, usually with a dull gray band along each side. This is a small fish, with most adults in the 7-10 cm length range, and a maximum of 12 cm. Omnivorous, their diet includes algae, insects, and crustaceans. Arroyo chub habitat is primarily the warm streams of the Los Angeles Plain, which are typically muddy torrents during the winter, and clear quiet brooks in the summer, possibly drying up in places. They are found both in slow-moving and fast-moving sections, but generally deeper than 40 cm. They are native to Los Angeles, Santa Margarita, San Gabriel, San Luis Rey, and Santa Ana Rivers, as well as to Malibu and San Juan Creeks. Many of the original populations have been extirpated, but it has recently been reestablished in the Arroyo Seco (Los Angeles County), a tributary of the Los Angeles River. The species also has been successfully introduced in a number of other rivers in the area, and can be found as far north as Chorro Creek in San Luis Obispo County, and as far east as the Mojave River. The Mojave and Cuyama River populations extend into the ranges of related fishes, and hybridize with Mojave chub and California roach, respectively.

Grasshopper sparrow

Grasshopper sparrow is a small, chunky grassland sparrow with clear buff breast and scaly-looking,dark rufous upperparts and a pale central stripe on crown; short, pointed tail. Apparently it can survive in areas where the introduced plants are combined with the native plants and the livestock grazing is not too intensive. It is found in open grassy and weedy meadows, pastures, and plains. This sparrow breeds from British Columbia, Manitoba, and New Hampshire south to Florida (rare), West Indies, and Mexico but winters north to California, Texas, and North Carolina. This elusive sparrow is named for its buzzy song. As soon as a weedy field becomes overgrown or trees have filled in an abandoned pasture, the Grasshopper Sparrow no longer uses the site for breeding. Less of a seed-eater than our other grass sparrows, it feeds largely on insects. When flushed, this sparrow flies a short distance and drops out of sight, into tall grass.

Western yellow bat

Western yellow bat can be distinguished from other bat species by the combination of yellow coloration, size (forearm = 42-50 mm), and short ears. Lasiurus xanthinus occurs in northern Mexico, western Arizona, southern California, southern Nevada, and southwestern New Mexico. Western yellow bats are associated with dry, thorny vegetation on the Mexican Plateau, and are found in desert regions of the southwestern United States, where they show a particular association with palms and other desert riparian habitats. They are known to occur in a number of palm oases, but are also believed to be expanding their range with the increased usage of ornamental palms in landscaping. Yellow bats are suspected to be non-colonial. Individuals usually roost in trees, hanging from the underside of a leaf. They are commonly found in the southwestern U.S. roosting in the skirt of dead fronds in both native and non-native palm trees, and have also been documented roosting in cottonwood trees. At least some individuals or populations may be migratory, although some individuals appear to be present year-round, even in the northernmost portion of their range. Yellow bats are insectivorous. Probably one of the primary threats in the U.S., however, is the cosmetic trimming of palm fronds. The use of pesticides in date-palm and other orchards may also constitute a threat to both roosting bats and the insects upon which they forage.

Coastal California gnatcatcher (*Polioptila californica californica*)

The Coastal California gnatcatcher is a small blue-gray songbird. It has dark blue-gray feathers on its back and grayish-white feathers on its underside. The wings have a brownish wash to them. Its long tail is mostly black with white outer tail feathers. They have a thin, small bill. The males have a black cap during the summer which is absent during the winter. The gnatcatcher typically occurs in or near sage scrub habitat, which includes the following plant communities as classified by Holland (1986): Venturan coastal sage scrub, Diegan coastal sage scrub, maritime succulent scrub, Riversidean sage scrub, Riversidean alluvial fan sage scrub, southern coastal bluff scrub, and coastal sage-chaparral scrub. Ninety-nine percent of all gnatcatcher locality records occur at or below an elevation of 984 feet (Atwood 1990). Gnatcatchers also use chaparral, grassland, and riparian habitats where they occur adjacent to sage scrub (Bontrager 1991). These non-sage scrub habitats are used for dispersal (Bowler 1995; Campbell et al. 1995). Gnatcatchers are persistent nest builders and often attempt multiple broods, which is suggestive of a high reproductive potential. Historically, gnatcatchers occurred from southern Ventura County southward through Los Angeles, Orange, Riverside, San Bernardino, and San Diego counties, and into Baja California, Mexico (Atwood 1990). The amount of coastal sage scrub available to gnatcatchers has continued to decrease during the period after the listing of the species. It is estimated that up to 90 percent of coastal sage scrub vegetation has been lost as a result of development and land conversion (Barbour and Major 1977).

Yellow-breasted chat

The yellow-breasted chat Grinnell and Miller (1944) reported that chats bred over the entire length and breadth of the state exclusive of higher mountains and coastal islands, and were more numerous toward the interior. Breeders arrive from April to early May. Departure from breeding grounds occurs from August – September (after complete prebasic molt); some may leave in July, some stragglers into October. Spring migration: March - May. Fall migration: July - October. Poorly documented due to the species' secretive nature; it goes largely undetected once singing ceases in mid-July (Dunn and Garrett 1997). Delacour (1959) reported the capture of an adult chat in Los Angeles on 5 December 1958. Dunn and Garrett (1997) report that western birds appear to move south during fall migration on a broad front, although migrants are generally scarcer near the coast. In California, chats require dense riparian thickets of willows, vine tangles, and dense brush associated with streams, swampy ground and the borders of small ponds (Small 1994). Chat nests frequently host Brown-headed Cowbird (Molothrus ater) and rarely hosts the Bronzed Cowbird (Molothrus aeneus). Flood control and river channelization eliminates early successional riparian habitat (willow/alder shrub habitats with a dense understory) that chats (and many other riparian focal species) use for breeding. Hunter et al. (1988) found that chats will use the exotic saltcedar (Tamarix chinensis), and they suggest that chats may use the saltcedar preferentially to native habitat. The authors do not report the frequency of nest placement in saltcedar, but Brown and Trosset (1989) report that chats nest in tamarisk and native shrubs in proportion to the occurrence of the different types of vegetation.

Least Bell's vireo

The least Bell's vireo (LBVI) is a small, olive-gray migratory songbird that nests and forages almost exclusively in riparian woodland habitats. Bell's vireos as a group are highly territorial and are almost exclusively insectivorous. Least Bell's vireo nesting habitat typically consists of well developed overstory, understory, and low densities of aquatic and herbaceous cover. The understory frequently contains dense sub-shrub or shrub thickets. These thickets are often dominated by plants such as narrow-leaf willow, mulefat, young individuals of other willow species such as arroyo willow or black willow, and one or more herbaceous species. LBVI generally begin to arrive from their wintering range in southern Baja California and establish breeding territories by mid-March to late-March. A large majority of breeding vireos apparently depart their breeding grounds by the third week of September and only a very few have been found wintering in the United States.

LBVI typically inhabit riparian forests with well-developed overstories and understories. The understory often contains dense subscrub or thickets above the ground. These thickets are usually dominated by sandbar willow, mulefat, blackberry (Rubus ursinus), and young trees of other willow species such as black willow and arroyo willow. The overstory usually contains black willow, cottonwood and Sycamore. Although LBVI use a variety of riparian plant species for nesting, it appears that the structure of the vegetation is more important than other factors such as species composition or the age of the stand. Vireos forage in riparian and adjacent chaparral habitats up to 984 feet from the nest, and use both high and low scrub layers as foraging substrate.

Table 3.3
FLORA AND FAUNA WITH POTENTIAL TO OCCUR IN THE PROGRAM AREA
(*Source: CNDDB, January 2020*, Occurrence Potential Assessed)

Taxonomic Group	Management Zone with Potential to Occur	Common Name / Scientific Name	Status Federal / State	Typical Habitat	Occurrence Potential
Amphibians	1	arroyo toad /Anaxyrus californicus	Endangered / SSC	Semi-arid regions near washes or intermittent streams, including valley-foothill and desert riparian, desert wash, etc. Rivers with sandy banks, willows, cottonwoods, and sycamores; loose, gravelly areas of streams in drier parts of range.	Medium potential to occur in the Study Area, dependent on shallow pools persisting due to higher flow conditions. Last known occurrence in the Study Area was in 1999 southeast of Frankish Peak in a catch basin along Cucamonga Creek.
Amphibians	1	Coast Range newt /Taricha torosa	None / SSC	Coastal drainages from Mendocino County to San Diego County. Lives in terrestrial habitats & will migrate over 1 km to breed in ponds, reservoirs & slow moving streams.	Low potential to occur in the STUDY AREA, dependent on ponds, reservoirs, and slow moving streams. Last known occurrence in the Study Area was in the 1990's in Cobal Canyon (Claremont Hills Wilderness Park).
Amphibians	1	foothill yellow-legged frog /Rana boylii	None / Candidate Threatened	Partly-shaded, shallow streams and riffles with a rocky substrate in a variety of habitats. Needs at least some cobble-sized substrate for egg-laying. Needs at least 15 weeks to attain metamorphosis.	Likely extirpated. Low occurrence potential due to disturbance level on future project sites.
Amphibians	1, 2, 3	San Gabriel slender salamander /Batrachoseps gabrieli	None / None	Known only from the San Gabriel Mtns. Found under rocks, wood, and fern fronds, and on soil at the base of talus slopes. Most active on the surface in winter and early spring.	Several individuals have been observed between 1998 and 2016, but outside the OBMPU area near Lytle Creek. Low occurrence potential.
Amphibians	1, 2, 3	southern mountain yellow-legged frog /Rana muscosa	Endangered / Endangered	Federal listing refers to populations in the San Gabriel, San Jacinto and San Bernardino mountains (southern DPS). Northern DPS was determined to warrant listing as endangered, Apr 2014, effective Jun 30, 2014. Always	Several individuals last observed in 1994, but outside the OBMPU area near Lytle Creek. Low occurrence potential; likely extirpated.

Taxonomic Group	Management Zone with Potential to Occur	Common Name / Scientific Name	Status Federal / State	Typical Habitat	Occurrence Potential
				encountered within a few feet of water. Tadpoles may require 2 - 4 yrs to complete their aquatic development.	
Amphibians	1, 2, 3, 4, 5	western spadefoot /Spea hammondii	None / None	Occurs primarily in grassland habitats, but can be found in valley-foothill hardwood woodlands. Vernal pools are essential for breeding and egg-laying.	Low potential to occur due to suitable habitat of vernal pools. Most recent observations in were in 2011 and 2014, outside of the Program area in isolated pools in the Chino Hills area.
Birds	2, 3, 4, 5	Bell's sage sparrow /Artemisiospiza belli belli	None / None	Nests in chaparral dominated by fairly dense stands of chamise. Found in coastal sage scrub in south of range. Nest located on the ground beneath a shrub or in a shrub 6-18 inches above ground. Territories about 50 yds apart.	Medium to high potential to occur in the Study Area where dense chamise exists.
Birds	1	black swift /Cypseloides niger	None / SSC	Coastal belt of Santa Cruz and Monterey counties; central & southern Sierra Nevada; San Bernardino & San Jacinto mountains. Breeds in small colonies on cliffs behind or adjacent to waterfalls in deep canyons and sea-bluffs above the surf; forages widely.	Potential to occur on the Study Area is low to medium, with higher potential to occur along the montane area north of MZ 1. Potential for foraging individuals throughout the western boundaries of the STUDY AREA.
Birds	1, 2, 3, 4, 5	burrowing owl /Athene cunicularia	None / None	Open, dry annual or perennial grasslands, deserts, and scrublands characterized by low-growing vegetation. Subterranean nester, dependent upon burrowing mammals, most notably, the California ground squirrel.	Potential to occur is high in all MZ's. Burrowing owl has been shown to adapt to urban areas and overwinter in drain pipes, abandoned tires and other cover sites.
Birds	1, 2, 3, 4, 5	California black rail /Laterallus jamaicensis coturniculus	None / Threatened	Inhabits freshwater marshes, wet meadows and shallow margins of saltwater marshes bordering larger bays. Needs water depths of	Occurrence potential is low for this species although suitable habitat exists in more vegetated weltand areas. The most recent observation was in 1931. Adequate dense

Taxonomic Group	Management Zone with Potential to Occur	Common Name / Scientific Name	Status Federal / State	Typical Habitat	Occurrence Potential
				about 1 inch that do not fluctuate during the year and dense vegetation for nesting habitat.	vegetation in wetland areas is suitable habitat in the southern portion of the Study Area
Birds	1, 2, 5	coastal cactus wren /Campylorhynchus brunneicapillus sandiegensis	None / SSC	Southern California coastal sage scrub. Wrens require tall opuntia cactus for nesting and roosting.	Low potential for occurrence. This species requires tall cactus for nesting found more inland or on coastal bluffs.
Birds	1, 2, 3, 4, 5	coastal California gnatcatcher /Polioptila californica californica	Threatened / SSC	Obligate, permanent resident of coastal sage scrub below 2500 ft in Southern California. Low, coastal sage scrub in arid washes, on mesas and slopes. Not all areas classified as coastal sage scrub are occupied.	Occurrence potential is medium to high. Several individuals have been observed as recently as 2017 in the Study Area. Potential for occurrence is concentrated in pockets of sage scrub habitat.
Birds	1, 2, 3, 4, 5	Cooper's hawk /Accipiter cooperii	None / None	Woodland, chiefly of open, interrupted or marginal type. Nest sites mainly in riparian growths of deciduous trees, as in canyon bottoms on river flood-plains; also, live oaks.	Occurrence potential for this species is medium to high, as the bird has adapted to semi-urban environments for foraging. Individuals have been observed recently in Chino Hills and Jurupa Valley.
Birds	1, 2, 5	golden eagle /Aquila chrysaetos	None / None	Rolling foothills, mountain areas, sage-juniper flats, and desert. Cliff-walled canyons provide nesting habitat in most parts of range; also, large trees in open areas.	Medium to high potential to occur in foothills to the north and west of the Study Area, but also in isolated rocky outcrops throughout the Study Area.
Birds	1, 2, 5	grasshopper sparrow /Ammodramus savannarum	None / SSC	Dense grasslands on rolling hills, lowland plains, in valleys and on hillsides on lower mountain slopes. Favors native grasslands with a mix of grasses, forbs and scattered shrubs. Loosely colonial when nesting.	Suitable habitat exists in pockets throughout the STUDY AREA, although occurrence potential is low to medium. Last recorded individual was in the Chino Hills in 2001.

Taxonomic Group	Management Zone with Potential to Occur	Common Name / Scientific Name	Status Federal / State	Typical Habitat	Occurrence Potential
Birds	4, 5	Lawrence's goldfinch /Spinus lawrencei	None / None	Nests in open oak or other arid woodland and chaparral, near water. Nearby herbaceous habitats used for feeding. Closely associated with oaks.	Occurrence potential is medium, although only one observation has been recorded near the Santa Ana River in 2015.
Birds	1, 2, 3, 4, 5	least Bell's vireo /Vireo bellii pusillus	Endangered / Endangered	Summer resident of Southern California in low riparian in vicinity of water or in dry river bottoms; below 2000 ft. Nests placed along margins of bushes or on twigs projecting into pathways, usually willow, Baccharis, mesquite. Critical habitat overlaps with the southern portion of the STUDY AREA.	Occurrence potential for this species is high in riparian areas on the edges of the Study Area. Critical habitat overlaps with the Program Area in the south and individuals have been observed from 2003 through 2014 along the Santa Ana River.
Birds	1, 2, 5	long-eared owl /Asio otus	None / SSC	Riparian bottomlands grown to tall willows and cottonwoods; also, belts of live oak paralleling stream courses. Require adjacent open land, productive of mice and the presence of old nests of crows, hawks, or magpies for breeding.	Occurrence potential is low to medium. Suitable habitat exists, but the last recorded observation was in 1925.
Birds	1	merlin /Falco columbarius	None / None	Seacoast, tidal estuaries, open woodlands, savannahs, edges of grasslands & deserts, farms & ranches. Clumps of trees or windbreaks are required for roosting in open country.	Occurrence potential is medium along the Chino Hills and other fringe wildlife and urban habitat transition zones.
Birds	1, 2, 3, 4, 5	southern California rufous-crowned sparrow /Aimophila ruficeps canescens	None / None	Resident in Southern California coastal sage scrub and sparse mixed chaparral. Frequents relatively steep, often rocky hillsides with grass and forb patches.	Occurrence potential is high for this species due to suitable sage scrub and mixed chaparral throughout the Program area.

Taxonomic Group	Management Zone with Potential to Occur	Common Name / Scientific Name	Status Federal / State	Typical Habitat	Occurrence Potential
Birds	1, 2, 3, 4, 5	southwestern willow flycatcher /Empidonax traillii extimus	Endangered / Endangered	Riparian woodlands in Southern California. Critical habitat extends along the southern portion of the STUDY AREA.	Occurrence potential for this species is medium to high in areas with willow or cottonwood riparian areas on the edges of the Study Area. Critical habitat overlaps with the southern portions of the Program area and few occurrences have been recorded in the southern Program area along the Santa Ana River as recently as 2005.
Birds	1, 2, 3, 4, 5	Swainson's hawk /Buteo swainsoni	None / Threatened	Breeds in grasslands with scattered trees, juniper-sage flats, riparian areas, savannahs, & agricultural or ranch lands with groves or lines of trees. Requires adjacent suitable foraging areas such as grasslands, or alfalfa or grain fields supporting rodent populations.	Occurrence potential is low to medium for this species, which adapts well to a variety of habitat, both in-tact and disturbed. However, no recently recorded observations have been made of this species in the Program area (Chino area in 1920).
Birds	1, 2, 3, 4, 5	tricolored blackbird /Agelaius tricolor	None / Threatened	Highly colonial species, most numerous in Central Valley & vicinity. Largely endemic to California. Requires open water, protected nesting substrate, and foraging area with insect prey within a few km of the colony.	Occurrence potential for this species is medium to high, particularly along the Santa Ana River corridor along the southern portion of the Program area. Individuals have been recorded in the area most recently between 2009 - 2015.
Birds	1, 2, 3, 4, 5	western yellow-billed cuckoo /Coccyzus americanus occidentalis	Threatened / Endangered	Riparian forest nester, along the broad, lower flood-bottoms of larger river systems. Nests in riparian jungles of willow, often mixed with cottonwoods, with lower story of blackberry, nettles, or wild grape. Critical habitat extends along the southern portion of the STUDY AREA.	Occurrence potential for this species is low due to presumed low population numbers and the only one recent observation in the Study Area in 2001 along the Santa Ana River. This species could inhabit areas with willow or cottonwood riparian areas on the edges of the STUDY AREA. Critical habitat overlaps with the southern portions of the Program area.

Taxonomic Group	Management Zone with Potential to Occur	Common Name / Scientific Name	Status Federal / State	Typical Habitat	Occurrence Potential
Birds	1, 2, 5	white-tailed kite /Elanus leucurus	None / None	Rolling foothills and valley margins with scattered oaks & river bottomlands or marshes next to deciduous woodland. Open grasslands, meadows, or marshes for foraging close to isolated, dense-topped trees for nesting and perching.	Occurrence potential for this species is medium to high, particularly along the southwestern boundary of the Program area where more valley marginal habitat and deciduous forest is present. Individuals have been recorded in the area most recently in 2009.
Birds	1, 2, 3, 4, 5	yellow rail /Coturnicops noveboracensis	None / SSC	Summer resident in eastern Sierra Nevada in Mono County. Freshwater marshlands.	Occurrence potential is low due to lack of recent recorded observations (last observed in the area in 1914). The most likely area of potential occurrence is limited to the marshland in the southern portion of the Program area.
Birds	1, 2, 3, 4, 5	yellow warbler /Setophaga petechia	None / SSC	Riparian plant associations in close proximity to water. Also nests in montane shrubbery in open conifer forests in Cascades and Sierra Nevada. Frequently found nesting and foraging in willow shrubs and thickets, and in other riparian plants including cottonwoods, sycamores, ash, and alders.	Occurrence potential for this species is medium to high, particularly along the Santa Ana River corridor / Prado Basin, along the southern portion of the Program area. Individuals have been recorded in this area most recently between 2016.
Birds	1, 2, 3, 4, 5	yellow-breasted chat /Icteria virens	None / SSC	Summer resident; inhabits riparian thickets of willow and other brushy tangles near watercourses. Nests in low, dense riparian, consisting of willow, blackberry, wild grape; forages and nests within 10 ft of ground.	Occurrence potential for this species is medium to high, particularly along the Santa Ana River corridor / Prado Basin, along the southern portion of the Program area. Individuals have been recorded in this area most recently between 2015.
Fish	1, 2, 3, 4, 5	arroyo chub /Gila orcuttii	None / None	Native to streams from Malibu Creek to San Luis Rey River basin. Introduced into streams in Santa Clara, Ventura, Santa Ynez, Mojave & San Diego river basins. Slow water stream sections with mud or sand bottoms. Feeds	Occurrence potential is medium. Suitable habitat exists in the Santa Ana River and Chino Creek. The most recent occurrence is found outside of the Study Area in Covina, CA, 2013. All other

Taxonomic Group	Management Zone with Potential to Occur	Common Name / Scientific Name	Status Federal / State	Typical Habitat	Occurrence Potential
				heavily on aquatic vegetation and associated invertebrates.	occurrences were in the late 1990's and early 2000's.
Fish	2, 3, 4, 5	Santa Ana speckled dace /Rhinichthys osculus ssp. 3	None / None	Headwaters of the Santa Ana and San Gabriel rivers. May be extirpated from the Los Angeles River system. Requires permanent flowing streams with summer water temps of 17-20 C. Usually inhabits shallow cobble and gravel riffles.	Suitable habitat exists in the Santa Ana River. The only recent occurrence is found inside of the Study Area along the Santa Ana River in the Hidden Valley Wildlife Area.
Fish	1, 2, 3, 4, 5	Santa Ana sucker /Catostomus santaanae	Threatened / None	Endemic to Los Angeles Basin south coastal streams. Habitat generalists, but prefer sand-rubble-boulder bottoms, cool, clear water, and algae.	Occurrence potential is medium to high. Occurrences observed from 2002 through 2011 in the Santa Ana River and Chino Creek.
Fish	1, 2, 3, 4, 5	steelhead - southern California DPS /Oncorhynchus mykiss irideus pop. 10	Endangered / None	Federal listing refers to populations from Santa Maria River south to southern extent of range (San Mateo Creek in San Diego County). Southern steelhead likely have greater physiological tolerances to warmer water and more variable conditions.	Occurrence potential is low in the Program area and no known occurrences have been recently recorded in the Santa Ana River.
Insects	1, 2, 3, 4, 5	Crotch bumble bee /Bombus crotchii	None / Candidate Endangered	Coastal California east to the Sierra-Cascade crest and south into Mexico. Food plant genera include Antirrhinum, Phacelia, Clarkia, Dendromecon, Eschscholzia, and Eriogonum.	No recent observation data in the project area. Low occurrence potential.
Insects	1, 2, 3, 4	Delhi Sands flower-loving fly /Rhaphiomidas terminatus abdominalis	Endangered / None	Found only in areas of the Delhi Sands formation in southwestern San Bernardino & northwestern Riverside counties. Requires fine, sandy soils, often with wholly or partly	Occurrence potential low in disturbed areas. The last known observance of this species was in 2010. Presumed extant is in the northeast portions of MZ's 2, 3, and 4.

Taxonomic Group	Management Zone with Potential to Occur	Common Name / Scientific Name	Status Federal / State	Typical Habitat	Occurrence Potential
				consolidated dunes & sparse vegetation. Oviposition req. shade.	
Insects	2, 3, 4	greenest tiger beetle /Cicindela tranquebarica viridissima	None / None	Inhabits the woodlands adjacent to the Santa Ana River basin. Usually found in open spots between trees.	Low occurrence potential. This species was last observed in the area in 1987 in the eastern portion of MZ 4 along the Santa Ana River corridor.
Insects	4, 5	quino checkerspot butterfly /Euphydryas editha quino	Endangered / None	Sunny openings within chaparral & coastal sage shrublands in parts of Riverside & San Diego counties. Hills and mesas near the coast. Need high densities of food plants Plantago erecta, P. insularis, and Orthocarpus purpurescens.	Low potential for occurrence. Occurs primarily outside the immediate project vicinity.
Mammals	1	American badger /Taxidea taxus	None / SSC	Most abundant in drier open stages of most shrub, forest, and herbaceous habitats, with friable soils. Needs sufficient food, friable soils and open, uncultivated ground. Preys on burrowing rodents. Digs burrows.	Low potential to occur in majority of the project area. Higher potential to occur where undeveloped land just outside project boundaries exists.
Mammals	1, 2	big free-tailed bat /Nyctinomops macrotis	None / SSC	Low-lying arid areas in Southern California. Need high cliffs or rocky outcrops for roosting sites. Feeds principally on large moths.	Potential to occur on the Study Area is low to medium, with higher potential to occur along the montane area west of MZ 1 and 2.
Mammals	1, 2	desert bighorn sheep /Ovis canadensis nelsoni	None / None	Widely distributed from the White Mtns in Mono Co. to the Chocolate Mts in Imperial Co. Open, rocky, steep areas with available water and herbaceous forage.	Low potential for occurrence. This species will remain outside of urban areas, possibly descending hills to access water for drinking, although this will be temporary and the sheep will avoid human activity.

Taxonomic Group	Management Zone with Potential to Occur	Common Name / Scientific Name	Status Federal / State	Typical Habitat	Occurrence Potential
Mammals	1	hoary bat /Lasiurus cinereus	None / None	Prefers open habitats or habitat mosaics, with access to trees for cover and open areas or habitat edges for feeding. Roosts in dense foliage of medium to large trees. Feeds primarily on moths. Requires water.	There is low potential for occurrence, although some may be found along habitat edges where water and large trees exist along the northern fringe of MZ 1.
Mammals	1, 2, 3, 4	Los Angeles pocket mouse /Perognathus longimembris brevinasus	None / SSC	Lower elevation grasslands and coastal sage communities in and around the Los Angeles Basin. Open ground with fine, sandy soils. May not dig extensive burrows, hiding under weeds and dead leaves instead.	Low to medium occurrence potential. The most recent observations have been in 2017 along Cajon Wash. No recently observed occurrence within the 4 Management Zones.
Mammals	1, 2, 3, 4	northwestern San Diego pocket mouse /Chaetodipus fallax fallax	None / SSC	Coastal scrub, chaparral, grasslands, sagebrush, etc. in western San Diego County. Sandy, herbaceous areas, usually in association with rocks or coarse gravel.	Low occurrence potential due to lack of specific habitat requirements.
Mammals	1, 2	pallid bat /Antrozous pallidus	None / None	Deserts, grasslands, shrublands, woodlands and forests. Most common in open, dry habitats with rocky areas for roosting. Roosts must protect bats from high temperatures. Very sensitive to disturbance of roosting sites.	Low occurrence potential. Suitable habitat exist in some rocky areas and scrub habitat, although no observations have been made since the 1950's in the project area.
Mammals	2, 3	pallid San Diego pocket mouse /Chaetodipus fallax pallidus	None / SSC	Desert border areas in eastern San Diego County in desert wash, desert scrub, desert succulent scrub, pinyon-juniper, etc. Sandy, herbaceous areas, usually in association with rocks or coarse gravel.	Low occurrence potential due to lack of specific habitat requirements.
Mammals	1, 2, 3, 4, 5	pocketed free-tailed bat /Nyctinomops femorosaccus	None / SSC	Variety of arid areas in Southern California; pine-juniper woodlands, desert scrub, palm oasis, desert wash, desert riparian, etc. Rocky areas with high cliffs.	Low potential for occurrence in the project area. Some of this species was observed in habitat outside the project area along the Santa Ana River corridor in the mid-1980's.

Taxonomic Group	Management Zone with Potential to Occur	Common Name / Scientific Name	Status Federal / State	Typical Habitat	Occurrence Potential
Mammals	1, 2, 3, 4, 5	San Bernardino kangaroo rat /Dipodomys merriami parvus	Endangered / Candidate Endangered	Alluvial scrub vegetation on sandy loam substrates characteristic of alluvial fans and flood plains. Needs early to intermediate seral stages.	There is a low potential for occurrence of this species. It is possibly extirpated and has not been observed recently in the project area.
Mammals	2, 3, 4, 5	San Diego black-tailed jackrabbit /Lepus californicus bennettii	None / SSC	Intermediate canopy stages of shrub habitats & open shrub / herbaceous & tree / herbaceous edges. Coastal sage scrub habitats in Southern California.	There is low potential for occurrence, although observations as recently as the late 1990's have been made of this species in Jurupa Valley up to Fontana.
Mammals	1, 2, 3, 4	San Diego desert woodrat /Neotoma lepida intermedia	None / SSC	Coastal scrub of Southern California from San Diego County to San Luis Obispo County. Moderate to dense canopies preferred. They are particularly abundant in rock outcrops, rocky cliffs, and slopes.	Medium potential to occur, based on recent observations, 2010.
Mammals	1, 2, 3, 4, 5	Stephens' kangaroo rat /Dipodomys stephensi	Endangered / Threatened	Primarily annual & perennial grasslands, but also occurs in coastal scrub & sagebrush with sparse canopy cover. Prefers buckwheat, chamise, brome grass and filaree. Will burrow into firm soil.	Low occurrence potential due. Possibly extirpated.
Mammals	1, 2, 3, 4, 5	western mastiff bat /Eumops perotis californicus	None / None	Many open, semi-arid to arid habitats, including conifer & deciduous woodlands, coastal scrub, grasslands, chaparral, etc. Roosts in crevices in cliff faces, high buildings, trees and tunnels.	Medium potential to occur in the project area in all MZ's with suitable habitat (crevices of buildings). Their ability to roost in manmade structures, makes this essential for detection before initiating a new project.
Mammals	1, 2, 3, 4, 5	western yellow bat /Lasiurus xanthinus	None / SSC	Found in valley foothill riparian, desert riparian, desert wash, and palm oasis habitats. Roosts in trees, particularly palms. Forages over water and among trees.	Medium potential to occur in the project area in all MZ's with suitable habitat (desertic vegetation such as palm trees).

Taxonomic Group	Management Zone with Potential to Occur	Common Name / Scientific Name	Status Federal / State	Typical Habitat	Occurrence Potential
Plants	1, 2, 3, 4	aparejo grass /Muhlenbergia utilis	None / None	Meadows and seeps, marshes and swamps, chaparral, coastal scrub, cismontane woodland. Sometimes alkaline, sometimes serpentinite. 25-2325 m.	Low to medium potential to occur in the southern portion of the project site where more chaparral and marshland exist.. CRPR Plant Rank 2B.2
Plants	1, 2, 3, 4, 5	Brand's star phacelia /Phacelia stellaris	None / None	Coastal scrub, coastal dunes. Open areas. 3-370 m. (CNPS 2019)	Potential to occur in the Study Area is low to medium and only in open pockets of scrub shrub habitat.. CRPR Plant Rank 1B.1
Plants	1, 2, 5	Braunton's milk-vetch /Astragalus brauntonii	Endangered / None	Chaparral, coastal scrub, valley and foothill grassland. Recent burns or disturbed areas; usually on sandstone with carbonate layers. Soil specialist; requires shallow soils to defeat pocket gophers and open areas, preferably on hilltops, saddles or bowls between hills. 3-640 m. (CNPS 2011)	Potential to occur in the Study Area is low due to specific shallow soil type necessary for successful growth and avoidance of burrowing mammals. Observed occurrence was recorded southwest of the Program area in southern cottonwood willow riparian forest in 2010. CRPR Plant Rank 1B.1
Plants	1, 2, 3, 4	California saw-grass /Cladium californicum	None / None	Meadows and seeps, marshes and swamps (alkaline or freshwater). Freshwater or alkaline moist habitats. -20-2135 m. (CNPS 2017)	Occurrence potential medium in the southern portions of the Study Area. CRPR Plant Rank 2B.2
Plants	1, 2, 3, 4, 5	Chaparral sand-verbena /Abronia villosa var. aurita	None / None	Chaparral, coastal scrub, desert dunes. Sandy areas. -60-1570 m. (CNPS 2011)	Low potential to occur. CRPR Plant Rank 1B.1
Plants	4, 5	Coulter's goldfields /Lasthenia glabrata ssp. coulteri	None / None	Coastal salt marshes, playas, vernal pools. Usually found on alkaline soils in playas, sinks, and grasslands. 1-1375 m. (CNPS 2014)	Low potential to occur. CRPR Plant Rank 1B.1

Taxonomic Group	Management Zone with Potential to Occur	Common Name / Scientific Name	Status Federal / State	Typical Habitat	Occurrence Potential
Plants	1, 2, 5	Coulter's saltbush /Atriplex coulteri	None / None	Coastal bluff scrub, coastal dunes, coastal scrub, valley and foothill grassland. Ocean bluffs, ridgetops, as well as alkaline low places. Alkaline or clay soils. 2-460 m. (CNPS 2010)	Low potential to occur. CRPR Plant Rank 1B.2
Plants	1	Greata's aster /Symphyotrichum greatae	None / None	Chaparral, cismontane woodland, broadleafed upland forest, lower montane coniferous forest, riparian woodland. Mesic canyons. 335-2015 m. (CNPS 2010)	Low potential to occur. CRPR Plant Rank 1B.3
Plants	2	grey-leaved violet /Viola pinetorum ssp. grisea	None / None	Subalpine coniferous forest, upper montane coniferous forest, meadows and seeps. Dry mountain peaks and slopes. 1580-3700 m. (CNPS 2017)	Low potential to occur. CRPR Plant Rank 1B.2
Plants	1	Hall's monardella /Monardella macrantha ssp. hallii	None / None	Broadleafed upland forest, chaparral, lower montane coniferous forest, cismontane woodland, valley and foothill grassland. Dry slopes and ridges in openings. 700-1800 m. (CNPS 2010)	Low potential to occur. CRPR Plant Rank 1B.3
Plants	1, 2, 5	intermediate mariposa-lily /Calochortus weedii var. intermedius	None / None	Coastal scrub, chaparral, valley and foothill grassland. Dry, rocky calcareous slopes and rock outcrops. 60-1575 m. (CNPS 2010)	Low potential to occur. CRPR Plant Rank 1B.2
Plants	2	Johnston's buckwheat /Eriogonum microthecum var. johnstonii	None / None	Subalpine coniferous forest, upper montane coniferous forest. Slopes and ridges on granite or limestone. 1795-2865 m (CNPS 2019)	Low potential to occur. CRPR Plant Rank 1B.3

Taxonomic Group	Management Zone with Potential to Occur	Common Name / Scientific Name	Status Federal / State	Typical Habitat	Occurrence Potential
Plants	1, 2, 5	Jokerst's monardella /Monardella australis ssp. jokerstii	None / None	Lower montane coniferous forest, chapparal. Steep scree or talus slopes between breccia. Secondary alluvial benches along drainages and washes. 210-1740 m. (CNPS 2014)	Low potential to occur. CRPR Plant Rank 1B.1
Plants	1, 2, 3	lemon lily /Lilium parryi	None / None	Lower montane coniferous forest, meadows and seeps, riparian forest, upper montane coniferous forest. Wet, mountainous terrain; generally in forested areas; on shady edges of streams, in open boggy meadows & seeps. 625-2930 m. (CNPS 2010)	Low potential to occur. CRPR Plant Rank 1B.2
Plants	1, 2, 5	lucky morning-glory /Calystegia felix	None / None	Meadows and seeps, riparian scrub. Sometimes alkaline, alluvial. 9-205 m. (CNPS 2017)	Low potential to occur. CRPR Plant Rank 1B.1
Plants	1, 2, 3, 4, 5	many-stemmed dudleya /Dudleya multicaulis	None / None	Chaparral, coastal scrub, valley and foothill grassland. In heavy, often clayey soils or grassy slopes. 1-910 m. (CNPS 2010)	Low potential to occur. CRPR Plant Rank 1B.2
Plants	2, 3, 4	marsh sandwort /Arenaria paludicola	Endangered / Endangered	Marshes and swamps. Growing up through dense mats of Typha, Juncus, Scirpus, etc. in freshwater marsh. Sandy soil. 3-170 m.	Occurrence potential is low. This species seems to be all but extirpated and no recently recorded individuals have been detected in the Program area. CRPR Plant Rank 1B.1
Plants	1, 2, 3, 4	mesa horkelia /Horkelia cuneata var. puberula	None / None	Chaparral, cismontane woodland, coastal scrub. Sandy or gravelly sites. 15-1645 m. (CNPS 2012)	Low potential to occur. CRPR Plant Rank 1B.1
Plants	1, 2	Nevin's barberry /Berberis nevinii	Endangered / Endangered	Chaparral, cismontane woodland, coastal scrub, riparian scrub. On steep, N-facing slopes or in low grade sandy washes. 90-1590 m. This species is also a California Native Plant	Occurrence potential for this species is low due to historical disturbance in the Study Area. As recently as 2005, some of this species has been detected in the Study Area although this appears

Taxonomic Group	Management Zone with Potential to Occur	Common Name / Scientific Name	Status Federal / State	Typical Habitat	Occurrence Potential
				Society S.1 critically imperiled species. (CNPS 2015)	to be isolated to the north outside of the Program area. CRPR Plant Rank 1B.1
Plants	2, 3, 4	Parish's bush-mallow /Malacothamnus parishii	None / None	Chaparral, coastal sage scrub. In a wash. 305-455 m.	Low potential to occur. CRPR Plant Rank 1A
Plants	2, 3, 4	Parish's desert-thorn /Lycium parishii	None / None	Coastal scrub, Sonoran desert scrub. -3-570 m.	Low potential to occur. CRPR Plant Rank 2B.3
Plants	1, 2, 3, 4	Parry's spineflower /Chorizanthe parryi var. parryi	None / None	Coastal scrub, chaparral, cismontane woodland, valley and foothill grassland. Dry slopes and flats; sometimes at interface of 2 vegetation types, such as chaparral and oak woodland. Dry, sandy soils. 90-1220 m. (CNPS 2010)	Low potential to occur. CRPR Plant Rank 1B.1
Plants	2	Peirson's spring beauty /Claytonia peirsonii ssp. peirsonii	None / None	Upper montane coniferous forest, subalpine coniferous forest. Granitic scree slopes, often with a sandy or fine soil component and granitic cobbles. 1510-2745 m.	Low potential to occur. CRPR Plant Rank 1B.2
Plants	2, 3, 4	prairie wedge grass /Sphenopholis obtusata	None / None	Cismontane woodland, meadows and seeps. Open moist sites, along rivers and springs, alkaline desert seeps. 15-2625 m. (CNPS 2013)	Low potential to occur. CRPR Plant Rank 2B.2
Plants	2, 3, 4	Pringle's monardella /Monardella pringlei	None / None	Coastal scrub. Sandy hills. 300-400 m. (CNPS 2019)	Low potential to occur. CRPR Plant Rank 1A

Taxonomic Group	Management Zone with Potential to Occur	Common Name / Scientific Name	Status Federal / State	Typical Habitat	Occurrence Potential
Plants	1, 2, 3, 4	prostrate vernal pool navarretia /Navarretia prostrata	None / None	Coastal scrub, valley and foothill grassland, vernal pools, meadows and seeps. Alkaline soils in grassland, or in vernal pools. Mesic, alkaline sites. 3-1235 m. (CNPS 2015)	Low potential to occur. CRPR Plant Rank 1B.2
Plants	1, 2	rigid fringepod /Thysanocarpus rigidus	None / None	Pinyon and juniper woodland. Dry, rocky slopes and ridges of oak and pine woodland in arid mountain ranges. 425-2165 m. (CNPS 2019)	Low potential to occur. CRPR Plant Rank 1B.2
Plants	1	Rock Creek broomrape /Orobanche valida ssp. valida	None / None	Chaparral, pinyon and juniper woodland. On slopes of loose decomposed granite; parasitic on various chaparral shrubs. 975-1985 m. (CNPS 2011)	Low potential to occur. CRPR Plant Rank 1B.2
Plants	2, 3, 4	salt marsh bird's-beak /Chloropyron maritimum ssp. maritimum	Endangered / Endangered	Marshes and swamps, coastal dunes. Limited to the higher zones of salt marsh habitat. 0-10 m.	This is a possibly extirpated species with no recently recorded individual plants in the Study Area. Occurrence potential low. CRPR Plant Rank 1B.2
Plants	1, 2, 5	salt spring checkerbloom /Sidalcea neomexicana	None / None	Playas, chaparral, coastal scrub, lower montane coniferous forest, Mojavean desert scrub. Alkali springs and marshes. 3-2380 m. (CNPS 2013)	Low potential to occur. CRPR Plant Rank 2B.2
Plants	1, 2, 3, 4, 5	San Bernardino aster /Symphyotrichum defoliatum	None / None	Meadows and seeps, cismontane woodland, coastal scrub, lower montane coniferous forest, marshes and swamps, valley and foothill grassland. Vernally mesic grassland or near ditches, streams and springs; disturbed areas. 3-2045 m. (CNPS 2018)	Low potential to occur. CRPR Plant Rank 1B.2

Taxonomic Group	Management Zone with Potential to Occur	Common Name / Scientific Name	Status Federal / State	Typical Habitat	Occurrence Potential
Plants	4, 5	San Diego ambrosia /Ambrosia pumila	Endangered / None	Chaparral, coastal scrub, valley and foothill grassland. Sandy loam or clay soil; sometimes alkaline. In valleys; persists where disturbance has been superficial. Sometimes on margins or near vernal pools. 3-580 m. (CNPS 2011)	This is a presumed extirpated species with no recently recorded individual plants in the Study Area. Occurrence potential low. CRPR Plant Rank 1B.1
Plants	1, 2	San Gabriel linanthus /Linanthus concinnus	None / None	Lower montane coniferous forest, upper montane coniferous forest, chaparral. Dry rocky slopes, often in Jeffrey pine/canyon oak forest. 1310-2560 m. (CNPS 2012)	Low potential to occur. CRPR Plant Rank 1B.2
Plants	1, 2	San Gabriel manzanita /Arctostaphylos glandulosa ssp. gabrielensis	None / None	Chaparral. Rocky outcrops; can be dominant shrub where it occurs. 960-2015 m. (CNPS 201)	Low potential to occur. CRPR Plant Rank 1B.2
Plants	2	Sanford's arrowhead /Sagittaria sanfordii	None / None	Marshes and swamps. In standing or slow-moving freshwater ponds, marshes, and ditches. 0-605 m. (CNPS 2012)	Low potential to occur. CRPR Plant Rank 1B.2
Plants	1, 2, 3, 4, 5	Santa Ana River woollystar /Eriastrum densifolium ssp. sanctorum	Endangered / Endangered	Coastal scrub, chaparral. In sandy soils on river floodplains or terraced fluvial deposits. 180-705 m. This species is also a California Native Plant Society S.1 critically imperiled species. (CNPS 2016)	Occurrence potential for this species is low to medium due to historical disturbance in the Study Area, although some individuals have been recorded as recently as 2014 in the eastern portion of the Study Area. CRPR Plant Rank 1B.1
Plants	2, 3	short-joint beavertail /Opuntia basilaris var. brachyclada	None / None	Chaparral, Joshua tree woodland, Mojavean desert scrub, pinyon and juniper woodland. Sandy soil or coarse, granitic loam. 425-2015 m. (CNPS 2011)	Low potential to occur. CRPR Plant Rank 1B.2

Taxonomic Group	Management Zone with Potential to Occur	Common Name / Scientific Name	Status Federal / State	Typical Habitat	Occurrence Potential
Plants	2, 3	singlewhorl burrobrush /Ambrosia monogyra	None / None	Chaparral, Sonoran desert scrub. Sandy soils. 5-475 m. (CNPS 2013)	Low potential to occur. CRPR Plant Rank 2B.2
Plants	1	slender mariposa-lily /Calochortus clavatus var. gracilis	None / None	Chaparral, coastal scrub, valley and foothill grassland. Shaded foothill canyons; often on grassy slopes within other habitat. 210-1815 m. (CNPS 2015)	Low potential to occur. CRPR Plant Rank 1B.2
Plants	1, 2, 3	slender-horned spineflower /Dodecahema leptoceras	Endangered / Endangered	Chaparral, cismontane woodland, coastal scrub (alluvial fan sage scrub). Flood deposited terraces and washes; associates include Encelia, Dalea, Lepidospartum, etc. Sandy soils. 200-765 m. This species is also a California Native Plant Society S.1 critically imperiled species. Many historical examples have been lost by development and stream channelization. (CNPS 2010)	Occurrence potential for this species is low due to historical disturbance in Study Area. Individual plants have been recorded as recently as 2013 in Cajon Wash north of the Program area. CRPR Plant Rank 1B.1
Plants	1, 2, 3, 4, 5	smooth tarplant /Centromadia pungens ssp. laevis	None / None	Valley and foothill grassland, chenopod scrub, meadows and seeps, playas, riparian woodland. Alkali meadow, alkali scrub; also in disturbed places. 5-1170 m. Many historical occurences may be extirpated. Frequently confused with other Centromadia species such as C. parryi ssp. australis in ORA, LAX, and SDG cos., and C. pungens ssp. Pungens. (CNPS 2016)	Low potential to occur. CRPR Plant Rank 1B.1
Plants	1, 2, 3, 5	Southern California black walnut /Juglans californica	None / None	Chaparral, Cismontane woodland, Coastal scrub, Riparian woodland; alluvial. (CNPS 2015)	Occurrence potential of this fragmented species is low due to its historic fragementation, possible hybridization with horticultural varieties of walnut.. CRPR Plant Rank 4.2

Taxonomic Group	Management Zone with Potential to Occur	Common Name / Scientific Name	Status Federal / State	Typical Habitat	Occurrence Potential
Plants	1	Watson's amaranth /Amaranthus watsonii	None / None	Mojavean desert scrub, Sonoran desert scrub. (CNPS 2017)	Occurence potential is low. One occurrence northwest of the STUDY AREAon foothills of Mt. Baldy. (Calflora 2020).. CRPR Plant Rank 4.3
Plants	1, 2, 3, 4, 5	white rabbit-tobacco /Pseudognaphalium leucocephalum	None / None	Riparian woodland, cismontane woodland, coastal scrub, chaparral. Sandy, gravelly sites. 35-515 m. (CNPS 2016)	Low potential to occur. CRPR Plant Rank 2B.2
Plants	2, 3	white-bracted spineflower /Chorizanthe xanti var. leucotheca	None / None	Mojavean desert scrub, pinyon and juniper woodland, coastal scrub (alluvial fans). Sandy or gravelly places. 365-1830 m. (CNPS 2010)	Low potential to occur. CRPR Plant Rank 1B.2
Plants	1, 2	woolly mountain-parsley /Oreonana vestita	None / None	Subalpine coniferous forest, upper montane coniferous forest, lower montane coniferous forest. High ridges; on scree, talus, or gravel. 800-3370 m. (CNPS 2011)	Low potential to occur. CRPR Plant Rank 1B.3
Reptiles	1, 2, 3, 4, 5	California glossy snake /Arizona elegans occidentalis	None / SSC	Patchily distributed from the eastern portion of San Francisco Bay, southern San Joaquin Valley, and the Coast, Transverse, and Peninsular ranges, south to Baja California. Generalist reported from a range of scrub and grassland habitats, often with loose or sandy soils.	Occurrence potential is low to medium for this species in all areas of the Study Area where loose or sandy soils in scrub or grassland patches of habitat occur. The California glossy snake has adapted to a range of shrub and grassland habitats that exist to varying degree in all MZ's. The most recently recorded observations occur outside of the Program area in 2016.
Reptiles	1, 2, 3, 4, 5	coast horned lizard /Phrynosoma blainvillii	None / None	Frequents a wide variety of habitats, most common in lowlands along sandy washes with scattered low bushes. Open areas for sunning, bushes for cover, patches of loose soil for	Occurrence potential is medium, although potential is higher outside of the immediate Program area, where more undisturbed suitable habitat occurs. Recent observations have been in

Taxonomic Group	Management Zone with Potential to Occur	Common Name / Scientific Name	Status Federal / State	Typical Habitat	Occurrence Potential
				burial, and abundant supply of ants and other insects.	Santa Ana Canyon in 2005 and Cajon Canyon Creek in 2008 and 2009.
Reptiles	1, 4, 5	coastal whiptail /Aspidoscelis tigris stejnegeri	None / SSC	Found in deserts and semi-arid areas with sparse vegetation and open areas. Also found in woodland & riparian areas. Ground may be firm soil, sandy, or rocky.	Occurrence potential is low to medium in the riparian areas of the Program area, although there have been no recorded observations past 2006 in the Study Area.
Reptiles	1, 2, 3, 4, 5	orange-throated whiptail /Aspidoscelis hyperythra	None / None	Inhabits low-elevation coastal scrub, chaparral, and valley-foothill hardwood habitats. Prefers washes and other sandy areas with patches of brush and rocks. Perennial plants necessary for its major food: termites.	Occurrence potential is low to medium in the scrub brush and chaparral areas of the Program area. Recently recorded observations in 2010 place this species most likely in the Mockingbird Canyon area in the southern portion of the Program area.
Reptiles	1, 2, 3, 4, 5	red-diamond rattlesnake /Crotalus ruber	None / SSC	Chaparral, woodland, grassland, & desert areas from coastal San Diego County to the eastern slopes of the mountains. Occurs in rocky areas and dense vegetation. Needs rodent burrows, cracks in rocks or surface cover objects.	Occurrence potential is low to medium in the central Program area, and more likely to occur in the rocky, densely vegetated areas, in particular west and outside of MZ-1 in the Puente Hills, where the species was most recently observed in 2017.
Reptiles	2, 3, 4, 5	San Diego banded gecko /Coleonyx variegatus abbotti	None / SSC	Coastal & cismontane Southern California. Found in granite or rocky outcrops in coastal scrub and chaparral habitats.	Occurrence potential is low in the central Program area, and more likely to occur in the rocky, chaparral habitat areas, in particular in the eastern portion of MZ-5 and west and outside of MZ-1 in the Puente Hills, where the species was most recently observed in 2003.

Taxonomic Group	Management Zone with Potential to Occur	Common Name / Scientific Name	Status Federal / State	Typical Habitat	Occurrence Potential
Reptiles	1, 2, 3, 4, 5	southern California legless lizard /Anniella stebbinsi	None / SSC	Generally south of the Transverse Range, extending to northwestern Baja California. Occurs in sandy or loose loamy soils under sparse vegetation. Disjunct populations in the Tehachapi and Piute Mountains in Kern County. Variety of habitats; generally in moist, loose soil. They prefer soils with a high moisture content.	Occurrence potential is medium to high. Several individuals have been observed as recently as 2018 throughout the Study Area. This species has been observed in semi-urbanized areas and can be expected to survive in these areas and adapt to development, while remaining on the fringe habitat that exists in the Program area.
Reptiles	1, 2	two-striped gartersnake /Thamnophis hammondii	None / None	Coastal California from vicinity of Salinas to northwest Baja California. From sea to about 7,000 ft elevation. Highly aquatic, found in or near permanent fresh water. Often along streams with rocky beds and riparian growth.	Low Occurrence potential in MZ's 2, 3, 4 and 5. Slightly higher potential in the northwest fringe of MZ 1, due to more suitable habitat requirements.
Reptiles	1, 2, 3, 4, 5	western pond turtle /Emys marmorata	None / SSC	A thoroughly aquatic turtle of ponds, marshes, rivers, streams and irrigation ditches, usually with aquatic vegetation, below 6000 ft elevation. Needs basking sites and suitable (sandy banks or grassy open fields) upland habitat up to 0.5 km from water for egg-laying.	Occurrence potential is medium. As recently as 2011, western pond turtles have been observed in the Santa Ana River corridor within MZ 5.

Chapter 4. Discussion of Impacts and Mitigation

4.1 Discussion of Project Impacts

The construction and operation of the infrastructure required to support the OBMPU may result in direct impacts and indirect impacts on special-status wildlife species. The extent and nature of impacts on special-status wildlife species varies depending on the species under consideration, their range, and the type and quality of suitable habitats present.

In general, permanent and temporary direct impacts on special-status wildlife species during construction of the future infrastructure improvements include mortality or injury, and disturbances to suitable habitats for special-status wildlife species, including disruption of wetland and streambeds; water pollution; and reptile, bird, and mammal burrow or nest disturbance. These habitat disturbances within the program area, or at specific new or modified facilities, could lead to the permanent or temporary abandonment of these habitats by special-status species, a disruption in the life cycle of these species, or mortality or injury of these species. Because it is difficult to determine the number or extent of these kinds of impacts, direct impacts on special-status wildlife species will be addressed in subsequent environmental review once a specific component of the OBMPU has been defined for design and implementation.

Permanent and temporary indirect impacts on special-status wildlife species would occur through construction or maintenance of the program in a number of ways depending on the species and type of disturbance. Potential indirect impacts include erosion, soil compaction, increased siltation and sedimentation, fractures in the hardpan soils or rock outcroppings, alteration of jurisdictional water hydrology, dust aerosolization, host plant stress, destruction of native vegetation, habitat fragmentation, and noise and light pollution. These indirect impacts could lead to the disturbance of special-status wildlife species such as a temporary shift in foraging patterns or territories, refugia abandonment, increased predation, decreased reproductive success, and reduced population viability. Because it is difficult to quantify and measure these kinds of impacts, indirect impacts on special-status wildlife species are described qualitatively and will be quantitatively addressed in subsequent environmental documentation once specific aspects of the program is proposed for implementation and designed.

Construction of any of the program alternatives should only result in mostly minimal impacts on special-status wildlife species, because only a limited amount of marginal habitat for special-status wildlife species would be impacted by this activity. All facilities would impact only barren, urban, or agricultural areas and thus construction would potentially impact only the special-status wildlife species that use mostly urban area (e.g., special-status bird species, special-status mammal species, special-status bat species or species present in wetland or streambed habitats).

During ongoing operations or maintenance activities requiring ground disturbance, clearing, or grubbing that could cause erosion and sedimentation or that could indirectly affect the hydrology of nearby jurisdictional waters and the species that depend on these resources. Chemical runoff from trucks or equipment within the future OBMPU facility rights-of-way could indirectly degrade suitable habitat used by these species that are present adjacent to or within the management zone boundaries. If operational maintenance requires weed abatement activities, such as the use of herbicides, these activities could also contribute to chemical runoff and pollution of adjacent suitable habitats. However, maintenance activities that have potential impacts on special-status wildlife species are limited to the program right-of-way areas that are currently in service or that will be added to normal program operations and maintenance through separate design, environmental review and construction of such facilities at a later date.

Potential impacts on jurisdictional waters, special-status plant communities, protected trees, special-status plant, and wildlife species (including critical habitat) will be analyzed for each facility as site-specific design has been established Once a particular facility APE is established, the following steps will be taken during a detailed second-tier evaluation to assure resource impacts are quantified, and site specific measures are identified. Where none of the biological resource impacts below will occur, no further biological resource impact analysis may be necessary within a second-tier analysis. Further, where potentially significant impacts may occur, but specific mitigation outlined below can reduce such impacts to a less than significant level, future documentation may rely upon the procedures outlined in Sections 15162 and 15168 of the

State CEQA Guidelines to determine the required level of CEQA documentation for future infrastructure projects. OBMPU program proponents will perform these analyses at the time individual infrastructure improvements are considered for funding.

- Each resource will be evaluated for its presence or absence, and for the presence of habitat that could support the resource or provide habitat for the resource. Suitable habitat was determined based on background review and identification of species-specific life-history requirements.
- Potential impacts on special-status wildlife species will be determined using a habitat-based approach where the presence of the species was assumed in suitable habitat. Habitats in the project footprint and vicinity were determined through a combination of background review, habitat mapping during field surveys, and aerial photograph interpretation.
- Potential impacts on designated critical habitat will be based on the location of the critical habitat relative to the project footprint and the presence of primary constituent elements (PCEs) associated with the critical habitat designation.

In determining the potential direct and indirect impacts associated with construction and operation impacts on biological resources, a number of assumptions and limitations are identified:

- Construction and operation impacts will be considered temporary if they can be fully restored to pre-disturbance conditions following construction. Temporary impacts would include construction staging areas, construction laydown areas, relocation of underground utilities, and other work space that would not be occupied by permanent facilities during project operation.
- Impacts will be considered permanent when they have lasting effects beyond the project construction period, or cannot be fully restored following construction. Permanent impacts would include new right-of-way for new or expanded facility or water conveyance systems, road crossings, electrical substations, maintenance and operations facilities, and monitoring stations.
- Certain jurisdictional waters types (wetlands) are especially sensitive to disturbance; therefore, impacts on these features will be considered permanent where these features cannot be restored to their pre-project condition due to the permanent loss by new infrastructure.

4.2 Mitigation Measures

Because the individual projects implemented throughout the Program could result in potentially significant impacts on biological resources, mitigation measures were designed to avoid or reduce the impacts on these resources. The mitigation strategy includes avoidance of impacts on biological resources to the extent possible: field verification of sensitive resources and filling data gaps; the formulation of alternative designs (minimization and avoidance); limiting modifications to access and egress points to facilities (minimization); designing cuts and fills to minimize the area of disturbance; and where necessary, and compensation to offset unavoidable impacts to individual species or sensitive habitat.

The following mitigation measures are required to reduce impacts associated with future OBMPU site-specific projects to a less than significant level. Each stakeholder implementing specific project-related specific capital improvement projects shall implement the measures outlined below, as needed, when the impact being mitigated will be caused by such project.

To reduce or prevent activities that may adversely affect sensitive species, the following mitigation measures will be incorporated into any specific projects and/or contractor specifications for future project-related impacts to protect sensitive resources and habitat.

4.2-1 ***Where future project-related impacts will affect undeveloped land, site surveys shall be conducted by a qualified biologist/ecologist. If sensitive species are identified as a result of the survey for which mitigation/compensation must be provided in accordance with regulatory requirements, the following subsequent mitigation actions will be taken:***

a. The project proponent shall provide compensation for sensitive habitat acreage lost by acquiring and protecting in perpetuity (through property or mitigation bank credit acquisition) habitat for the sensitive

species at a ratio of not less than 1:1 for habitat lost. The property acquisition shall include the presence of at least one animal or plant per animal or plant lost at the development site to compensate for the loss of individual sensitive species.

b. The final mitigation may differ from the above values based on negotiations between the project proponent and USFWS and CDFW for any incidental take permits for listed species. The project proponent shall retain a copy of the incidental take permit as verification that the mitigation of significant biological resource impacts at a project site with sensitive biological resources has been accomplished.

c. Preconstruction botanical surveys for special-status plant communities and special-status plant species will be conducted. in areas that were not previously surveyed because of access or timing issues or project design changes, pre-construction surveys for special-status plant communities and special-status plant species will be conducted before the start of ground-disturbing activities during the appropriate blooming period(s) for the species.

4.2-2 Biological Resources Management Plan: During final design, a BRMP will be prepared to assemble the biological resources mitigation measures for each specific infrastructure improvement in the future. The BRMP will include terms and conditions from applicable permits and agreements and make provisions for monitoring assignments, scheduling, and responsibility. The BRMP will also discuss habitat replacement and revegetation, protection during ground-disturbing activities, performance (growth) standards, maintenance criteria, and monitoring requirements for temporary and permanent native plant community impacts. The parameters of the BRMP will be formed with the mitigation measures from the project-level EIR/EIS, including terms and conditions as applicable from the USFWS, USACE, SWRCB/RWQCB, and CDFW.

To reduce or prevent activities that may adversely affect rivers, streambeds or wetlands, the following mitigation measures will be incorporated into any specific projects and/or contractor specifications for future project-related impacts to protect sensitive resources and habitat.

4.2-3 Prior to discharge of fill or streambed alteration of jurisdictional areas, the project proponent shall obtain regulatory permits from the U.S. Army Corps of Engineers, local Regional Water Quality Control Board and the California Department of Fish and Wildlife. Any future project that must discharge fill into a channel or otherwise alter a streambed shall be minimized to the extent feasible, and any discharge of fill not avoidable shall be mitigated through compensatory mitigation. Mitigation can be provided by restoration of temporary impacts, enhancement of existing resources, or purchasing into any authorized mitigation bank or in-lieu fee program; by selecting a site of comparable acreage near the site and enhancing it with a native riparian habitat or invasive species removal in accordance with a habitat mitigation plan approved by regulatory agencies; or by acquiring sufficient compensating habitat to meet regulatory agency requirements. Typically, regulatory agencies require mitigation for jurisdictional waters without any riparian or wetland habitat to be mitigated at a 1:1 ratio. For loss of any riparian or other wetland areas, the mitigation ratio will begin at 2:1 and the ratio will rise based on the type of habitat, habitat quality, and presence of sensitive or listed plants or animals in the affected area. A Habitat Mitigation and Monitoring Proposal shall be prepared and reviewed and approved by the appropriate regulatory agencies. The project proponent will also obtain permits from the regulatory agencies (U.S. Army Corps of Engineers, Regional Water Quality Control Board, CDFW and any other applicable regulatory agency with jurisdiction over the proposed facility improvement) if any impacts to jurisdictional areas will occur. These agencies can impose greater mitigation requirements in their permits, but Caltrans will utilize the ratios outlined above as the minimum required to offset or compensate for impacts to jurisdictional waters, riparian areas or other wetlands.

4.2-4 Jurisdictional Water Preconstruction Surveys: A jurisdictional water preconstruction survey will be conducted at least six months before the start of ground-disturbing activities to identify and map all jurisdictional waters in the project footprint and if possible within a 250-foot buffer. The purpose of this survey is to confirm the extent of jurisdictional waters in areas where permission to enter was not previously granted and where aerial photograph interpretation was used to estimate the extent of these features. If possible, surveys would be performed during the spring, when plant species are in bloom and hydrological indicators are most readily

identifiable. These results would then be used to calculate impact acreages and determine the amount of compensatory mitigation required to offset the loss of wetland functions and values.

Regarding active bird nests, the following mitigation measure will be applied to this program.

4.2-5 It is illegal to "take" active bird nests of native birds, and if such nests are present at a project site, no take is allowed. To avoid an illegal take of active bird nests, any grubbing, brushing or tree removal will be conducted outside of the State identified nesting season (nesting season is approximately from February 15 through September 1 of a given calendar year). Alternatively, coordination with the CDFW to conduct nesting bird surveys will be completed, and methodology of surveys will be agreed upon. All nesting bird surveys will be conducted by a qualified biologist prior to initiation of ground disturbance to demonstrate that no bird nests will be disturbed by project construction activities.

The following mitigation can reduce the impact to burrowing owl to a less than significant level.

4.2-6 Prior to commencement of construction activity in locations that are not fully developed, protocol burrowing owl survey will be conducted using the 2012 survey protocol methodology identified in the "Staff Report on Burrowing Owl Mitigation, State of California, Natural Resources Agency, Department of Fish and Game, March 7, 2012", or the most recent CDFW survey protocol available. Protocol surveys shall be conducted by a qualified biologist to determine if any burrowing owl burrows are located within the potential area of impact. If occupied burrows may be impacted, an impact minimization plan shall be developed and approved by CDFW that will protect the burrow in place or provide for passive relocation to an alternate burrow within the vicinity but outside of the project footprint in accordance with current CDFW guidelines. Active nests must be avoided with a 250-foot buffer until all nestlings have fledged.

The following mitigation can ensure consistency with any HCP or MSHCP.

4.2-7 Prior to commencement of construction activity on a project facility within a MSHCP/HCP plan area, consistency with that plan, or take authorization through that plan, shall be obtained. Through avoidance, compensation or a comparable mitigation alternative, each project shall be shown to be consistent with a MSHCP/HCP.

Implementation of the above measures is protective of the environment. Should the regulatory agencies determine an alternative, equivalent mitigation program during acquisition of regulatory permits, such measure shall be deemed equivalent to the above measures and no additional environmental documentation shall be required to implement a measure different than outlined above. Note that if impacts cannot be mitigated or avoided in the manner outlined in the measures above, then subsequent environmental documentation would have to be prepared in accordance with procedures outlined in Section 15162 of the State CEQA Guidelines.

Implementation of the following mitigation measures will ensure that project design and site selection reduce impacts to sensitive biological resources to the extent feasible.

4.2.8 Place primary emphasis on the preservation of large, unbroken blocks of natural open space and wildlife habitat area, and protect the integrity of habitat linkages. As part of this emphasis, incorporate programs for purchase of lands, clustering of development to increase the amount of preserved open space, and assurances that the construction of facilities or infrastructure improvements meet standards identical to the environmental protection policies applicable to the specific facilities improvement.

4.2.9 Require facility designs and maintenance activities to be planned to protect habitat values and to preserve significant, viable habitat areas and habitat connection in their natural conditions.

a. Within designated habitat areas of rare, threatened or endangered species, prohibit disturbance of protected biotic resources.

b. Within riparian areas and wetlands subject to state or federal regulations, riparian woodlands, oak and walnut woodland, and habitat linkages, require that the vegetative resources which contribute to habitat carrying capacity (vegetative diversity, faunal resting sites, foraging areas, and food sources) are preserved in place or replaced so as not to result in an measurable reduction in the reproductive capacity of sensitive biotic resources.

c. Within habitats of plants listed by the CNDDB or CNPS as "special" or "of concern," require that new facilities not result in a reduction in the number of these plants, if they are present.

***4.2-10** Maximize the preservation of individual oak, sycamore and walnut trees within proposed development sites.*

***4.2-11** Require the establishment of buffer zones adjacent to areas of preserved biological resources. Such buffer zones shall be of adequate width to protect biological resources from grading and construction activities, as well as from the long-term use of adjacent lands. Permitted land modification activities with preservation and buffer areas are to be limited to those that are consistent with the maintenance of the reproductive capacity of the identified resources. The land uses and design of project facilities adjacent to a vegetative preservation area, as well as activities within the designated buffer area are not to be permitted to disturb natural drainage patterns to the point that vegetative resources receive too much or too little water to permit their ongoing health. In addition, landscape adjacent to areas of preserved biological resources shall be designed so as to avoid invasive species which could negatively impact the value of the preserved resource.*

Implementation of the following mitigation measures will ensure that project construction impacts to sensitive biological resources, including the potential effects of invasive species, are reduced to the extent feasible.

***4.2-12** Following construction activities within or adjacent to any natural area, the disturbed areas shall be revegetated using a plant mix of native plant species that are suitable for long term vegetation management at the specific site, which shall be implemented in cooperation with regulatory agencies and with oversight from a qualified biologist. The seeds mix shall be verified to contain the minimum amount of invasive plant species seeds reasonably available for the project area.*

***4.2-13** Clean Construction Equipment. During construction, equipment will be washed before entering the project footprint to reduce potential indirect impacts from inadvertent introduction of nonnative invasive plant species. Mud and plant materials will be removed from construction equipment when working in native plant communities, near special-status plant communities, or in areas where special-status plant species have been identified.*

***4.2-14** Contractor Education and Environmental Training.*

Personnel who work onsite will attend a Contractor Education and Environmental Training session. The environmental training is likely to be required by the regulatory agencies and will cover general and specific biological information on the special-status plant species, including the distribution of the resources, the recovery efforts, the legal status of the resources, and the penalties for violation of project permits and laws.

The Contractor Education and Environmental Training sessions will be given before the initiation of construction activities and repeated, as needed, when new personnel begin work within the project limits. Daily updates and synopsis of the training will be performed during the daily safety ("tailgate") meeting. All personnel who attend the training will be required to sign an attendance list stating that they have received the Contractor Education and Environmental Training.

***4.2-15** Biological Monitor to Be Present during Construction Activities in areas where impacts to Riparian, Riverine, Wetland, Endangered Species or Endangered Species Critical habitat occurs. A biological monitor (or monitors) will be present onsite during construction activities that could result in direct or indirect impacts on sensitive biological resources (including listed species) and to oversee permit compliance and monitoring efforts for all special-status resources.*

A biological monitor (qualified biologist) is any person who has a bachelor's degree in biological sciences, zoology, botany, ecology, or a closely related field and/or has demonstrated field experience in and knowledge about the identification and life history of the special-status species or jurisdictional waters that could be affected by project activities. The biological monitor(s) will be responsible for monitoring the Contractor to ensure compliance with the Section 404 Individual Permit, Section 401 Water Quality Certification and the Lake and Streambed Alteration Agreement. Activities to ensure compliance would include performing construction-monitoring activities, including monitoring environmental fencing, identifying areas where special-status plant species are or may be present, and advising the Contractor of methods that may minimize or avoid impacts on these resources. Biological monitor(s) will be required to be present in all areas during ground disturbance activities and for all construction activities conducted within or adjacent to identified Environmentally Sensitive Areas, Wildlife Exclusion Fencing, and Non-Disturbance Zones.

4.2-16 Food and Trash: All food-related trash items (e.g., wrappers, cans, bottles, food scraps) will be disposed of in closed containers and removed at least once a week from the construction site.

4.2-17 Rodenticides and Herbicides: Use of rodenticides and herbicides in the project footprint will be restricted. This measure is necessary to prevent poisoning of special-status species and the potential reduction or depletion of the prey populations of special–status wildlife species.

4.2-18 Wildlife Exclusion Fencing: Exclusion barriers (e.g., silt fences) will be installed at the edge of the construction footprint and along the outer perimeter of Environmentally Sensitive Areas and Environmentally Restricted Areas to restrict special-status species from entering the construction area. The design specifications of the exclusion fencing will be determined through consultation with the USFWS and/or CDFW. Clearance surveys will be conducted for special-status species after the exclusion fence is installed. If necessary, clearance surveys will be conducted daily.

4.2-19 Equipment Staging Areas: Staging areas for construction equipment will be located outside sensitive biological resources areas, including habitat for special-status species, jurisdictional waters, and wildlife movement corridors, to the maximum extent possible.

4.2-20 Plastic mono-filament netting (erosion-control matting) or similar material will <u>not</u> be used in erosion control materials to prevent potential harm to wildlife. Materials such as coconut coir matting or tackified hydroseeding compounds will be used as substitutes.

4.2-21 Vehicle Traffic: During ground-disturbing activities, project-related vehicle traffic will be restricted within the construction area to established roads, construction areas, and other designated areas to prevent avoidable impacts. Access routes will be clearly flagged and off-road traffic will be prohibited.

4.2-22 Entrapment Prevention: All excavated, steep-sided holes or trenches more than 8 inches deep will be covered at the close of each working day with plywood or similar materials, or a minimum of one escape ramp constructed of earth fill for every 10 feet of trenching will be provided to prevent the entrapment of wildlife. Before such holes or trenches are filled, they will be thoroughly inspected for trapped animals.

All culverts or similar enclosed structures with a diameter of 4 inches or greater will be covered, screened, or stored more than 1 foot off the ground to prevent use by wildlife. Stored material will be cleared for common and special-status wildlife species before the pipe is subsequently used or moved.

4.2-23 Weed Control Plan: A Weed Control Plan will be prepared and implemented to minimize or avoid the spread of weeds during ground-disturbing activities. In the Weed Control Plan, the following topics will be addressed:

- *Schedule for noxious weed surveys.*
- *Weed control treatments, including permitted herbicides, and manual and mechanical methods for application; herbicide application will be restricted in Environmentally Sensitive Areas.*
- *Timing of the weed control treatment for each plant species.*
- *Fire prevention measures.*

4.2-24 Dewatering/Water Diversion: ***Open or flowing water may be present during construction. If construction occurs where there is open or flowing water, a strategy that is approved by the resource agencies (e.g., USACE, SWRCB/RWQCB, and CDFW), such as the creation of cofferdams, will be used to dewater or divert water from the work area. If cofferdams are constructed, implementation of the following cofferdam or water diversion measures is recommended to avoid and lessen impacts on jurisdictional waters during construction:***

- ***The cofferdams, filter fabric, and corrugated steel pipe are to be removed from the creek bed after completion of the project.***
- ***The timing of work within all channelized waters is to be coordinated with the regulatory agencies.***
- ***The cofferdam is to be placed upstream of the work area to direct base flows through an appropriately sized diversion pipe. The diversion pipe will extend through the Contractor's work area, where possible, and outlet through a sandbag dam at the downstream end.***
- ***Sediment catch basins immediately below the construction site are to be constructed when performing in-channel construction to prevent silt- and sediment-laden water from entering the main stream flow. Accumulated sediments will be periodically removed from the catch basins.***

Implementation of the above mitigation measures is considered adequate to minimize construction-related impacts to the extent feasible, including the potential for invasive species occupancy caused by project-related disturbance of natural areas.

4.3 Regulatory Compliance

Impacts on biological resources will be permitted or authorized through consultation with the various natural resource regulatory agencies (USFWS, USACE, SWRCB/RWQCB, and CDFW). Both formal and informal consultation with these agencies may result in additional project-specific avoidance and minimization measures.

4.3.1 Regulatory Agency Access

If requested, before, during, or on completion of ground-disturbing activities, access to the construction site will be provided to USFWS, USACE, SWRCB/RWQCB, and CDFW staff. Because of safety concerns, agency personnel will check in with the Contractor before accessing the construction site. If agency personal access the construction site, the biological monitor will prepare a memorandum within 1 day of the visit that documents agency access and issues raised during the field meeting.

4.4 Critical Habitat

Critical habitat has been designated for several species adjacent to, directly overlapping, or in the general vicinity of the Program area, with significant concentration along the Santa Ana River corridor. One example is the critical habitat designated for the Southwestern willow flycatcher along the Santa Ana River to the south of the Program area. The specific locations of pertinent critical habitat areas are shown in maps contained in Chapter 6 - Figures. The primary mitigation for potential impacts to critical habitat will be avoidance. Where avoidance is not feasible, mitigation measures 4.2-1 and 4.2-7 will be implemented. It is rare that critical habitat extends directly within the property owned by project proponents because these areas are generally maintained to support the OBMPU operations, not protect habitat. However, where either permanent or temporary disturbances will occur within critical habitat, full mitigation will be provided to offset impacts to such habitat. As indicated in the subsequent discussion on cumulative impacts, certain areas that contain critical habitat for species may not be fully mitigable, and an unavoidable significant adverse biological resource impact may occur. This can only be determined after the new projects are identified, and engineering and designs are completed, and avoidance measures incorporated per specific, necessary project actions. Where avoidance cannot be achieved, the residual impact to critical habitat may be unavoidable.

4.4.1 Wetlands and Other Waters Coordination Summary

Wetlands and other waters in the project vicinity, including waters of the U.S., waters of the state, and state streambeds, are regulated by the federal government (USACE) and the State of California (RWRCB and CDFW). When considering wetlands and other waters, these features are collectively termed jurisdictional waters. Wetlands and other waters are assumed to fall under the jurisdiction of the USACE, SWRCB, and CDFW for purposes of this discussion. The jurisdictional status of these waters will be confirmed by the USACE, SWRCB, and CDFW when the regulatory permitting process is conducted. Further definitions are presented below.

- **Wetlands**: According to the USACE Wetlands Delineation Manual (Environmental Laboratory 1987) and the recently published Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Arid West Region (Version 2.0) (USACE 2008b), three criteria must be satisfied to classify an area as a jurisdictional wetland: (1) a predominance of plant life that is adapted to life in wet conditions (hydrophytic vegetation), (2) soils that saturate, flood, or pond long enough during the growing season to develop anaerobic conditions in the upper part (hydric soils), and (3) permanent or periodic inundation or soils saturation, at least seasonally (wetland hydrology).
- **Waters of the U.S.**: The CWA defines waters of the U.S. as follows: (1) all waters that are currently used, or were used in the past, or may be susceptible to use in interstate or foreign commerce, including all waters that are subject to the ebb and flow of the tide; (2) all interstate waters including interstate wetlands; (3) all other waters such as intrastate lakes, rivers, streams (including intermittent streams), mudflats, sandflats, wetlands, sloughs, prairie potholes, wet meadows, playa lakes, or natural ponds, the use, degradation or destruction of which could affect interstate or foreign commerce; (4) all impoundments of waters otherwise defined as waters of the U.S.; (5) tributaries to the foregoing types of waters; and (6) wetlands adjacent to the foregoing waters (33 CFR 328.3[a]). Current status of the Waters of the US Rule continues to change. Any regulatory environment must be reassessed for each future project to determine which rules apply and which permitting may be necessary during the planning and permitting phase.
- **Waters of the State**: Waters of the state are broadly defined by the Porter-Cologne Water Quality Control Act (Section 1305[e]). Under this definition, isolated wetlands that may not be subject to regulations under federal law are considered waters of the state. On March 9, 2012, the California Water Boards released a preliminary draft of their Wetland Area Protection Policy, which includes a proposed wetland definition. Under their proposed definition, an area is a wetland if, under normal circumstances, it (1) is continuously or recurrently inundated with shallow water or saturated within the upper substrate; (2) has anaerobic conditions within the upper substrate caused by such hydrology; and (3) either lacks vegetation or the vegetation is dominated by hydrophytes (SWRCB 2012).
- **State Streambeds**: CDFW has not released an official definition of lake or streambed and therefore the extent of the area regulated under Section 1602 remains undefined. However, CDFW jurisdiction generally includes the streambed and bank, together with the adjacent floodplain and riparian vegetation.

Based on the background review and subsequent windshield surveys, numerous jurisdictional waters occur in the Study Area for the OBMPU. Many of the jurisdictional waters (built waterways) are heavily managed by local irrigation districts, which serve public water needs and agricultural production. As a result, some of these jurisdictional waters support few natural biological functions and values. The biological functions of these man-made features include limited habitat for wildlife and capacity for water storage or release. A number of these jurisdictional waters have been previously degraded or impacted by existing roads and water resource management infrastructure.

Direct impacts on natural and man-made features include the removal or modification of local hydrology, the redirection of flow, and the placement of fill material. In the case of man-made features, these impacts would remove or disrupt the limited biological functions that these features provide. In natural areas, these activities would remove or disrupt the hydrology, vegetation, wildlife use, water quality conditions, and other biological functions provided by the resources.

Temporary impacts on jurisdictional waters include the placement of temporary fill during construction in both man-made and natural jurisdictional waters. Temporary fill could be placed during the construction of access roads and staging/equipment storage areas. The temporary fill would result in a temporary loss of jurisdictional waters and could potentially increase erosion and sediment transport into adjacent areas.

Potential indirect impacts on jurisdictional waters include a number of water-quality-related impacts: erosion and transport of fine sediments or fill downstream of construction to unintentional release of contaminants into jurisdictional waters that are outside of the project footprint. These discharges would indirectly impact adjacent or downstream jurisdictional waters.

A Jurisdictional Determination and subsequent approval of the determination by the regulatory agencies will be conducted on each facility as the design becomes available and construction of a particular facility is scheduled to occur within the foreseeable future. However, unforeseen direct impacts, indirect impacts, and temporary impacts to natural and man-made water bodies may occur depending upon the design of the infrastructure improvement, and the construction methodology required.

4.5 Cumulative Impacts

Cumulative biological resource impacts can only occur when such resources are not avoided, protected or mitigated as outlined above. The mitigation requirements outlined in Section 4.2 are identified to ensure that biological resources are avoided or otherwise protected or mitigated, such that no cumulatively considerable impacts to significant biological resources are forecast to occur if the proposed project is implemented as analyzed in this document.

These impacts may include direct impacts such as the removal or modification of local hydrology, the redirection of flow, and the placement of fill material. Potential indirect impacts on jurisdictional waters include a number of water-quality-related impacts: erosion and transport of fine sediments or fill downstream of construction to unintentional release of contaminants into jurisdictional waters that are outside of the project footprint. Temporary impacts on jurisdictional waters include the placement of temporary fill during construction in both man-made and natural jurisdictional waters. Temporary fill could be placed during the construction of access roads and staging/equipment storage areas. The temporary fill would result in a temporary loss of jurisdictional waters and could potentially increase erosion and sediment transport into adjacent areas.

In the case of man-made features, these impacts would remove or disrupt the limited biological functions that these features provide. In natural areas, these activities would remove or disrupt the hydrology, vegetation, wildlife use, water quality conditions, and other biological functions provided by the resources. Therefore, these impacts should be quantified and analyzed in a second tier environmental documentation.

However, there are certain areas within the overall project area of potential impact where the resource impacts from constructing new infrastructure may cause unavoidable significant adverse impacts on biological resources. These areas are highly dependent upon the final design of each Program goal, i.e. individual project, and if those actions cannot be reasonably or feasibly offset, the ultimate design of these Program improvements must be based on sound engineering. In each case where most environmental impacts cannot be fully avoided, it may be possible to avoid certain impacts by designs that avoid such impacts through sound mitigation-based planning at each step.

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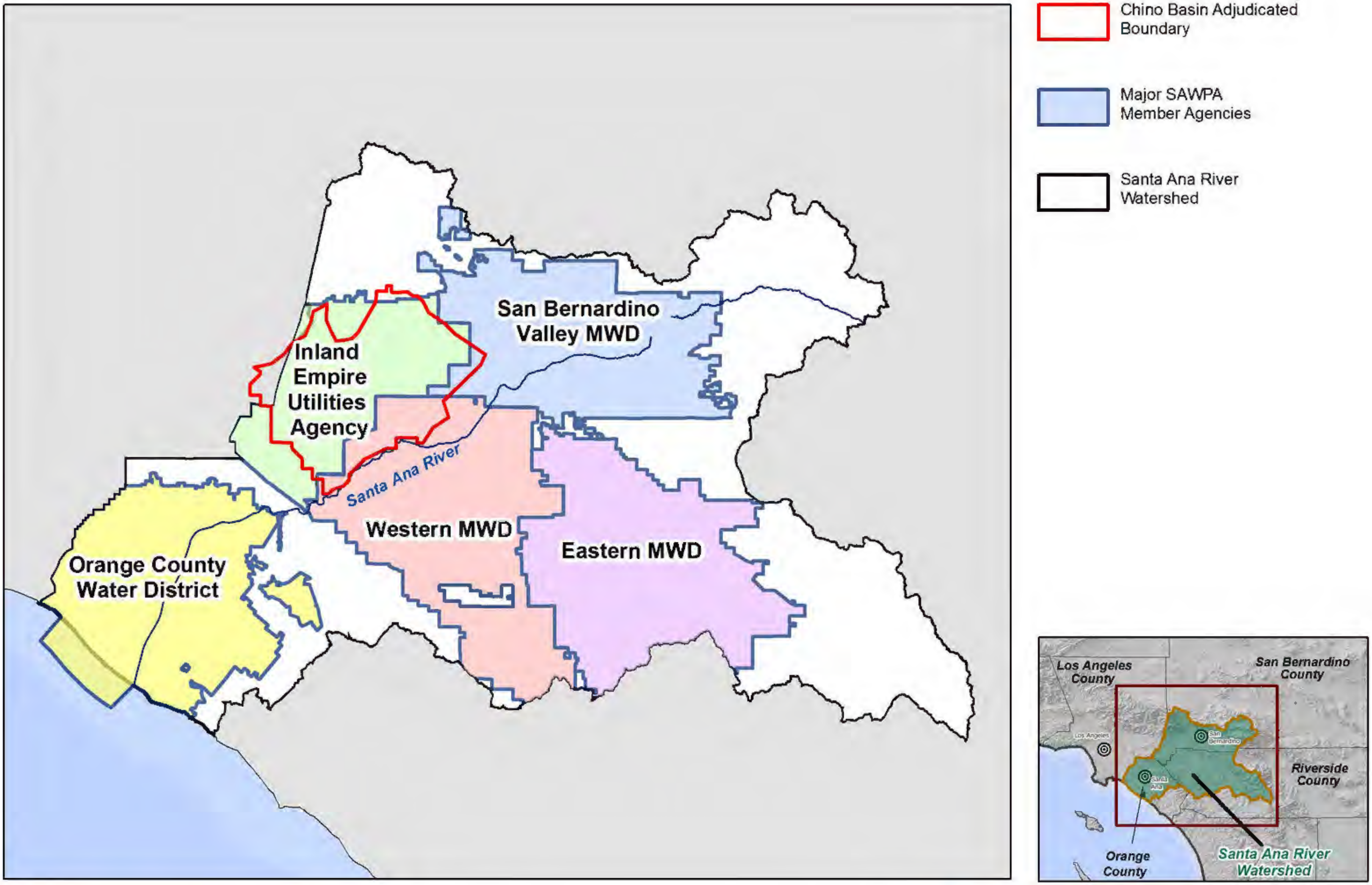
Chapter 6. Figures

Exhibit 1



Produced by:

WEI Wildermuth Environmental, Inc.

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Date: 12/16/2019
Name: 1.) Chino in SAR Watershed

Prepared for:

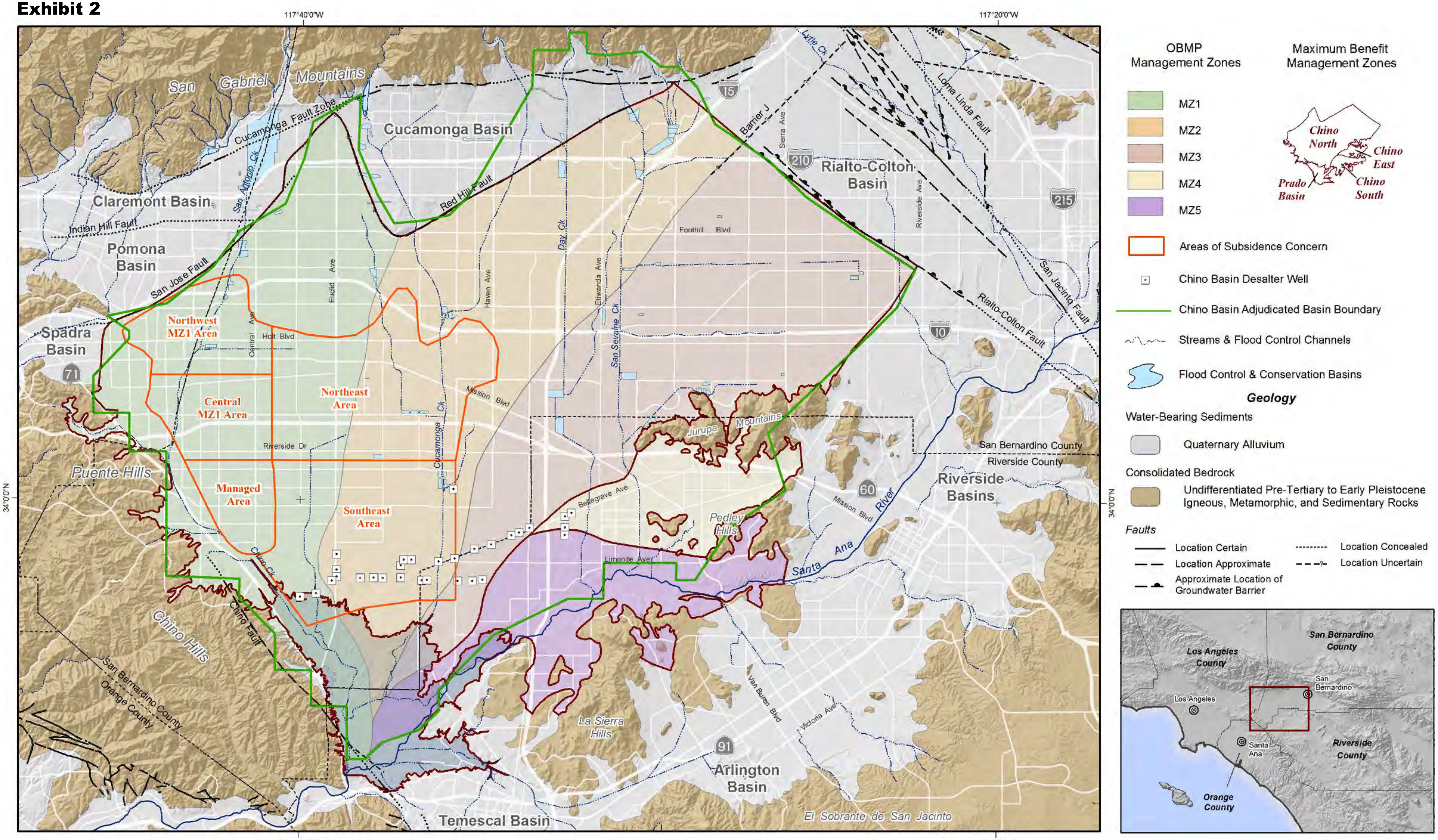
OBMP 2020 Update
Project Description

Chino Basin Watermaster — Partners in Basin Management

Location of the Chino Basin and the Santa Ana River Watershed

Figure 1-1

Exhibit 2



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Document Name: 2.) Project Location + Bulletin 118

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OBMP 2020 Update
Project Description

Chino Basin Watermaster — Partners in Basin Management

Chino Basin

OBMP Management Zones, Maximum Benefit Management Zones and Areas of Subsidence Concern

Figure 1-1

Exhibit 3

Figure 1 – Drivers and Trends and Their Implications
2020 OBMP Update

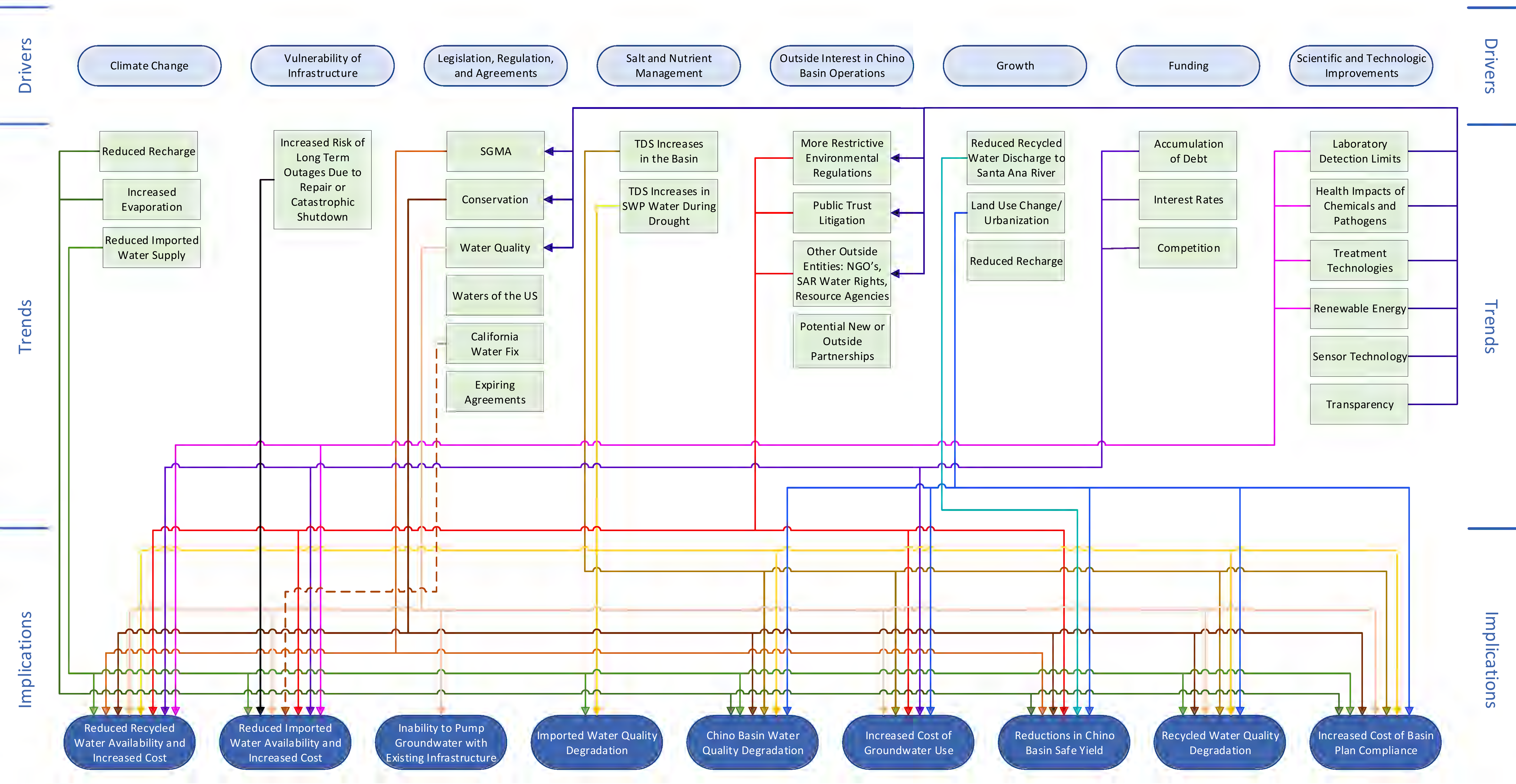


Exhibit 4

Implementation actions for the next 20 years by Program Element
Program Element 1
Watermaster will continue to conduct the required monitoring and reporting programs, including collection of: groundwater production, groundwater level, groundwater quality, ground level, surface water, climate, water supply planning, biological, and well construction/destruction monitoring data.
Perform review and update of Watermaster’s regulatory and Court-ordered monitoring and reporting programs and document in a work plan: *OBMP Monitoring and Reporting Work Plan* .
Perform periodic review and update of the *OBMP Monitoring and Reporting Work Plan* (or other guidance documents developed by Watermaster) and modify the monitoring and reporting programs, as appropriate.
Program Element 2
Continue to convene the Recharge Investigations and Projects Committee.
Complete the 2023 Recharge Master Plan Update (RMPU).
Implement recharge projects based on need and available resources.
Update the RMPU no less than every five years (2028, 2033, 2038).
Program Element 4
Implement Watermaster’s Subsidence Management Plan, and adapt it as necessary.
Watermaster will arrange for the physical recharge of at least 6,500 afy of Supplemental Water in MZ-1 as an annual average. Watermaster may re-evaluate the minimum annual quantity of Supplemental Water recharge in MZ-1 and may increase this quantity through the term of the Peace Agreement.
Program Element 5
The IEUA will maximize the reuse of its recycled water in the Chino Basin.
The IEUA, the TVMWD, the WMWD, and/or other Party acting as a coordinating agency will establish or expand future recycled water planning efforts to maximize the reuse of all available sources of recycled water.
Watermaster will support the IEUA, the TVMWD, the WMWD, and/or others in their efforts to maximize recycled water reuse to ensure these efforts are integrated with Watermaster’s groundwater and salinity management efforts.
The IEUA, the TVMWD, the WMWD, and/or other Party acting as a coordinating agency will establish or expand future integrated water resources planning efforts to address water supply reliability for all Watermaster Parties.
Watermaster will support the IEUA, the TVMWD, the WMWD, and/or others in their efforts to improve water supply reliability to ensure those efforts are integrated with Watermaster’s groundwater management efforts.

Implementation actions for the next 20 years by Program Element
Program Element 6
Re-convene the water quality committee and meet periodically to update groundwater quality management priorities.
Develop and implement an initial emerging contaminants monitoring plan.
Prepare a water quality assessment of the Chino Basin to evaluate the need for a *Groundwater Quality Management Plan* and prepare a long-term emerging contaminants monitoring plan.
Continue to support the Parties in identifying funding from outside sources to finance cleanup efforts.
Develop and implement a *Groundwater Quality Management Plan* and periodically update it.
Implement long-term emerging contaminants monitoring plan.
Continue to conduct investigations to assist the parties and/or the Regional Board in accomplishing mutually beneficial objectives as needed.
Implement projects of mutual interest.
Program Element 7
Complete the 2020 update of TDS and nitrate projections to evaluate compliance with maximum benefit salt and nutrient management plan, and, if necessary, based on the outcome, prepare a plan and schedule to implement a salt offset compliance strategy.
Continue to implement the maximum-benefit salt and nutrient management plan pursuant to the Basin Plan.
Starting in 2025 and every five years thereafter, update water quality projections to evaluate compliance with the maximum-benefit salt and nutrient management plan.
Program Element 8/9
Complete and submit to the Court the 2020 Safe Yield Recalculation.
Complete and submit to the Court the 2020 Storage Management Plan (SMP).
Develop a *Storage and Recovery Master Plan* to support the design of optimized storage and recovery programs that are consistent with the 2020 Storage Management Plan and provide the Watermaster with criteria to review, condition, and approve applications in a manner that is consistent with the Judgment and the Peace Agreement.
Assess losses from storage accounts based on the findings of the 2020 Safe Yield Recalculation.
Update the Storage Management Plan in 2025 and every five years thereafter, and when: • the Safe Yield is recalculated, • Watermaster determines a review and update is warranted based new information and/or the needs of the parties or the basin, and • at least five years before the aggregate amount of managed storage by the parties is projected to fall below 340,000 af
Perform safe yield recalculation every 10 years (2030, 2040).
Update the storage loss rate following each recalculation of Safe Yield (2030, 2040) and during periodic updates of the SMP.

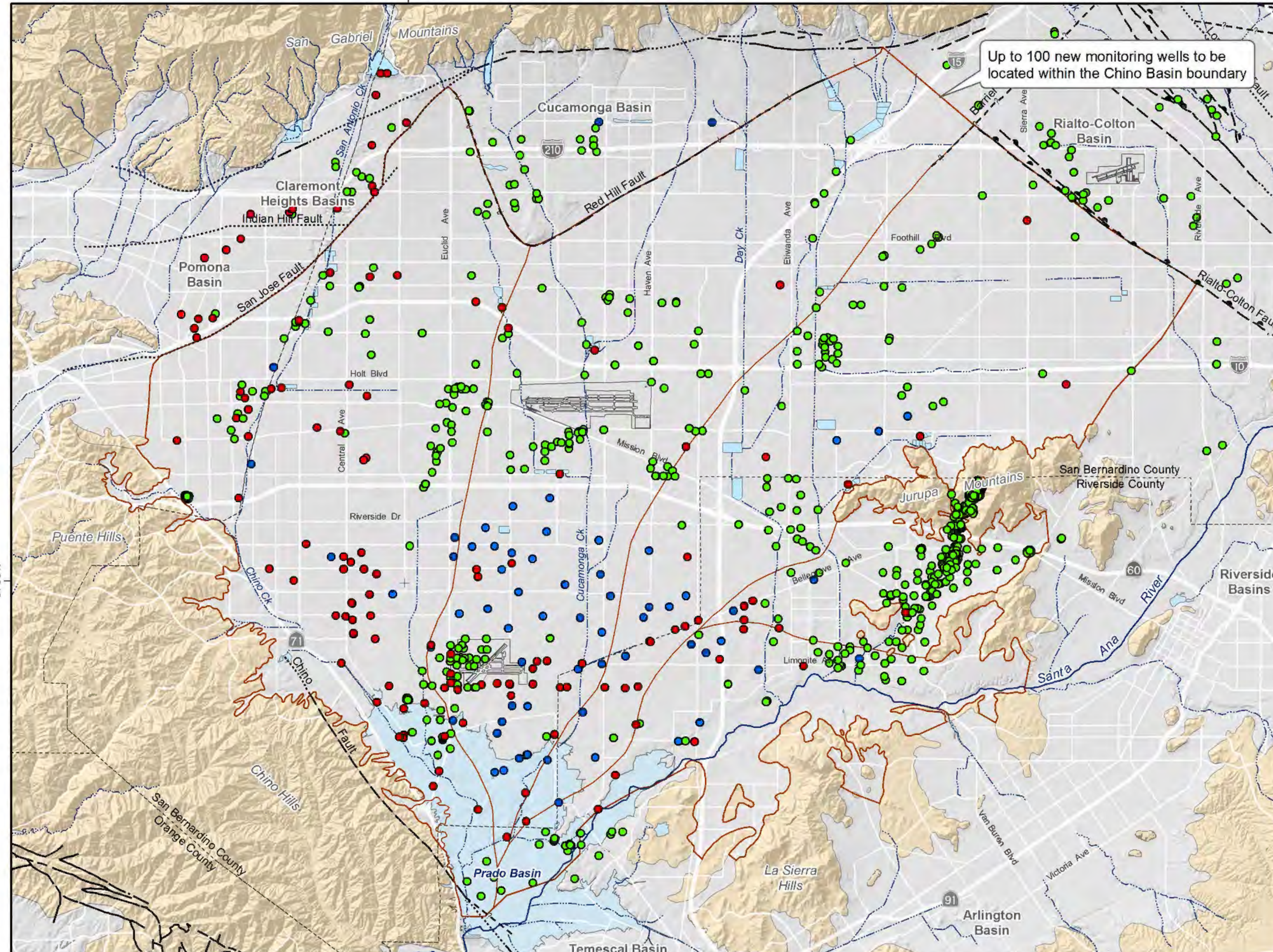
Actions in blue represent actions that are not in the 2000 OBMP ("new" actions).

Exhibit 5

List of facilities to be evaluated in CEQA	PE1	PE2	PE4	PE5	PE6	PE7	PE8/9
New monitoring wells	✓	✓	✓	✓	✓	✓	✓
New surface water and groundwater recharge monitoring facilities	✓	✓					✓
New meteorological monitoring facilities	✓	✓					✓
New meter installation at pumping wells	✓						
New extensometers	✓		✓				✓
New benchmarks	✓		✓				✓
New stormwater diversion, storage, transfer and recharge facilities		✓	✓	✓			✓
CIM storage facilities*		✓	✓	✓			✓
Flood MAR*		✓	✓	✓			✓
Regional conveyance:*		✓	✓	✓			✓
Lower Cucamonga Basin		✓		✓			✓
Mills Wetlands		✓		✓			✓
Riverside Basin		✓		✓			✓
Vulcan Basin *		✓		✓			✓
Confluence Project*		✓		✓			✓
Injection wells*		✓	✓	✓			✓
Treatment (for some sources)*		✓	✓	✓			✓
Restore WFA Agua de Lejos Treatment Plant capacity for in-lieu recharge		✓	✓	✓			✓
MS4 recharge project incentives		✓	✓				✓
Relocate pumping from MZ1 to MZ2/3 and southern portion of the Chino Basin and/or increase recharge in MZ1			✓				✓
New production wells*			✓				✓
Acquire supplemental water supplies*		✓		✓			
Regional conveyance				✓			✓
New dedicated regional conveyance facilities				✓			✓
North-south pipeline*				✓			✓
East-west pipeline*				✓			✓
Incorporate local conveyance facilities into a regional conveyance system*				✓			✓
Maximize recycled water reuse				✓			
Expand system for indirect reuse*				✓			
Advanced water treatment*				✓		✓	
Direct potable use*				✓			
New regional groundwater treatment plants (up to 10 mgd for local use; up to 30 mgd for export)*				✓	✓		✓
Expansion of existing groundwater treatment plants*				✓	✓		✓
Upgrade recycled water treatment plant to desalt effluent*						✓	
Maintain or increase groundwater pumping in Chino Creek Well Field (CCWF) area:							
New production wells in CCWF area*						✓	✓
Acquire wells in CCWF area*						✓	✓
New ASR wells in MZ2/3 north of Highway 60*							✓

*Includes conveyance infrastructure

Exhibit 6



Groundwater-Level Monitoring Program
Wells symbolized by Measurement Frequency

- Measurement by CBWM Staff - Monthly (69 wells)
- Measurement by Transducer - Every 15 Minutes (177 wells)
- Measurement by Owner at Various Frequencies (1,077 wells)

OBMP Management Zones

Streams & Flood Control Channels

Flood Control & Conservation Basins

Geology

Water-Bearing Sediments

Quaternary Alluvium

Consolidated Bedrock

Undifferentiated Pre-Tertiary to Early Pleistocene Igneous, Metamorphic, and Sedimentary Rocks

Faults

Location Certain

Location Approximate

Approximate Location of Groundwater Barrier

Location Concealed

Location Uncertain

Prepared by:

WEI
WILDERMUTH ENVIRONMENTAL, INC.

Author: SO
Date: 12/17/2019
File: 6.) Map of GWL.mxd

0 1 2 3 4 5 Miles
0 2 4 6 8 Km

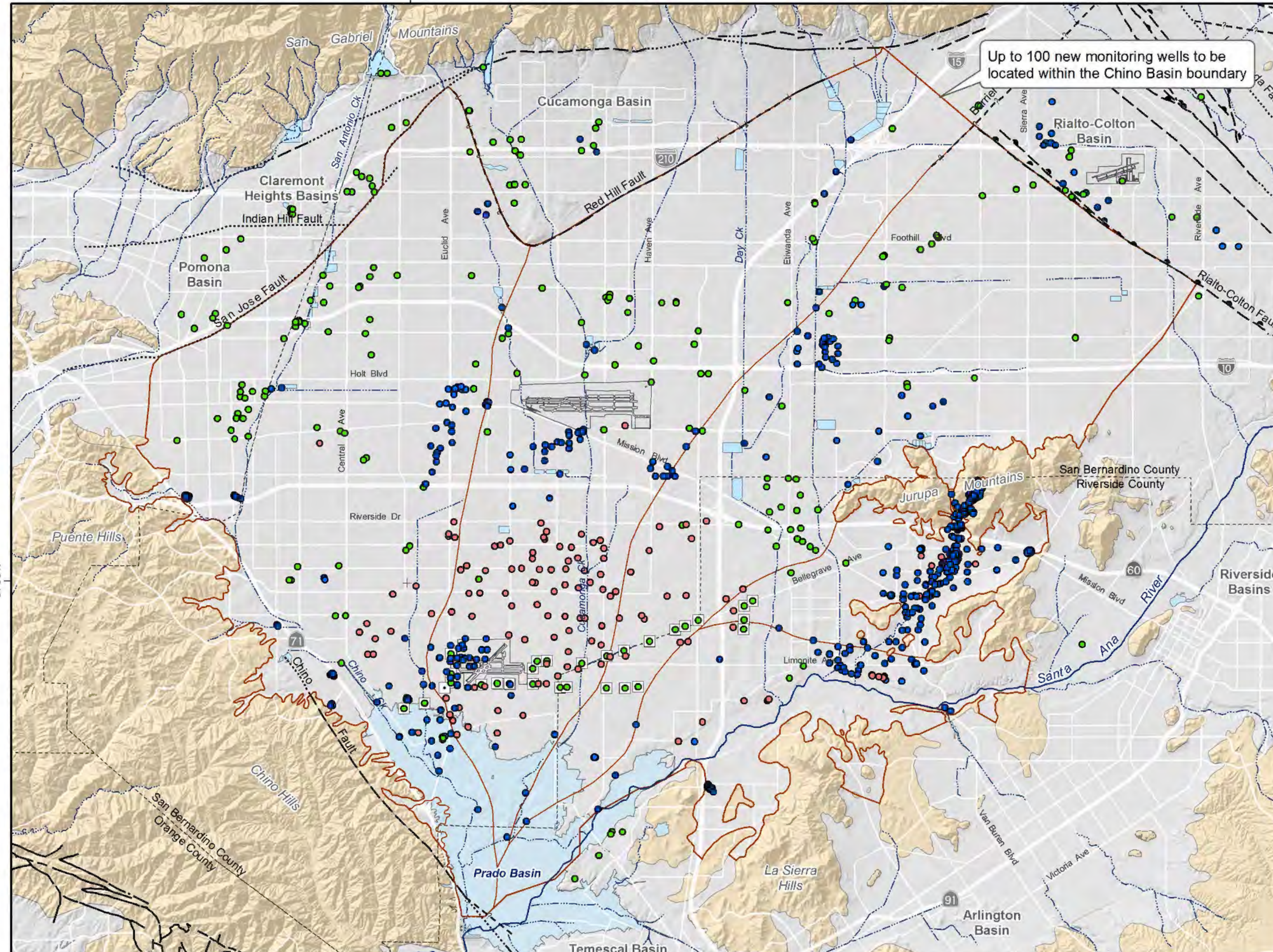
Prepared for:
OBMP 2020 Update
Scoping Report

Groundwater-Level Monitoring

Well Location and Measurement Frequency
Fiscal Year 2017/18

Exhibit L-3

Exhibit 7



Wells with Groundwater-Quality Data (June 2013 to June 2018)

- Monitoring Wells (986 wells)
- Municipal Production Wells (248 wells)
- Private Production Wells (123 wells)
- Chino Basin Desalter Wells

OBMP Management Zones

Streams & Flood Control Channels

Flood Control & Conservation Basins

Geology

Water-Bearing Sediments

Quaternary Alluvium

Consolidated Bedrock

Undifferentiated Pre-Tertiary to Early Pleistocene Igneous, Metamorphic, and Sedimentary Rocks

Faults

Location Certain

Location Approximate

Approximate Location of Groundwater Barrier

Location Concealed

Location Uncertain

Prepared by:

WEI
WILDERMUTH ENVIRONMENTAL, INC.

Author: SO
Date: 12/17/2019
File: 7.) Map of GWQ.mxd

0 1 2 3 4 5 Miles
0 2 4 6 8 Km

Prepared for:

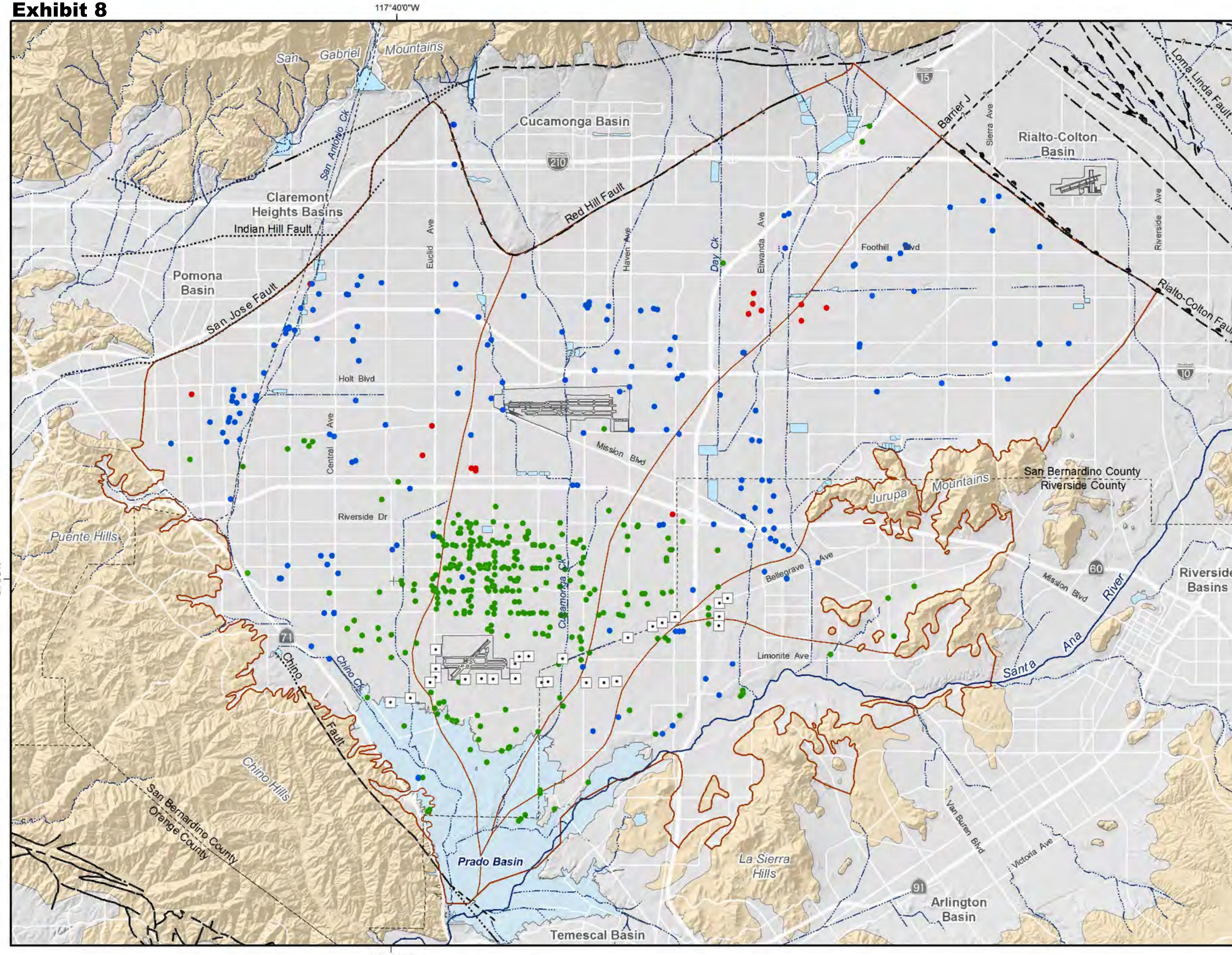
OBMP 2020 Update
Scoping Report

CHINO BASIN WATERMASTER
Partners in Basin Management

Groundwater-Quality Monitoring
July 2013 to June 2018

Exhibit L-4

Exhibit 8



Groundwater Production Wells by Pool

- Agricultural Pool (Pool 1 - 276 Wells) *Potential to install in-line flow meters*
- Overlying Non-Agricultural Pool (Pool 2 - 13 Wells)
- Appropriative Pool (Pool 3 - 143 Wells)
- Chino Basin Desalter Authority (25 Wells)

OBMP Management Zones

Streams & Flood Control Channels

Flood Control & Conservation Basins

Geology

Water-Bearing Sediments

Quaternary Alluvium

Consolidated Bedrock

Undifferentiated Pre-Tertiary to Early Pleistocene Igneous, Metamorphic, and Sedimentary Rocks

Faults

Location Certain

Location Approximate

Approximate Location of Groundwater Barrier

Location Concealed

Location Uncertain

Prepared by:

WEI
Wildermuth Environmental, Inc.

Author: SO
Date: 12/18/2019
File: 8.) Map of GWP.mxd

0 1 2 3 4 5 Miles
0 2 4 6 8 Km

Prepared for:

OBMP 2020 Update

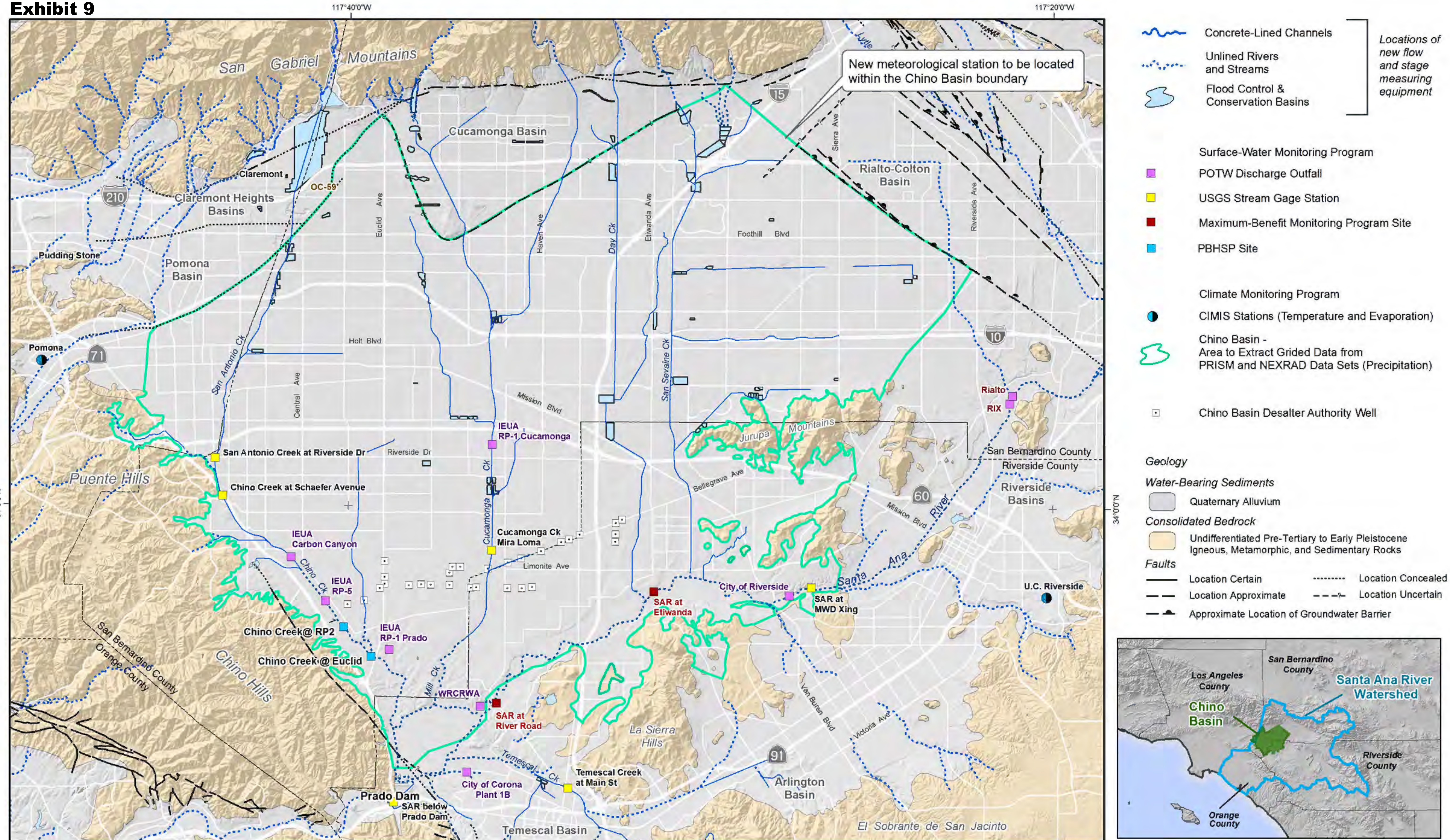
Scoping Report

Groundwater-Production Monitoring

Fiscal Year 2017/18

Exhibit L-2

Exhibit 9



Prepared by:

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Wildermuth Environmental, Inc.

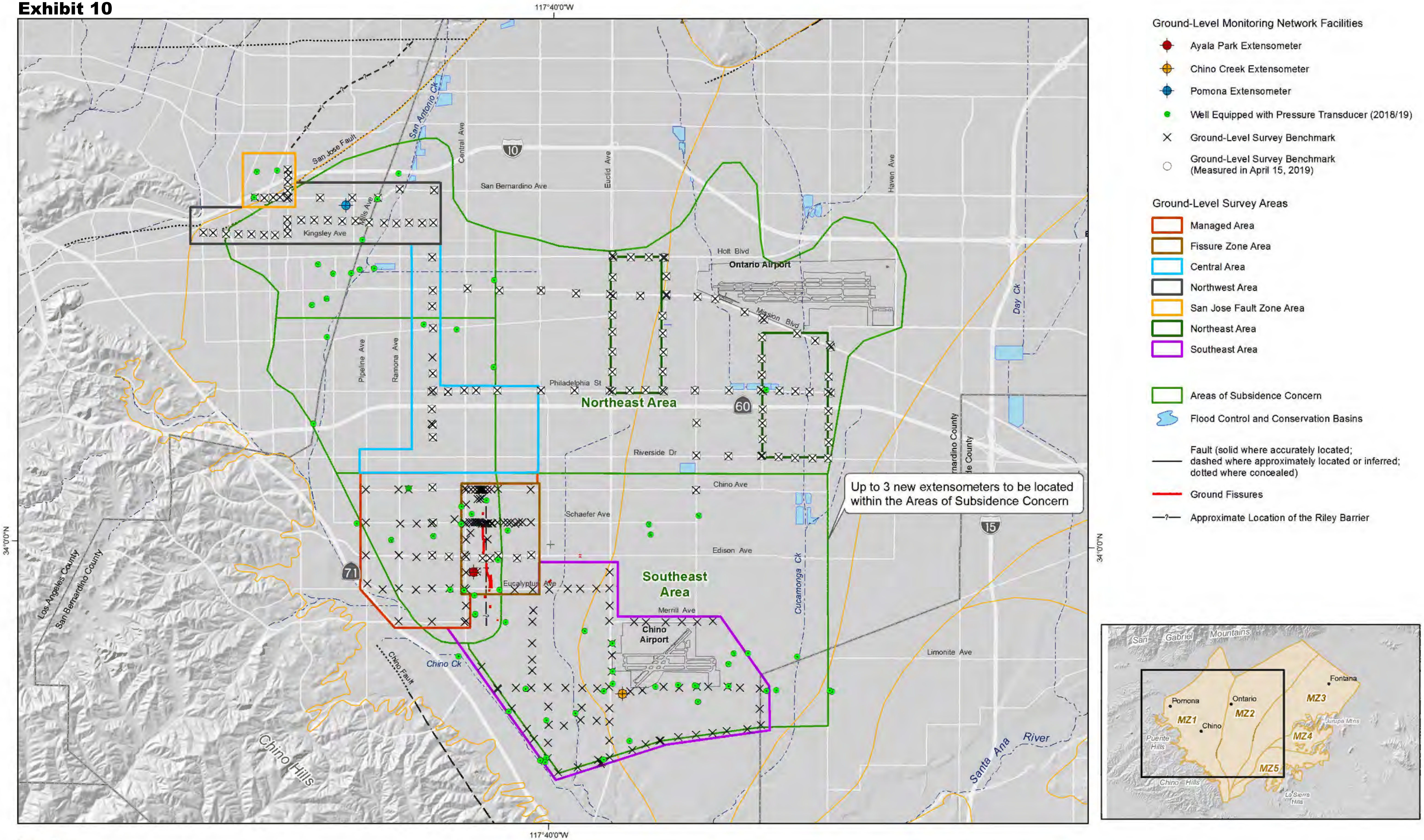
Author: SO
Date: 12/19/2019
File: 9.) Map of SWQ

Prepared for:
OBMP 2020 Update
Scoping Report

Surface-Water and Climate Monitoring

Exhibit L-5

Exhibit 10



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Author: NWS
Date: 12/18/2019
File: 10.) Subsidence Monitoring.mxd

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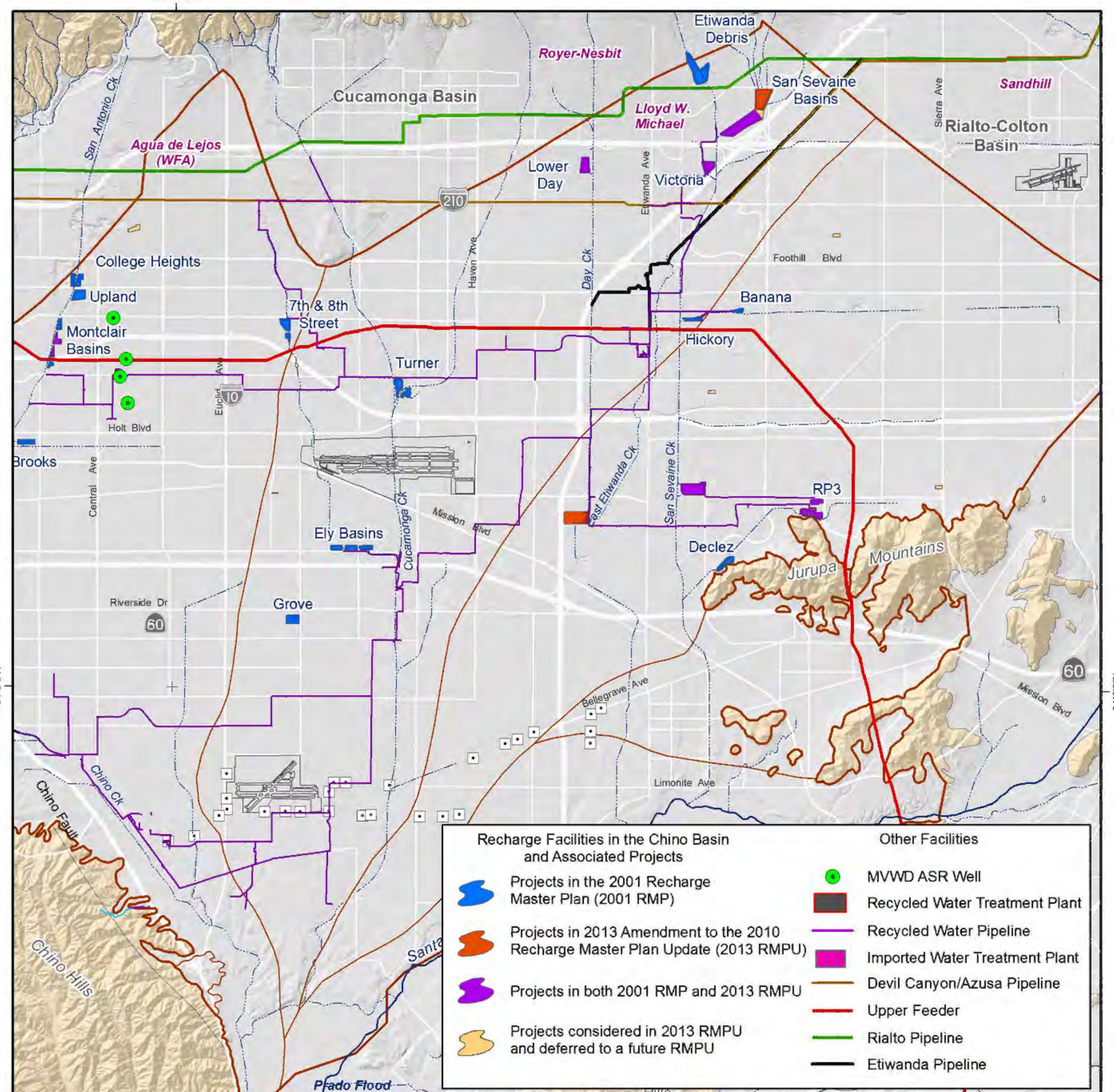
Scoping Report

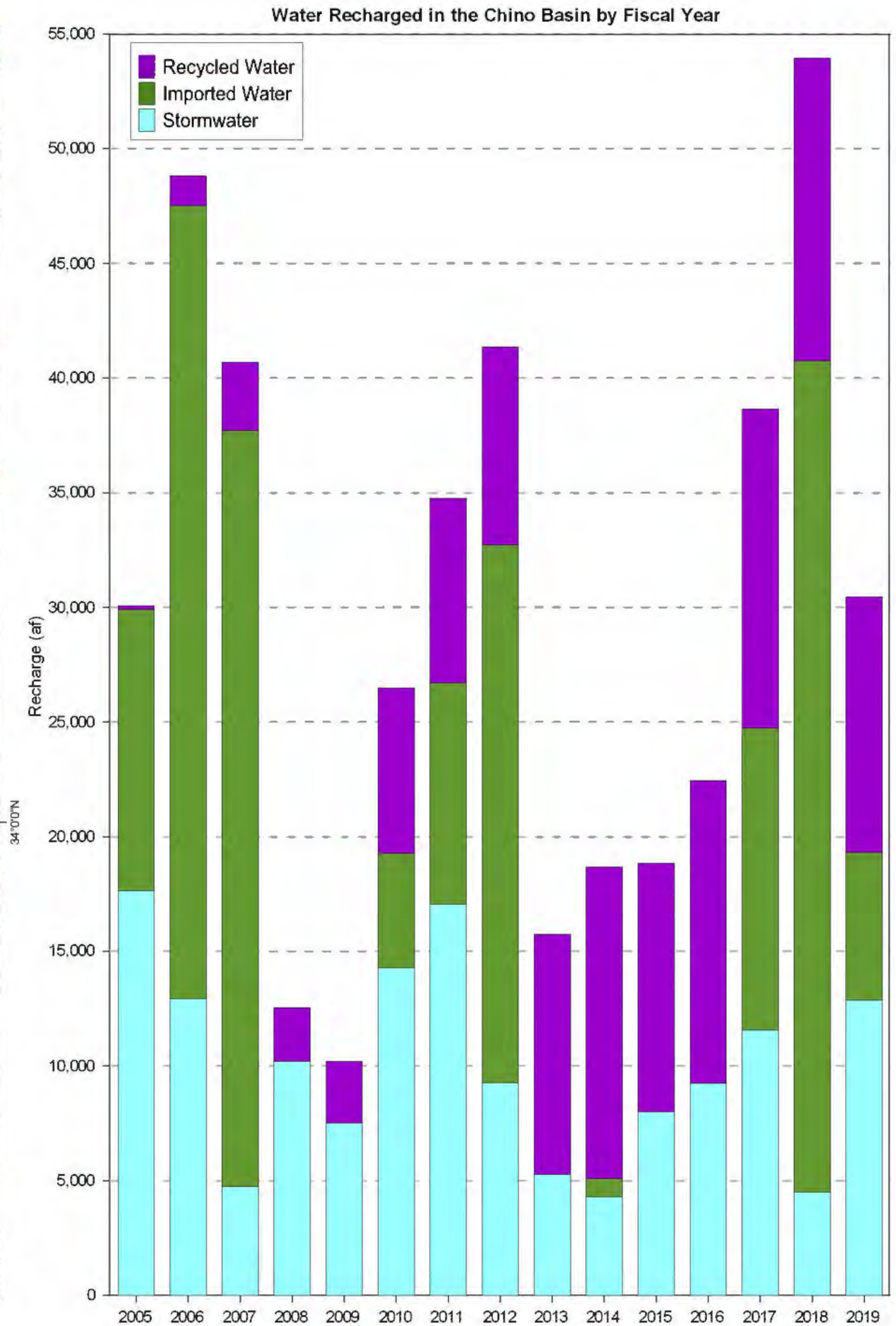
CHINO BASIN WATERMASTER
Partners in Basin Management

Ground-Level Monitoring Network
Western Chino Basin

Exhibit L-6

Exhibit 11





Prepared by:

WEI
WILDERMUTH ENVIRONMENTAL, INC.

Author: CS
Date: 20181129
File: 11.) Recharge Basin + Recharge Chart

Prepared for:

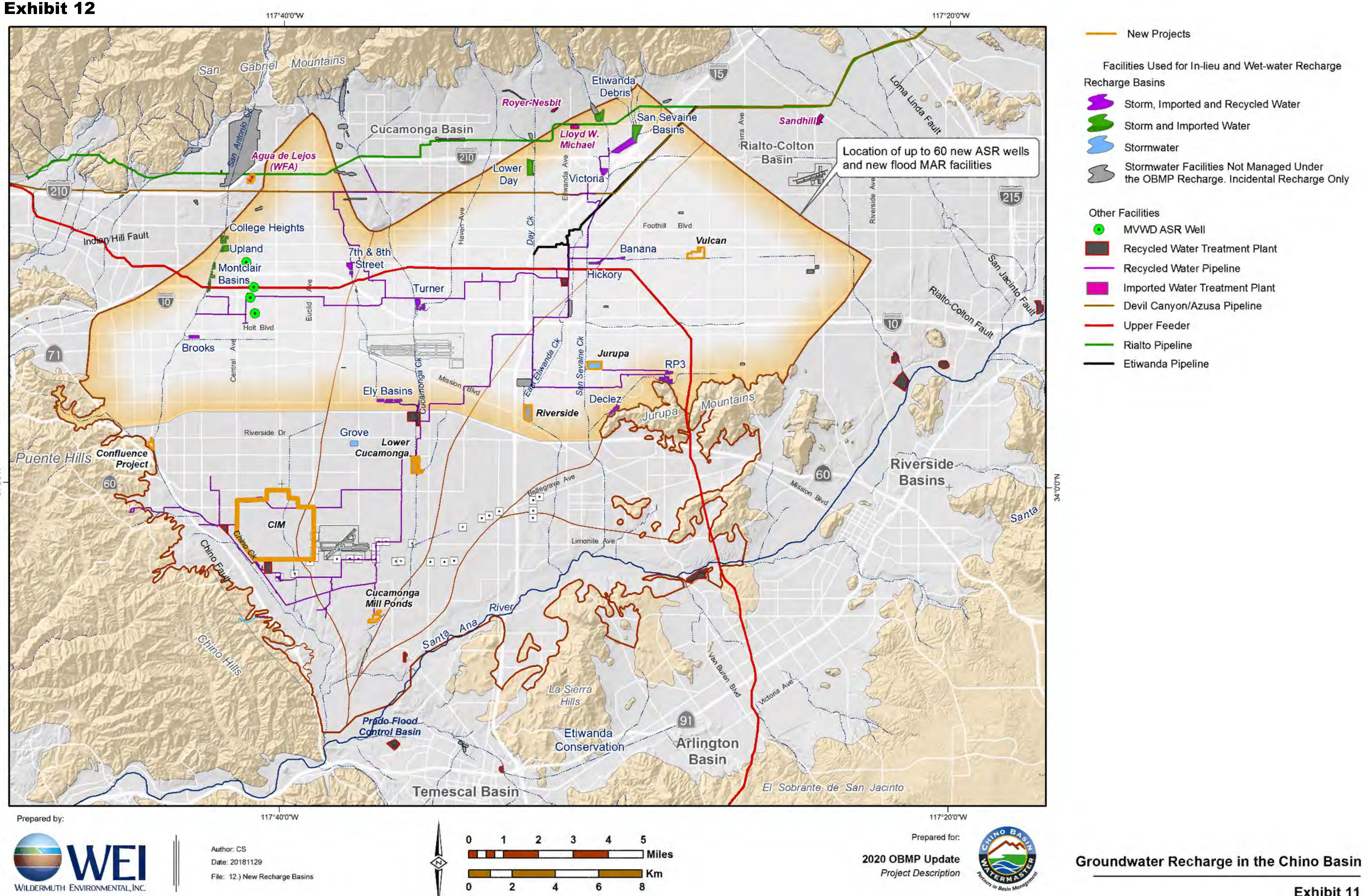
2020 OBMP Update
Project Description

Chino Basin Watermaster

Groundwater Recharge in the Chino Basin

Exhibit 10

Exhibit 12



Prepared by:

WEI
WILDERMUTH ENVIRONMENTAL, INC.

Author: CS
Date: 20181129
File: 12.) New Recharge Basins

Prepared for:

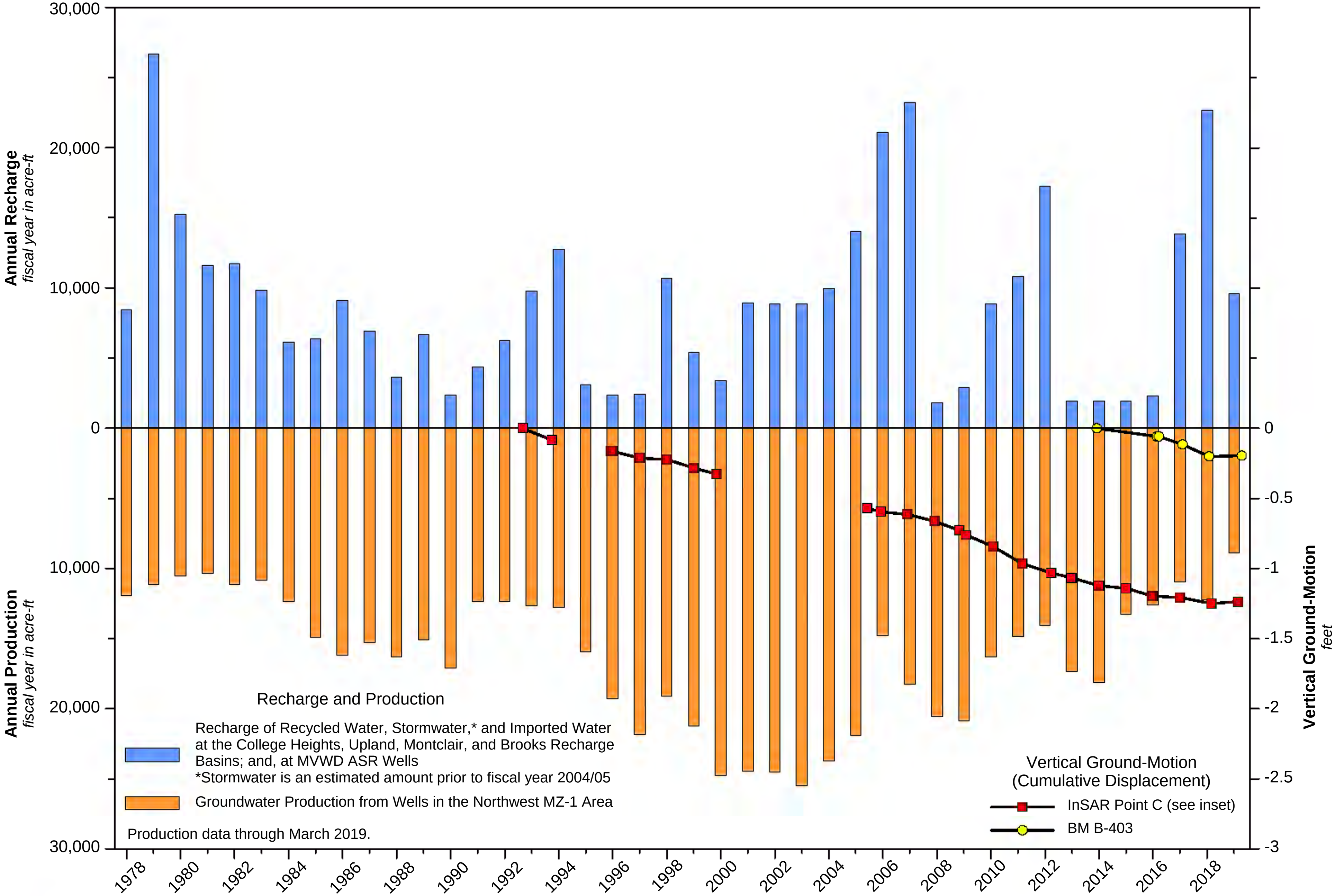
2020 OBMP Update
Project Description

CHINO BASIN WATERMASTER
Partners in Basin Management

Groundwater Recharge in the Chino Basin

Exhibit 11

Exhibit 13



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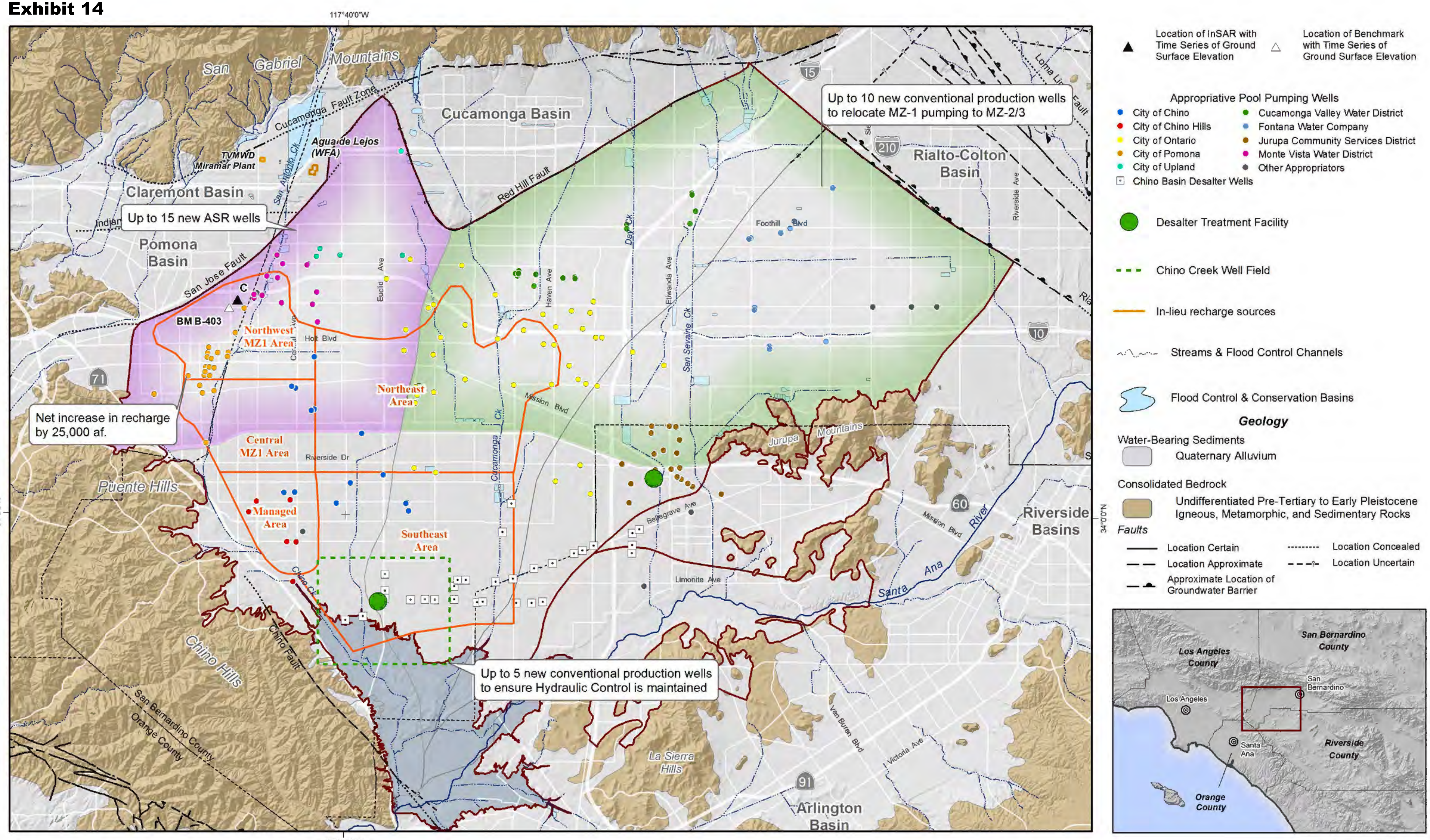
Prepared for:
OBMP 2020 Update
Scoping Report

Pumping, Recharge and Land Subsidence in the Northwest MZ-1 Area

Exhibit CG-3

Exhibit 14



117°40'0"W

Prepared by:

WEI
Wildermuth Environmental, Inc.

Author: LG
Date: 12/20/2019
Document Name: 14.) Map of Chino Basin Concerns_new

Prepared for:
OBMP 2020 Update
Project Description

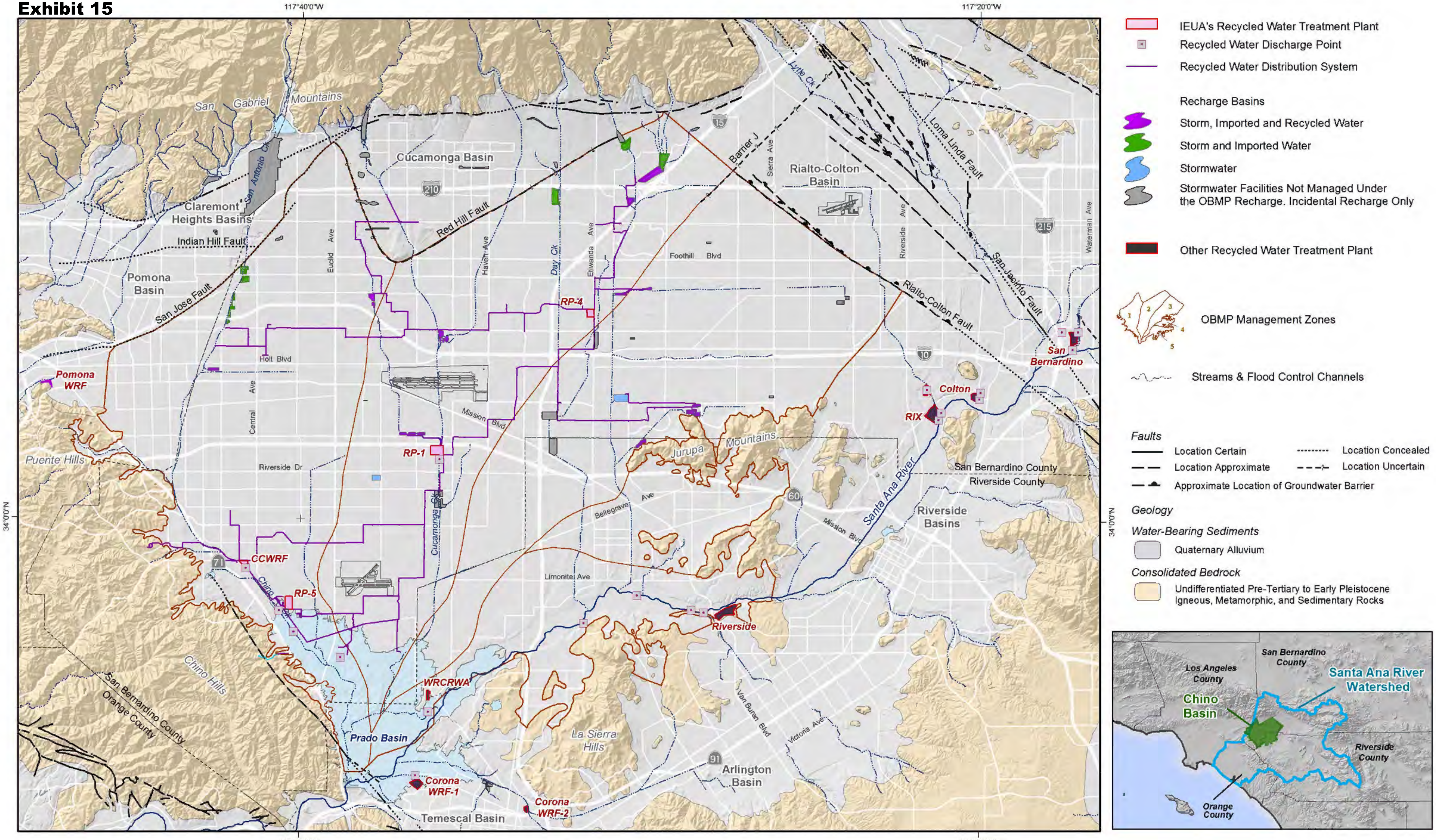
Chino Basin Watermaster — Partners in Basin Management

Chino Basin

OBMP Management Zones, Maximum Benefit Management Zones and Areas of Subsidence Concern

Figure 1-1

Exhibit 15



Prepared by:

WEI
Wildermuth Environmental, Inc.

Author: SO
Date: 12/20/2019
File: 15.) RW Treatment Plants.mxd

0 1 2 3 4 5 Miles
0 2 4 6 8 Km

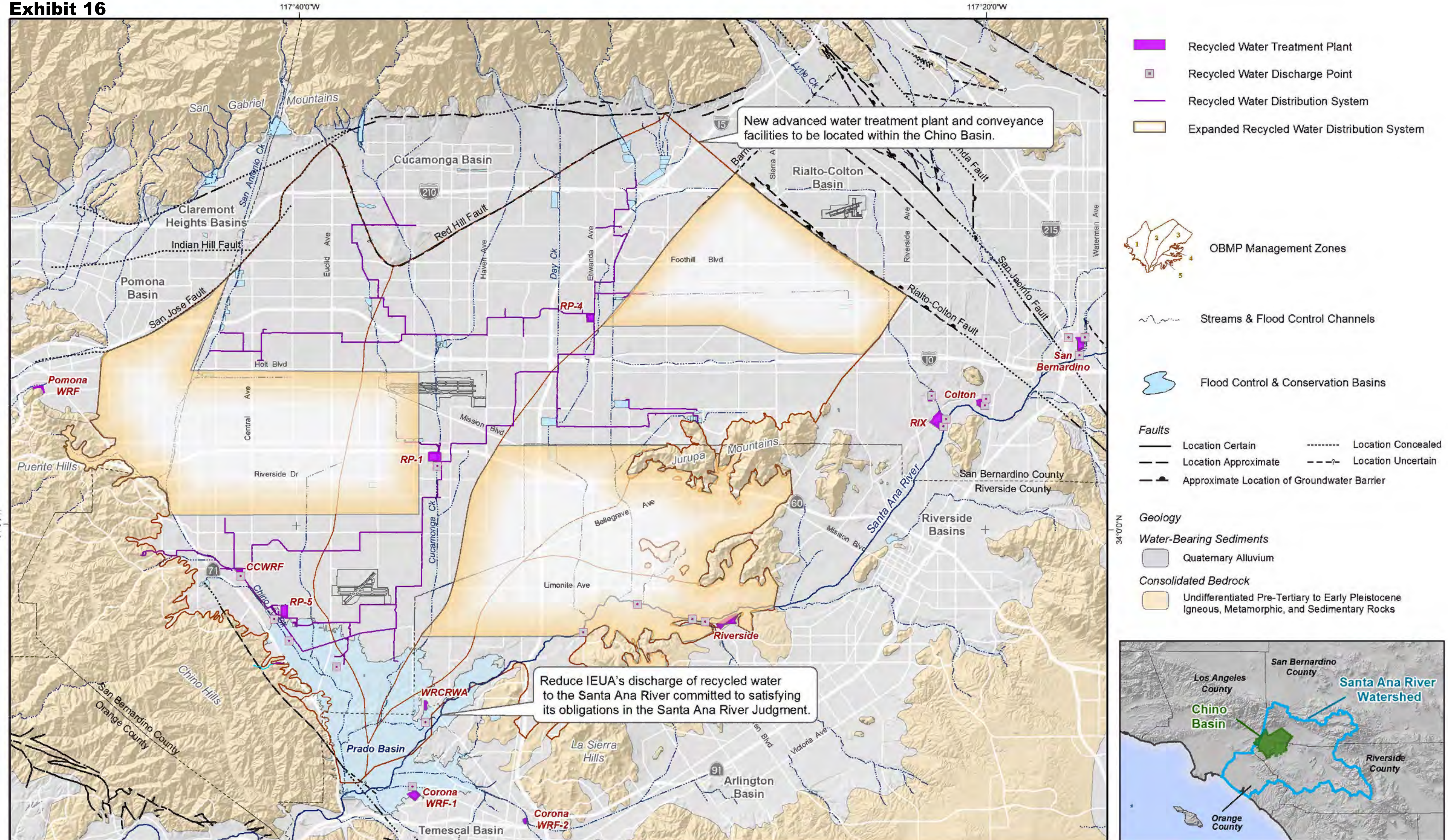
Prepared for:
OBMP 2020 Update
Scoping Report

Chino Basin Watermaster — Partners in Basin Management

Recycled Water Treatment Plants and Discharge Points

Exhibit D-1

Exhibit 16



Prepared by:

WEI Wildermuth Environmental, Inc.

Author: SO
Date: 12/18/2019
File: 16.) New RW Treatment Plants.mxd

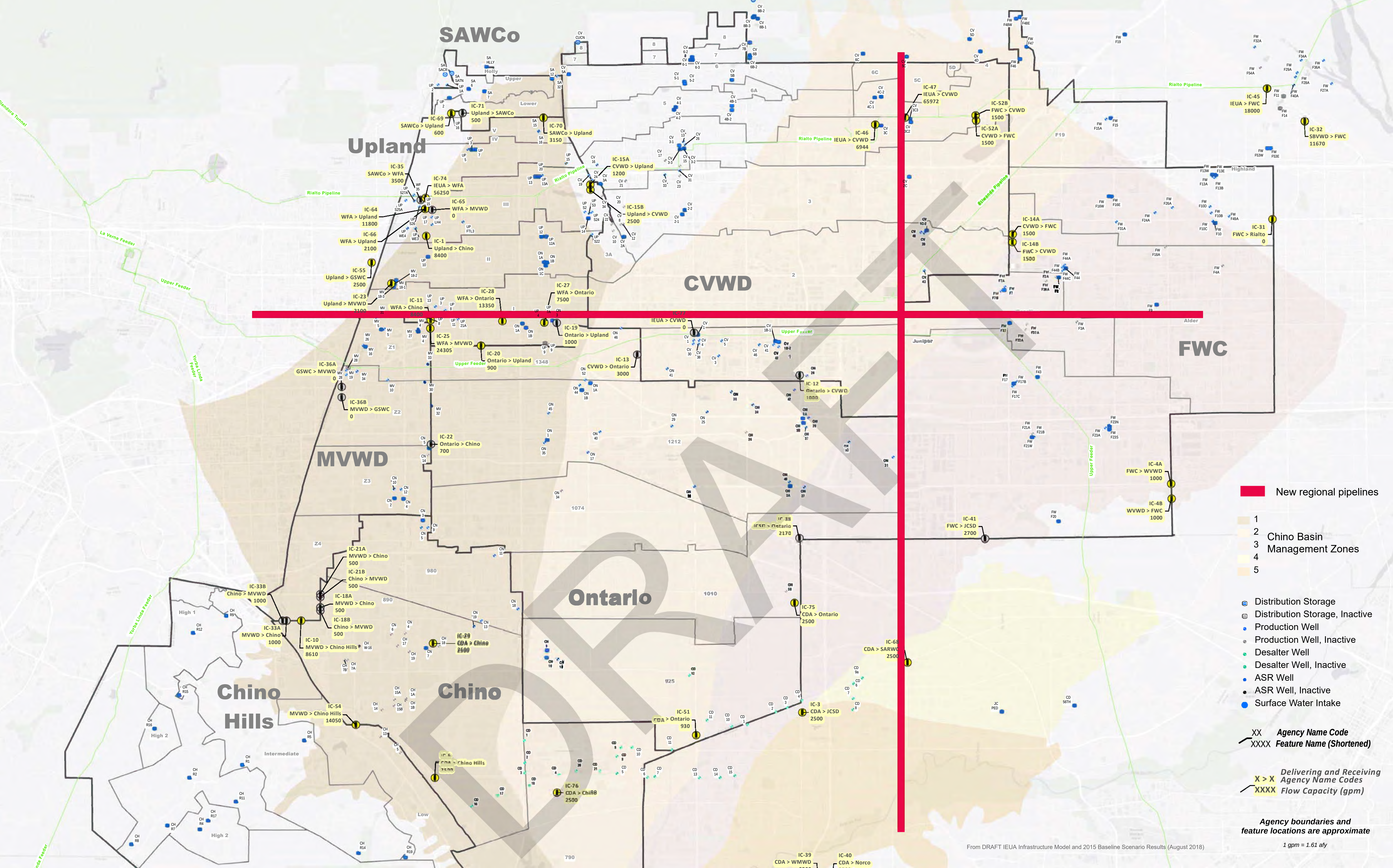
Prepared for:
OBMP 2020 Update
Scoping Report

Chino Basin Watermaster

Recycled Water Treatment Plants and Discharge Points

Exhibit D-1

Exhibit 17



SAWCo
Upland
CVWD
FWC
MVWD
Ontario
Chino
Chino Hills
DRAFT
New regional pipelines
1
2
3
4
5
Chino Basin Management Zones
Distribution Storage
Distribution Storage, Inactive
Production Well
Production Well, Inactive
Desalter Well
Desalter Well, Inactive
ASR Well
ASR Well, Inactive
Surface Water Intake
XX Agency Name Code
XXXX Feature Name (Shortened)
X > X Delivering and Receiving Agency Name Codes
XXXX Flow Capacity (gpm)
Agency boundaries and feature locations are approximate
1 gpm = 1.61 afy
From DRAFT IEUA Infrastructure Model and 2015 Baseline Scenario Results (August 2018)

Exhibit 18

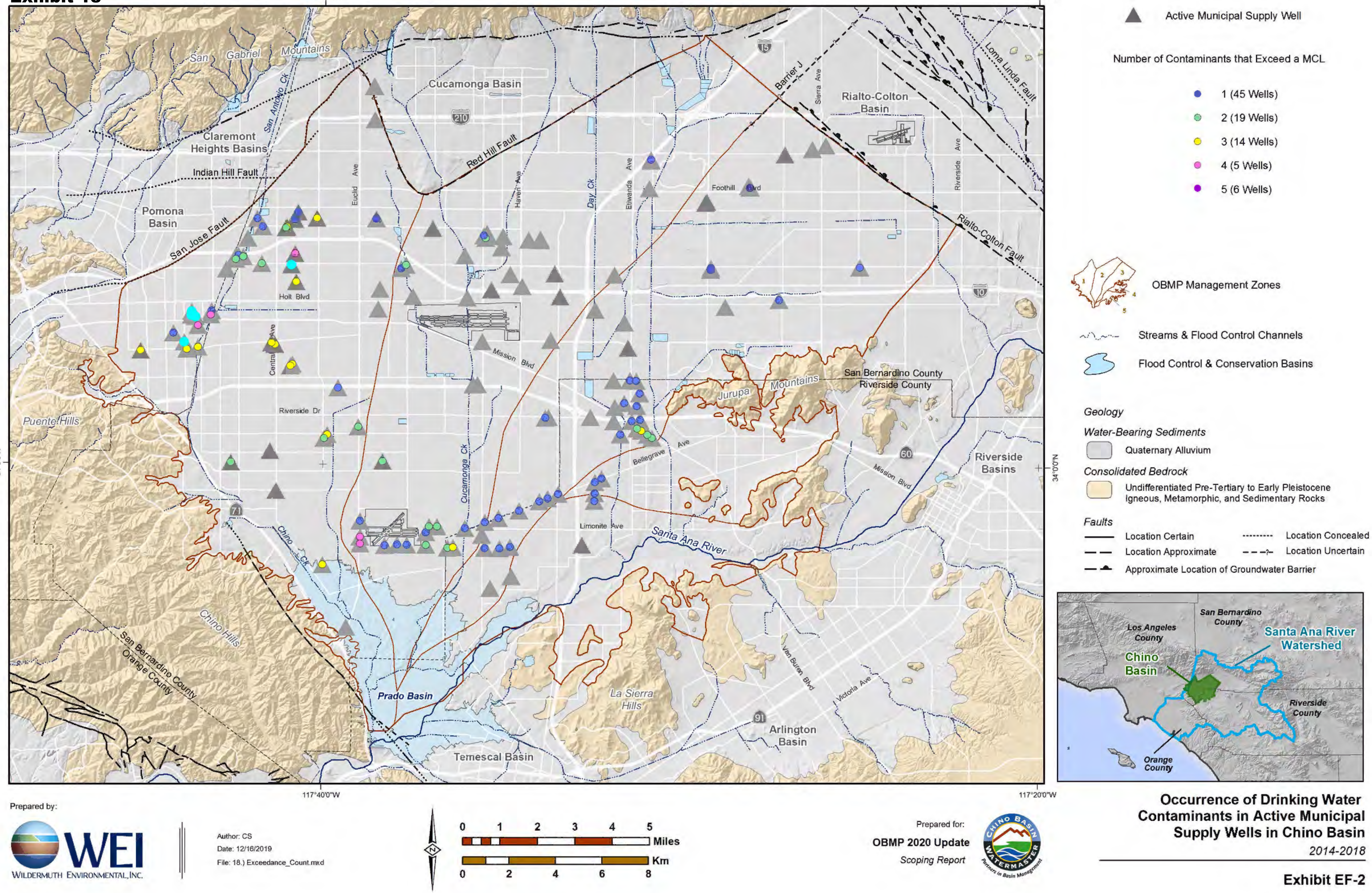
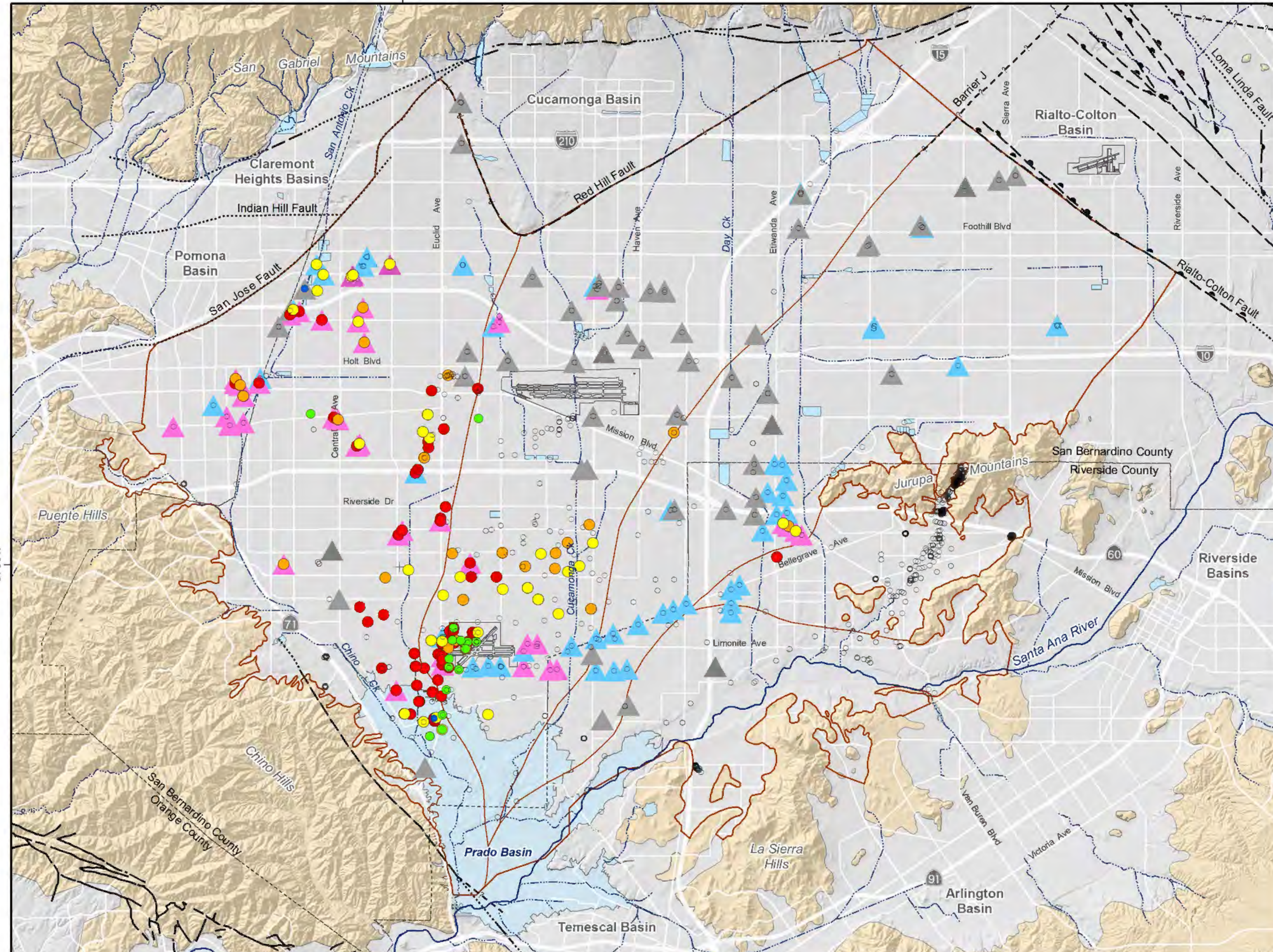

117°40'0"W
117°20'0"W
34°0'0"N
San Gabriel Mountains
Cucamonga Basin
Rialto-Colton Basin
Claremont Heights Basins
Indian Hill Fault
Pomona Basin
San Jose Fault
Red Hill Fault
Barrier J
Loma Linda Fault
Rialto-Colton Fault
San Antonio Ck
Euclid Ave
Haven Ave
Day Ck
Etiwanda Ave
Sierra Ave
Riverside Ave
Foothill Blvd
Holt Blvd
Central Ave
Mission Blvd
Riverside Dr
Bellegrave Ave
Limonite Ave
Cucamonga Ck
Chino Ck
Santa Ana River
Jurupa Mountains
San Bernardino County
Riverside County
Riverside Basins
Puente Hills
Chino Hills
San Bernardino County
Orange County
Prado Basin
Temescal Basin
La Sierra Hills
Arlington Basin
Van Buren Blvd
Victoria Ave
15
210
10
60
71
91
Active Municipal Supply Well
Number of Contaminants that Exceed a MCL
1 (45 Wells)
2 (19 Wells)
3 (14 Wells)
4 (5 Wells)
5 (6 Wells)
OBMP Management Zones
Streams & Flood Control Channels
Flood Control & Conservation Basins
Geology
Water-Bearing Sediments
Quaternary Alluvium
Consolidated Bedrock
Undifferentiated Pre-Tertiary to Early Pleistocene Igneous, Metamorphic, and Sedimentary Rocks
Faults
Location Certain
Location Approximate
Approximate Location of Groundwater Barrier
Location Concealed
Location Uncertain
Los Angeles County
San Bernardino County
Santa Ana River Watershed
Chino Basin
Riverside County
Orange County
Prepared by:
WEI
Wildermuth Environmental, Inc.
Author: CS
Date: 12/16/2019
File: 18.) Exceedance_Count.mxd
0 1 2 3 4 5 Miles
0 2 4 6 8 Km
Prepared for:
OBMP 2020 Update
Scoping Report
Chino Basin Watermaster
Partners in Basin Management
Occurrence of Drinking Water Contaminants in Active Municipal Supply Wells in Chino Basin
2014-2018
Exhibit EF-2

Exhibit 19



1,2,3-TCP (µgl)

- ND
- < 0.0025
- 0.0025 - 0.005
- 0.005 - 0.01
- 0.01 - 0.02
- > 0.02

California Primary MCL = 0.005 µgl

Active Municipal Supply Well

- Well with no contaminants that exceed the MCL
- Well with one contaminant that exceeds the MCL
- Well with two or more contaminants that exceed the MCL

OBMP Management Zones

Streams & Flood Control Channels

Flood Control & Conservation Basins

Geology

Water-Bearing Sediments

Quaternary Alluvium

Consolidated Bedrock

Undifferentiated Pre-Tertiary to Early Pleistocene Igneous, Metamorphic, and Sedimentary Rocks

Faults

- Location Certain
- Location Approximate
- Approximate Location of Groundwater Barrier
- Location Concealed
- Location Uncertain

Prepared by:

WEI
WILDERMUTH ENVIRONMENTAL, INC.

Author: CS
Date: 12/18/2019
File: 19.) 1,2,3-TCP_2014-2018.mxd

0 1 2 3 4 5 Miles

0 2 4 6 8 Km

Prepared for:

OBMP 2020 Update

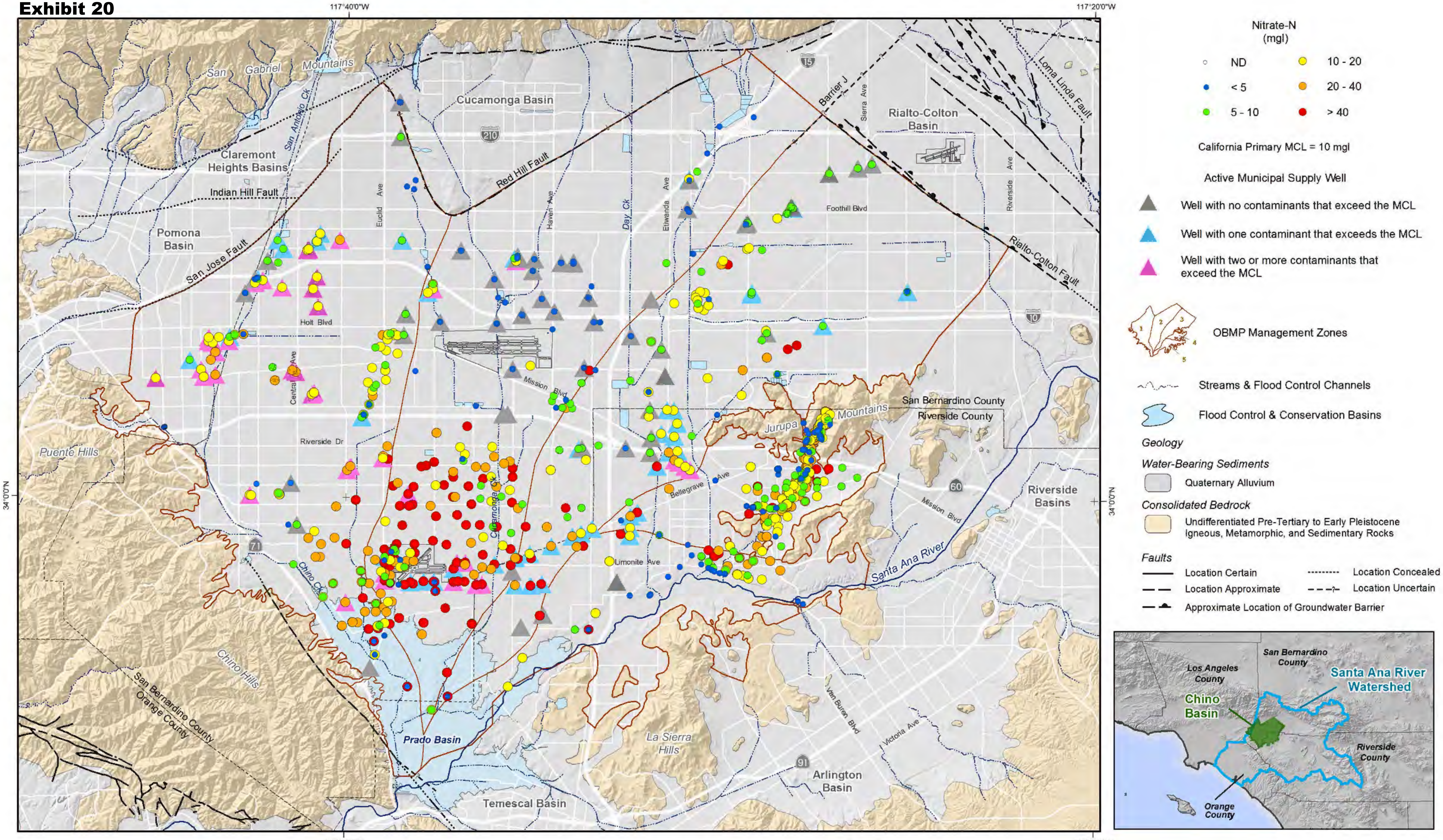
Scoping Report

Maximum 1,2,3-Trichloropropane (1,2,3-TCP) Concentration

2014-2018

Exhibit EF-4

Exhibit 20



Prepared by:

WEI
WILDERMUTH ENVIRONMENTAL, INC.

Author: CS
Date: 12/18/2019
File: 20.) NO3_2014-2018.mxd

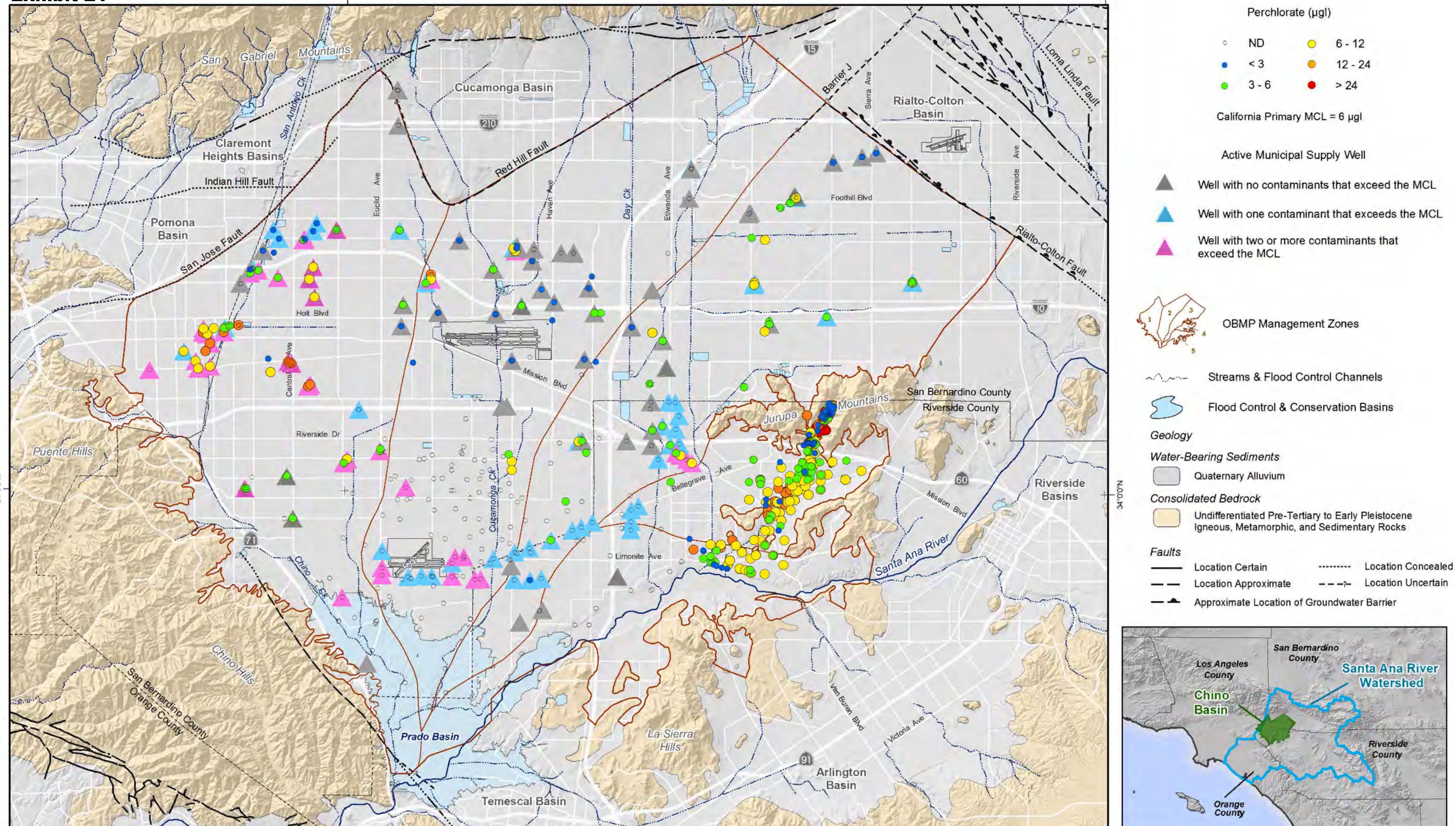
Prepared for:
OBMP 2020 Update
Scoping Report

CHINO BASIN WATERMASTER
Partners in Basin Management

Maximum Nitrate Concentration
2014-2018

Exhibit EF-3

Exhibit 21



Prepared by:

WEI Wildermuth Environmental, Inc.

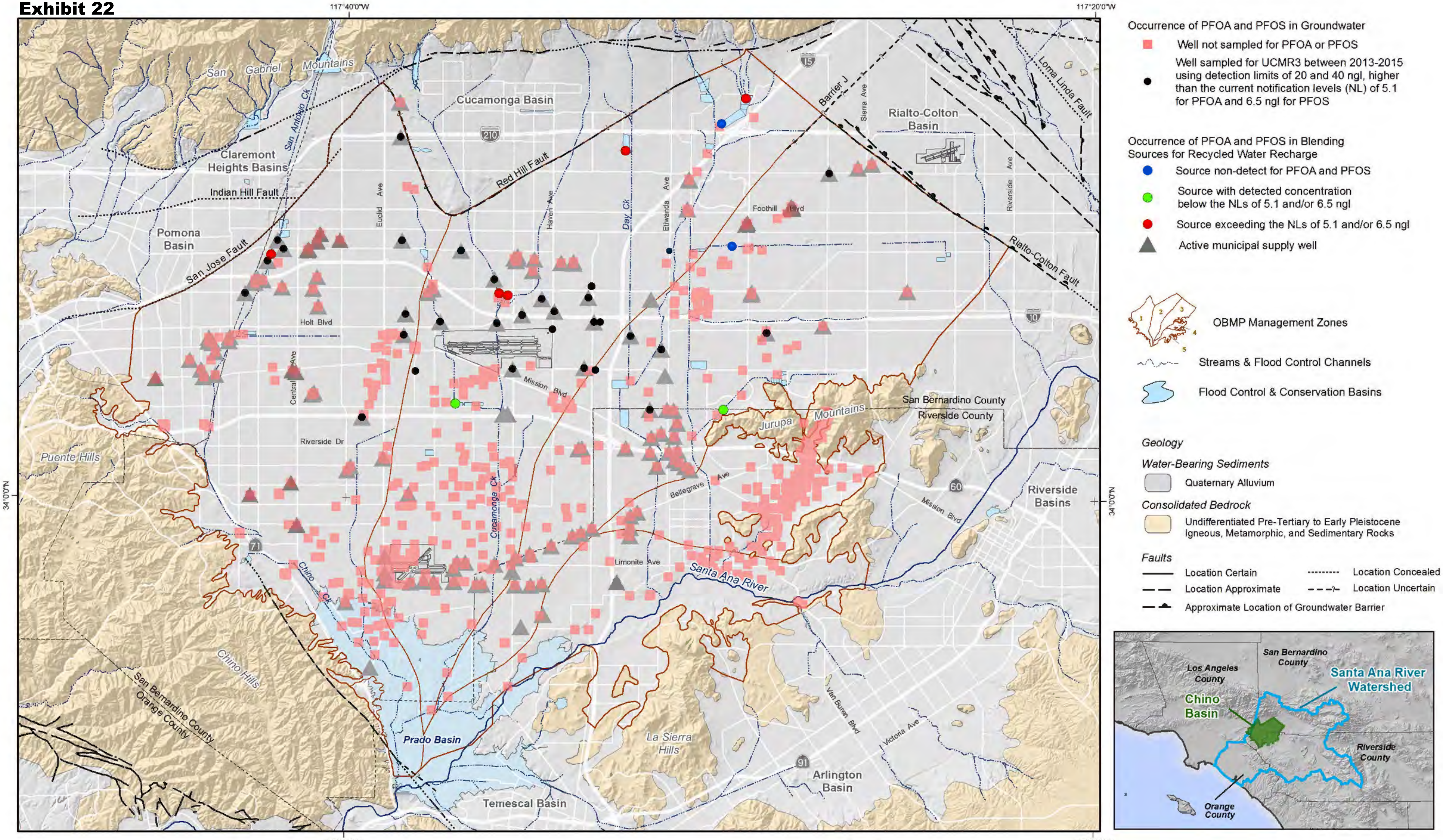
Author: CS
Date: 12/18/2019
File: 21.) CLO4_MCL_2014-2018.mxd

Prepared for:
OBMP 2020 Update
Scoping Report

Maximum Perchlorate Concentration
2014-2018

Exhibit EF-5

Exhibit 22



Prepared by:

WEI
WILDERMUTH ENVIRONMENTAL, INC.

Author: CS
Date: 12/18/2019
File: 22.) PFAS_1998-2019.mxd

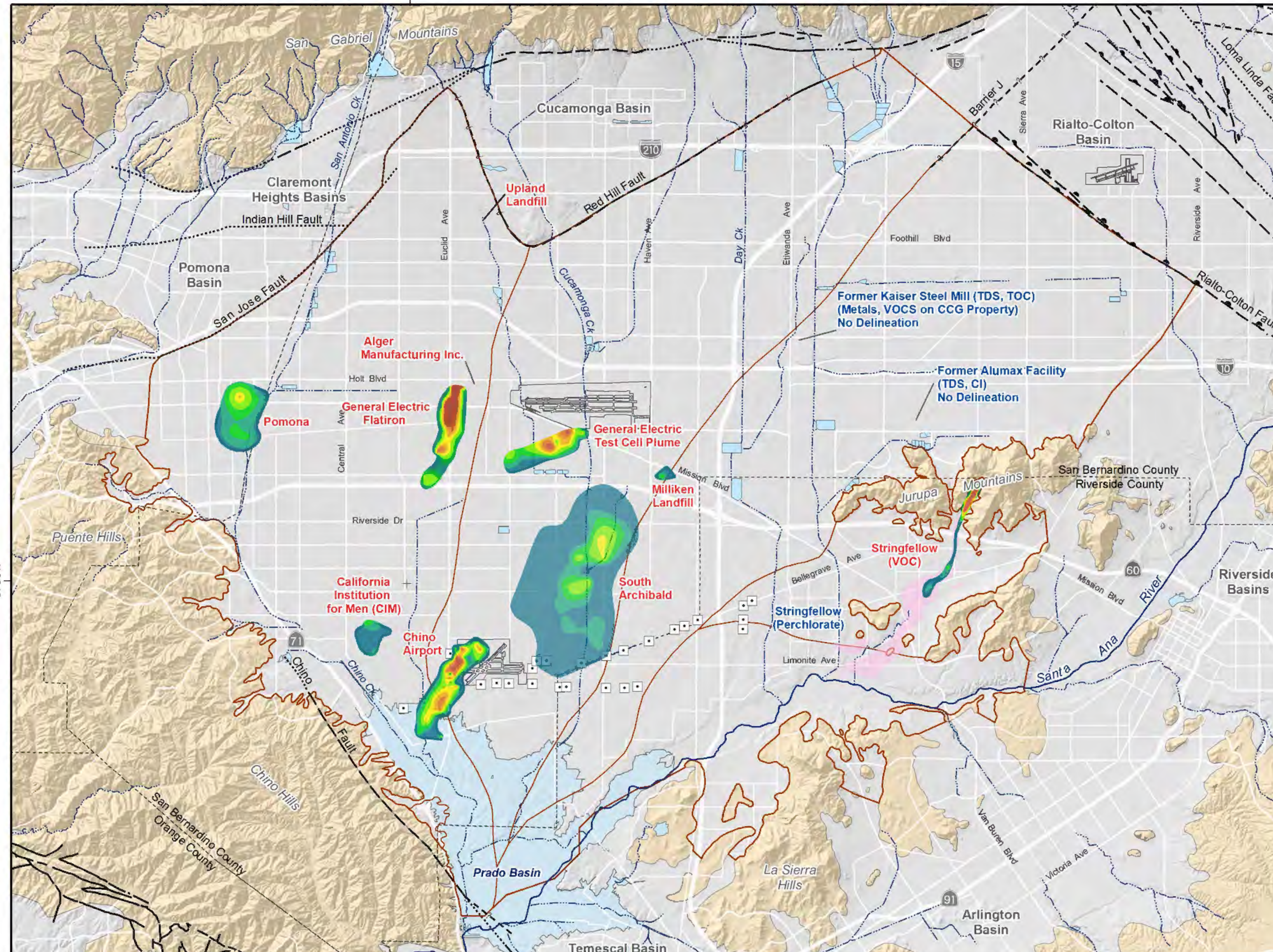
Prepared for:
OBMP 2020 Update
Scoping Report

CHINO BASIN WATERMASTER
Partners in Basin Management

PFOA and PFOS Concentrations
Through March 2019

Exhibit EF-10

Exhibit 23



VOC Concentration (µgl)

- > 0 to ≤ 5
- > 5 to ≤ 10
- > 10 to ≤ 20
- > 20 to ≤ 50
- > 50 to ≤ 100
- > 100 to ≤ 200
- > 200 to ≤ 500
- > 500

The VOC plumes shown on this map are generalized illustrations of the estimated spatial extent of TCE or PCE, based on the maximum concentration measured at wells over the five-year period of July 2013 to June 2018. The VOC plume illustrations were created with the grid function in Golden Software's Surfer 16 using an ordinary kriging interpolation model with model input parameter estimation and optimization performed by semivariogram analysis in Golden Software's Surfer 16. Interpretations of the plume extent and boundary delineation were made based on measured concentrations and local groundwater flow patterns as predicted by the Chino Basin groundwater flow model.

VOC Plumes Labeled in Red by Name

Other Plumes - Labeled in Blue by Name and Dominant Contaminant

The plumes characterized by color ramp represent Watermaster's most recent characterization of the primary contaminant of concern. The spatial extent of the VOC contamination was delineated by Watermaster based on the five-year maximum concentrations of the primary contaminant of concern for the period of July 2013 to June 2018. The primary VOC contaminant of concern in all of the plumes is TCE with the exception of the CIM plume, which is PCE. The VOC plumes associated with the Upland Landfill and the Alger Manufacturing Facility are of limited geographical extent at the scale of this map, so only their general locations are identified.

Other point-source contamination plumes in the Chino Basin include the former Kaiser Steel Mill, the former Alumax Facility, and the Stringfellow NPL Site, which are labeled by name and the primary contaminants associated with the sites. The former Kaiser Steel Mill TDS and total organic carbon (TOC) plume has not been delineated since 2008 (WEI, 2008b), and there are no plume delineations for the contamination associated with the former Kaiser Steel Mill CCG Property for metals and VOCs or the former Alumax Facility for TDS and chloride (Cl). The Stringfellow perchlorate plume shown here was delineated in the most recent remediation evaluation report for the site (Kleinfelder, 2018).

Prepared by:

WEI
WILDERMUTH ENVIRONMENTAL, INC.

Author: LH
Date: 12/18/2019
File: 23.) Plumes_new_txt.mxd

0 1 2 3 4 5 Miles
0 2 4 6 8 Km

Prepared for:

2018 State of the Basin Report
Groundwater Quality

Delineation of Groundwater Contamination
Plumes and Point Sources of Concern

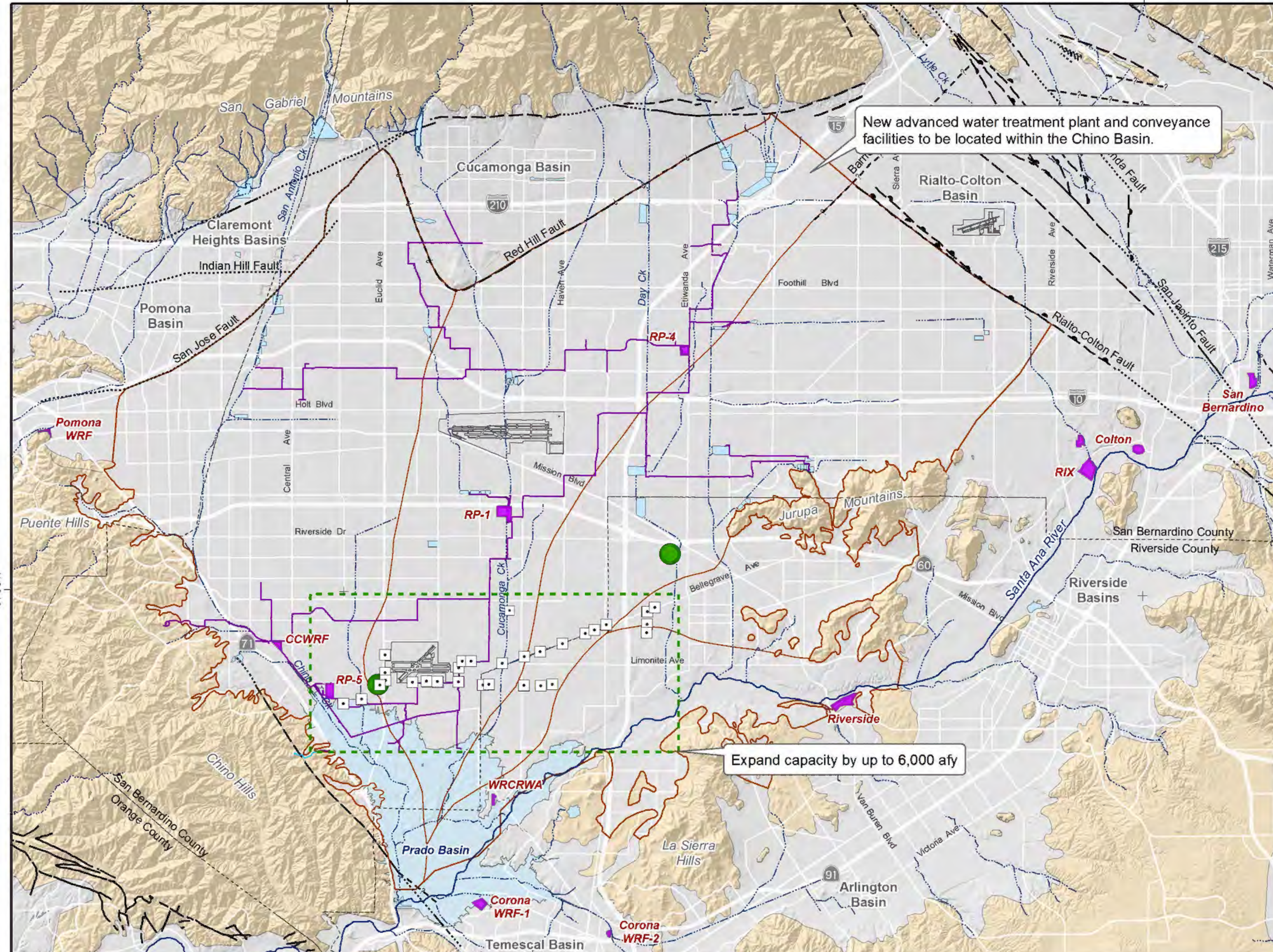
Exhibit 5-15

Exhibit 24

Exhibit 15
Limitations, Compliance Metrics, and Compliance Actions for the Chino Basin Maximum-Benefit Commitments

Source Waters with Water Quality Limitations in the Chino Basin SNMP	Water Quality Limitation	Compliance Metric	Action Limit	Required Compliance Action when Compliance Metric Exceeds the Action Limit
IEUA Recycled Water (Commitment 6)	TDS: 550 mgl	The agency-wide, 12-month running-average concentration	When the compliance metric exceeds 545 mgl for three consecutive months	Submit to the Regional Board for approval a plan and schedule to comply with the water quality limitations within 60 days.
	TIN: 8 mgl		When the compliance metric exceeds 8 mgl in any month	
Combined water sources used for managed recharge: storm, imported and recycled waters (Commitment 7)	TDS: 420 mgl Nitrate: 5 mgl	The five-year, volume-weighted running-average concentration of all sources of managed recharge	TDS: 420 mgl Nitrate: 5 mgl	Prepare a salt offset plan to mitigate salt loading from recharge greater than 420 mgl. Offsets could include desalting of recycled water or groundwater, or increased recharge of low-TDS waters.
Groundwater (Commitment 9)	TDS: 420 mgl	The volume-weighted concentration of groundwater in the Chino North GMZ (computed every three years)	TDS: 420 mgl	Reduce the TDS concentration of IEUA recycled water to comply with the maximum-benefit TDS objective or prepare a salt offset plan to mitigate loading from the use of recycled water than 420 mgl.
	Nitrate: 5 mgl		n/a	This action limit was already exceeded when the objective was established. So long as all other maximum benefit commitments are met, no compliance action is required.

Exhibit 25



Recycled Water Treatment Plant*

*New treatment train at one or more IEUA plants to reduce the TDS concentration to levels to ensure compliance with its permits

Recycled Water Distribution System

Desalter Treatment Facility

Chino Basin Desalter Well

OBMP Management Zones

Streams & Flood Control Channels

Flood Control & Conservation Basins

Faults

Location Certain

Location Approximate

Approximate Location of Groundwater Barrier

Location Concealed

Location Uncertain

Geology

Water-Bearing Sediments

Quaternary Alluvium

Consolidated Bedrock

Undifferentiated Pre-Tertiary to Early Pleistocene Igneous, Metamorphic, and Sedimentary Rocks

Prepared by:

WEI
WILDERMUTH ENVIRONMENTAL, INC.

Author: SO
Date: 12/20/2019
File: 25.) Exhibit D-1_RW Treatment Plants.mxd

0 1 2 3 4 5 Miles

0 2 4 6 8 Km

Prepared for:

OBMP 2020 Update

Scoping Report

Recycled Water Treatment Plants and Discharge Points

Exhibit D-1

Exhibit 26

Exhibit 16

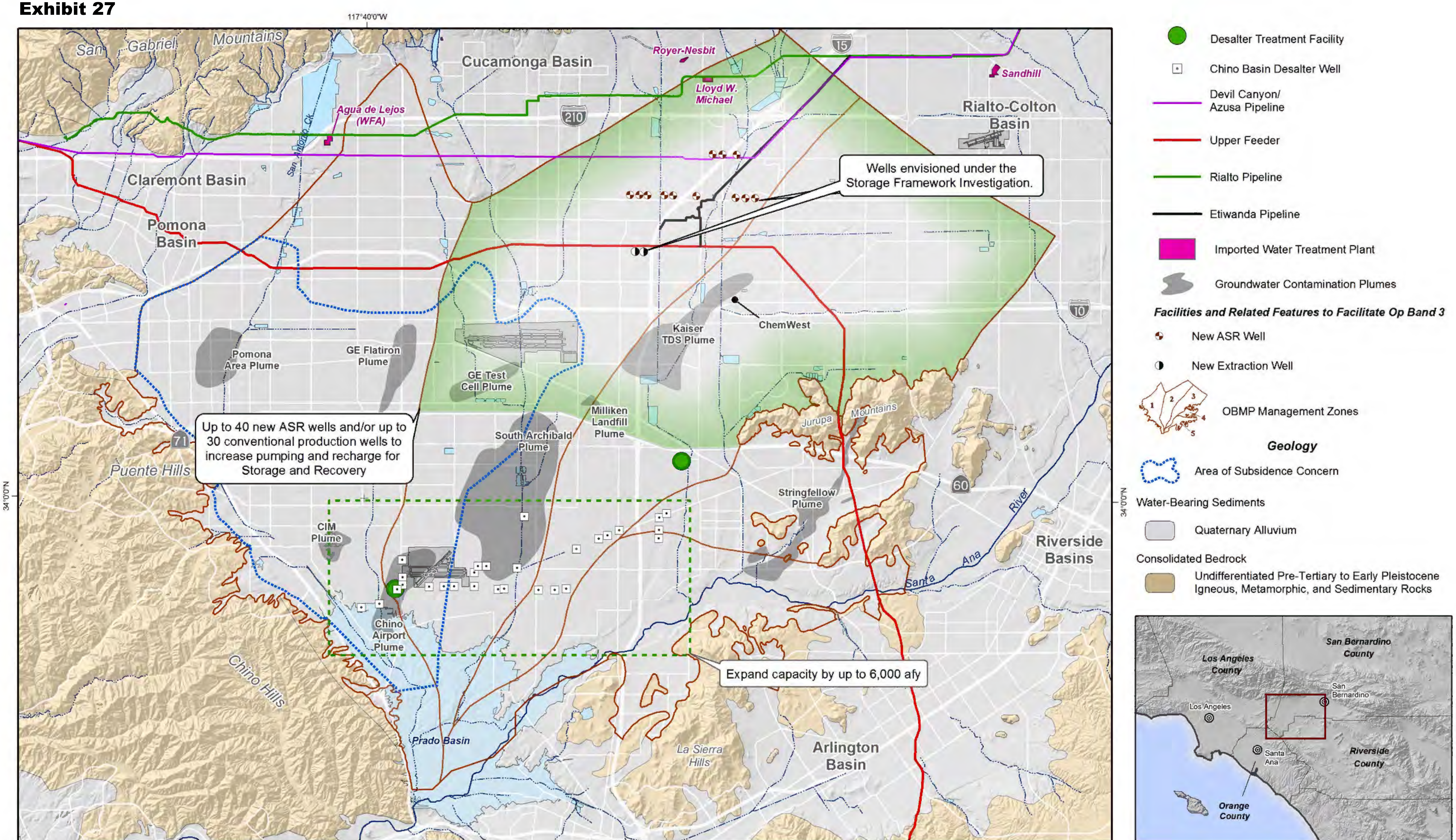
Ending Balances in Managed Storage in the Chino Basin[1]

(af)

Fiscal Year ending June 30	Appropriative Pool				Overlying Non-Agricultural Pool			Total Managed Storage by Parties	Dry Year Yield Program Storage	Total Managed Storage
	Carryover (1)	Excess Carryover (2)	Local Supplemental Storage (3)	Subtotal (4)	Carryover (5)	Excess Carryover (6)	Subtotal (7)	(8) = (7) + (4)	(9)	(10) = (9) + (8)
2000	28,911	170,342		199,253	6,541	31,031	37,572	236,825	0	236,825
2001	15,940	77,907	92,813	186,660	5,301	32,330	37,631	224,291	0	224,291
2002	13,521	70,103	87,801	171,425	5,285	33,727	39,012	210,437	0	210,437
2003	18,656	71,329	81,180	171,165	6,743	36,850	43,593	214,758	7,738	222,496
2004	21,204	70,503	80,963	172,670	7,177	40,881	48,058	220,728	26,300	247,028
2005	21,289	76,080	88,849	186,218	7,227	45,888	53,115	239,333	38,754	278,087
2006	32,062	56,062	86,170	174,294	7,227	49,178	56,405	230,699	58,653	289,352
2007	34,552	50,895	83,184	168,631	7,084	51,476	58,560	227,191	77,116	304,307
2008	41,626	83,962	81,520	207,108	6,819	45,248	52,067	259,175	74,877	334,052
2009	42,795	101,908	79,890	224,593	6,672	46,600	53,272	277,865	34,494	312,359
2010	41,263	120,897	90,133	252,293	6,934	47,732	54,666	306,959	8,543	315,502
2011	41,412	146,074	98,080	285,566	6,959	49,343	56,302	341,868	0	341,868
2012	42,614	209,981	116,138	368,733	6,914	13,993	20,907	389,640	0	389,640
2013	39,413	225,068	116,378	380,859	7,073	15,473	22,546	403,405	0	403,405
2014	41,708	224,496	123,484	389,688	6,478	12,812	19,290	408,978	0	408,978
2015	40,092	239,517	127,994	407,603	6,823	12,225	19,048	426,651	0	426,651
2016	39,733	248,013	131,522	419,267	7,195	9,949	17,144	436,411	0	436,411
2017	38,340	260,682	143,552	442,575	7,226	8,292	15,519	458,093	6,315	464,408
2018	34,582	254,221	155,018	443,821	7,198	10,775	17,973	461,795	41,380	503,174
2019	38,605	279,033	166,406	484,044	7,227	12,004	19,231	503,275	45,969	549,244

1 -- WEI. (2019). Draft Storage Management Plan.

Exhibit 27



117°40'0"W

Prepared by:

WEI
WILDERMUTH ENVIRONMENTAL, INC.

Author: GAR
Date: 12/20/2019
Document Name: 27.) MZ-2_3_ASR Additions

0 1 2 3 4 5 Miles
0 2 4 6 8 KM

Prepared for:
Storage Framework Investigation

CHINO BASIN WATERMASTER
Partners in Basin Management

Siting of New ASR and Extraction Wells to Facilitate Storage and Recovery Programs in Op Band 3

Figure 6-2a

Program Natural Environment Study
Optimum Basin Management Program Update

Chino Basin Watermaster and Inland Empire Utilities Agency

Management Zone 1
CNDDB and IPaC Lists

CALIFORNIA DEPARTMENT OF FISH and WILDLIFE RareFind

OBMPU Management Zone 1

Query Summary:
Quad IS (San Dimas (3411717) OR Ontario (3411716) OR Mt. Baldy (3411726) OR Prado Dam (3311786) OR Guasti (3411715))

Print Close

CNDDB Element Query Results

Scientific Name	Common Name	Taxonomic Group	Element Code	Total Occs	Returned Occs	Federal Status	State Status	Global Rank	State Rank	CA Rare Plant Rank	Other Status	Habitats
Abronia villosa var. aurita	chaparral sand-verbena	Dicots	PDNYC010P1	98	1	None	None	G5T2?	S2	1B.1	BLM_S-Sensitive, SB_RSABG-Rancho Santa Ana Botanic Garden, USFS_S-Sensitive	Chaparral, Coastal scrub, Desert dunes
Accipiter cooperii	Cooper's hawk	Birds	ABNKC12040	118	1	None	None	G5	S4	null	CDFW_WL-Watch List, IUCN_LC-Least Concern	Cismontane woodland, Riparian forest, Riparian woodland, Upper montane coniferous forest
Agelaius tricolor	tricolored blackbird	Birds	ABPBXB0020	955	4	None	Threatened	G2G3	S1S2	null	BLM_S-Sensitive, CDFW_SSC-Species of Special Concern, IUCN_EN-Endangered, NABCI_RWL-Red Watch List, USFWS_BCC-Birds of Conservation Concern	Freshwater marsh, Marsh & swamp, Swamp, Wetland
Aimophila ruficeps canescens	southern California rufous-crowned sparrow	Birds	ABPBX91091	235	3	None	None	G5T3	S3	null	CDFW_WL-Watch List	Chaparral, Coastal scrub
Ammodramus savannarum	grasshopper sparrow	Birds	ABPBXA0020	27	1	None	None	G5	S3	null	CDFW_SSC-Species of Special Concern, IUCN_LC-Least Concern	Valley & foothill grassland
Anaxyrus californicus	arroyo toad	Amphibians	AAABB01230	139	1	Endangered	None	G2G3	S2S3	null	CDFW_SSC-Species of Special Concern, IUCN_EN-Endangered	Desert wash, Riparian scrub, Riparian woodland, South coast flowing waters, South coast standing waters
Anniella stebbinsi	southern California legless lizard	Reptiles	ARACC01060	417	11	None	None	G3	S3	null	CDFW_SSC-Species of Special Concern, USFS_S-Sensitive	Broadleaved upland forest, Chaparral, Coastal dunes, Coastal scrub
Antrozous pallidus	pallid bat	Mammals	AMACC10010	420	2	None	None	G5	S3	null	BLM_S-Sensitive, CDFW_SSC-Species of Special Concern, IUCN_LC-Least Concern, USFS_S-Sensitive, WBWG_H-High Priority	Chaparral, Coastal scrub, Desert wash, Great Basin grassland, Great Basin scrub, Mojavean desert scrub, Riparian woodland, Sonoran desert scrub, Upper montane coniferous forest, Valley & foothill grassland

Aquila chrysaetos	golden eagle	Birds	ABNKC22010	321	3	None	None	G5	S3	null	BLM_S-Sensitive, CDF_S-Sensitive, CDFW_FP-Fully Protected, CDFW_WL-Watch List, IUCN_LC-Least Concern, USFWS_BCC-Birds of Conservation Concern	Broadleaved upland forest, Cismontane woodland, Coastal prairie, Great Basin grassland, Great Basin scrub, Lower montane coniferous forest, Pinon & juniper woodlands, Upper montane coniferous forest, Valley & foothill grassland
Arctostaphylos glandulosa ssp. gabrielensis	San Gabriel manzanita	Dicots	PDERI042P0	35	3	None	None	G5T3	S3	1B.2	BLM_S-Sensitive, SB_RSABG-Rancho Santa Ana Botanic Garden, USFS_S-Sensitive	Chaparral
Arizona elegans occidentalis	California glossy snake	Reptiles	ARADB01017	260	5	None	None	G5T2	S2	null	CDFW_SSC-Species of Special Concern	null
Asio otus	long-eared owl	Birds	ABNSB13010	48	1	None	None	G5	S3?	null	CDFW_SSC-Species of Special Concern, IUCN_LC-Least Concern	Cismontane woodland, Great Basin scrub, Riparian forest, Riparian woodland, Upper montane coniferous forest
Aspidoscelis hyperythra	orange-throated whiptail	Reptiles	ARACJ02060	369	2	None	None	G5	S2S3	null	CDFW_WL-Watch List, IUCN_LC-Least Concern, USFS_S-Sensitive	Chaparral, Cismontane woodland, Coastal scrub
Aspidoscelis tigris stejnegeri	coastal whiptail	Reptiles	ARACJ02143	148	2	None	None	G5T5	S3	null	CDFW_SSC-Species of Special Concern	null
Astragalus brauntonii	Braunton's milk-vetch	Dicots	PDFAB0F1G0	44	1	Endangered	None	G2	S2	1B.1	SB_RSABG-Rancho Santa Ana Botanic Garden, SB_SBBG-Santa Barbara Botanic Garden	Chaparral, Coastal scrub, Limestone, Valley & foothill grassland
Athene cunicularia	burrowing owl	Birds	ABNSB10010	1989	31	None	None	G4	S3	null	BLM_S-Sensitive, CDFW_SSC-Species of Special Concern, IUCN_LC-Least Concern, USFWS_BCC-Birds of Conservation Concern	Coastal prairie, Coastal scrub, Great Basin grassland, Great Basin scrub, Mojavean desert scrub, Sonoran desert scrub, Valley & foothill grassland
Atriplex coulteri	Coulter's saltbush	Dicots	PDCHE040E0	121	1	None	None	G3	S1S2	1B.2	SB_RSABG-Rancho Santa Ana Botanic Garden	Coastal bluff scrub, Coastal dunes, Coastal scrub, Valley & foothill grassland
Batrachoseps gabrieli	San Gabriel slender salamander	Amphibians	AAAAD02110	8	3	None	None	G2G3	S2S3	null	IUCN_DD-Data Deficient, USFS_S-Sensitive	Talus slope
Berberis nevinii	Nevin's barberry	Dicots	PDBER060A0	32	4	Endangered	Endangered	G1	S1	1B.1	SB_RSABG-Rancho Santa Ana Botanic Garden, SB_SBBG-Santa Barbara Botanic Garden	Chaparral, Cismontane woodland, Coastal scrub, Riparian scrub

Bombus crotchii	Crotch bumble bee	Insects	IIHYM24480	234	5	None	Candidate Endangered	G3G4	S1S2	null	null	null
Buteo swainsoni	Swainson's hawk	Birds	ABNKC19070	2518	2	None	Threatened	G5	S3	null	BLM_S-Sensitive, IUCN_LC-Least Concern, USFWS_BCC-Birds of Conservation Concern	Great Basin grassland, Riparian forest, Riparian woodland, Valley & foothill grassland
California Walnut Woodland	California Walnut Woodland	Woodland	CTT71210CA	76	13	None	None	G2	S2.1	null	null	Cismontane woodland
Callophrys mossii hidakupa	San Gabriel Mountains elfin butterfly	Insects	IILEPE2206	3	3	None	None	G4T1T2	S1S2	null	USFS_S-Sensitive	Lower montane coniferous forest
Calochortus clavatus var. gracilis	slender mariposa-lily	Monocots	PMLIL0D096	143	5	None	None	G4T2T3	S2S3	1B.2	BLM_S-Sensitive, SB_RSABG-Rancho Santa Ana Botanic Garden, USFS_S-Sensitive	Chaparral, Coastal scrub, Valley & foothill grassland
Calochortus plummerae	Plummer's mariposa-lily	Monocots	PMLIL0D150	230	14	None	None	G4	S4	4.2	SB_RSABG-Rancho Santa Ana Botanic Garden	Chaparral, Cismontane woodland, Coastal scrub, Lower montane coniferous forest, Valley & foothill grassland
Calochortus weedii var. intermedius	intermediate mariposa-lily	Monocots	PMLIL0D1J1	140	6	None	None	G3G4T2	S2	1B.2	SB_RSABG-Rancho Santa Ana Botanic Garden, USFS_S-Sensitive	Chaparral, Coastal scrub, Valley & foothill grassland
Calystegia felix	lucky morning-glory	Dicots	PDCON040P0	10	6	None	None	G1Q	S1	1B.1	null	Meadow & seep, Riparian scrub
Campylorhynchus brunneicapillus sandiegensis	coastal cactus wren	Birds	ABPBG02095	156	1	None	None	G5T3Q	S3	null	CDFW_SSC-Species of Special Concern, USFS_S-Sensitive, USFWS_BCC-Birds of Conservation Concern	Coastal scrub
Canyon Live Oak Ravine Forest	Canyon Live Oak Ravine Forest	Riparian	CTT61350CA	50	14	None	None	G3	S3.3	null	null	Riparian forest
Catostomus santaanae	Santa Ana sucker	Fish	AFCJC02190	28	2	Threatened	None	G1	S1	null	AFS_TH-Threatened, IUCN_VU-Vulnerable	Aquatic, South coast flowing waters
Centromadia pungens ssp. laevis	smooth tarplant	Dicots	PDAST4R0R4	126	1	None	None	G3G4T2	S2	1B.1	SB_RSABG-Rancho Santa Ana Botanic Garden	Alkali playa, Chenopod scrub, Meadow & seep, Riparian woodland, Valley & foothill grassland, Wetland
Chaetodipus fallax fallax	northwestern San Diego pocket mouse	Mammals	AMAFD05031	101	3	None	None	G5T3T4	S3S4	null	CDFW_SSC-Species of Special Concern	Chaparral, Coastal scrub
Chorizanthe parryi var. parryi	Parry's spineflower	Dicots	PDPGN040J2	150	2	None	None	G3T2	S2	1B.1	BLM_S-Sensitive, SB_RSABG-Rancho Santa Ana Botanic Garden, USFS_S-Sensitive	Chaparral, Cismontane woodland, Coastal scrub, Valley & foothill grassland
Cladium californicum	California saw-grass	Monocots	PMCYP04010	13	1	None	None	G4	S2	2B.2	SB_RSABG-Rancho Santa Ana Botanic Garden, USFS_S-Sensitive	Alkali marsh, Freshwater marsh, Meadow & seep, Wetland
Coccyzus	western	Birds	ABNRB02022	156	3	Threatened	Endangered	G5T2T3	S1	null	BLM_S-	Riparian forest

americanus occidentalis	yellow-billed cuckoo										Sensitive, NABCI_RWL-Red Watch List, USFS_S-Sensitive, USFWS_BCC-Birds of Conservation Concern	
Coturnicops noveboracensis	yellow rail	Birds	ABNME01010	45	1	None	None	G4	S1S2	null	CDFW_SSC-Species of Special Concern, IUCN_LC-Least Concern, NABCI_RWL-Red Watch List, USFS_S-Sensitive, USFWS_BCC-Birds of Conservation Concern	Freshwater marsh, Meadow & seep
Crotalus ruber	red-diamond rattlesnake	Reptiles	ARADE02090	192	3	None	None	G4	S3	null	CDFW_SSC-Species of Special Concern, USFS_S-Sensitive	Chaparral, Mojavean desert scrub, Sonoran desert scrub
Cypseloides niger	black swift	Birds	ABNUA01010	46	1	None	None	G4	S2	null	CDFW_SSC-Species of Special Concern, IUCN_LC-Least Concern, NABCI_YWL-Yellow Watch List, USFWS_BCC-Birds of Conservation Concern	null
Diplectrona californica	California diplectronan caddisfly	Insects	IITRI23010	1	1	None	None	G1G2	S1S2	null	null	Aquatic
Dipodomys merriami parvus	San Bernardino kangaroo rat	Mammals	AMAFD03143	81	3	Endangered	Candidate Endangered	G5T1	S1	null	CDFW_SSC-Species of Special Concern	Coastal scrub
Dipodomys stephensi	Stephens' kangaroo rat	Mammals	AMAFD03100	220	1	Endangered	Threatened	G2	S2	null	IUCN_EN-Endangered	Coastal scrub, Valley & foothill grassland
Dodecahema leptoceras	slender-horned spineflower	Dicots	PDPGN0V010	41	1	Endangered	Endangered	G1	S1	1B.1	SB_RSABG-Rancho Santa Ana Botanic Garden	Chaparral, Cismontane woodland, Coastal scrub
Dudleya multicaulis	many-stemmed dudleya	Dicots	PDCRA040H0	154	14	None	None	G2	S2	1B.2	BLM_S-Sensitive, SB_RSABG-Rancho Santa Ana Botanic Garden, USFS_S-Sensitive	Chaparral, Coastal scrub, Valley & foothill grassland
Elanus leucurus	white-tailed kite	Birds	ABNKC06010	180	3	None	None	G5	S3S4	null	BLM_S-Sensitive, CDFW_FP-Fully Protected, IUCN_LC-Least Concern	Cismontane woodland, Marsh & swamp, Riparian woodland, Valley & foothill grassland, Wetland
Empidonax traillii extimus	southwestern willow flycatcher	Birds	ABPAE33043	70	2	Endangered	Endangered	G5T2	S1	null	NABCI_RWL-Red Watch List	Riparian woodland
Emys marmorata	western pond turtle	Reptiles	ARAAD02030	1385	2	None	None	G3G4	S3	null	BLM_S-Sensitive, CDFW_SSC-Species of Special Concern, IUCN_VU-Vulnerable, USFS_S-Sensitive	Aquatic, Artificial flowing waters, Klamath/North coast flowing waters, Klamath/North coast standing waters, Marsh & swamp, Sacramento/San Joaquin flowing

												waters, Sacramento/San Joaquin standing waters, South coast flowing waters, South coast standing waters, Wetland
Eriastrum densifolium ssp. sanctorum	Santa Ana River woollystar	Dicots	PDPLM03035	31	1	Endangered	Endangered	G4T1	S1	1B.1	SB_RSABG-Rancho Santa Ana Botanic Garden	Chaparral, Coastal scrub
Eumops perotis californicus	western mastiff bat	Mammals	AMACD02011	296	5	None	None	G5T4	S3S4	null	BLM_S-Sensitive, CDFW_SSC-Species of Special Concern, WBWG_H-High Priority	Chaparral, Cismontane woodland, Coastal scrub, Valley & foothill grassland
Falco columbarius	merlin	Birds	ABNKD06030	37	1	None	None	G5	S3S4	null	CDFW_WL-Watch List, IUCN_LC-Least Concern	Estuary, Great Basin grassland, Valley & foothill grassland
Gila orcuttii	arroyo chub	Fish	AFCJB13120	49	2	None	None	G2	S2	null	AFS_VU-Vulnerable, CDFW_SSC-Species of Special Concern, USFS_S-Sensitive	Aquatic, South coast flowing waters
Horkelia cuneata var. puberula	mesa horkelia	Dicots	PDROS0W045	103	6	None	None	G4T1	S1	1B.1	USFS_S-Sensitive	Chaparral, Cismontane woodland, Coastal scrub
Icteria virens	yellow-breasted chat	Birds	ABPBX24010	100	1	None	None	G5	S3	null	CDFW_SSC-Species of Special Concern, IUCN_LC-Least Concern	Riparian forest, Riparian scrub, Riparian woodland
Lasiurus cinereus	hoary bat	Mammals	AMACC05030	238	2	None	None	G5	S4	null	IUCN_LC-Least Concern, WBWG_M-Medium Priority	Broadleaved upland forest, Cismontane woodland, Lower montane coniferous forest, North coast coniferous forest
Lasiurus xanthinus	western yellow bat	Mammals	AMACC05070	58	2	None	None	G5	S3	null	CDFW_SSC-Species of Special Concern, IUCN_LC-Least Concern, WBWG_H-High Priority	Desert wash
Laterallus jamaicensis coturniculus	California black rail	Birds	ABNME03041	303	1	None	Threatened	G3G4T1	S1	null	BLM_S-Sensitive, CDFW_FP-Fully Protected, IUCN_NT-Near Threatened, NABCI_RWL-Red Watch List, USFWS_BCC-Birds of Conservation Concern	Brackish marsh, Freshwater marsh, Marsh & swamp, Salt marsh, Wetland
Lepidium virginicum var. robinsonii	Robinson's pepper-grass	Dicots	PDBRA1M114	142	6	None	None	G5T3	S3	4.3	null	Chaparral, Coastal scrub
Lilium parryi	lemon lily	Monocots	PMLIL1A0J0	160	1	None	None	G3	S3	1B.2	SB_RSABG-Rancho Santa Ana Botanic Garden, USFS_S-Sensitive	Lower montane coniferous forest, Meadow & seep, Riparian forest, Upper montane coniferous forest, Wetland
Linanthus	San Gabriel	Dicots	PDPLM090D0	43	1	None	None	G2	S2	1B.2	SB_RSABG-	Chaparral,

concinnus	linanthus										Rancho Santa Ana Botanic Garden, USFS_S-Sensitive	Lower montane coniferous forest, Upper montane coniferous forest
Monardella australis ssp. jokerstii	Jokerst's monardella	Dicots	PDLAM18112	3	1	None	None	G4T1?	S1?	1B.1	USFS_S-Sensitive	Chaparral, Lower montane coniferous forest
Monardella macrantha ssp. hallii	Hall's monardella	Dicots	PDLAM180E1	41	4	None	None	G5T3	S3	1B.3	SB_RSABG-Rancho Santa Ana Botanic Garden, USFS_S-Sensitive	Broadleaved upland forest, Chaparral, Cismontane woodland, Lower montane coniferous forest, Valley & foothill grassland
Muhlenbergia californica	California muhly	Monocots	PMPOA480A0	5	1	None	None	G4	S4	4.3	null	Chaparral, Coastal scrub, Lower montane coniferous forest, Meadow & seep
Muhlenbergia utilis	aparejo grass	Monocots	PMPOA481X0	14	1	None	None	G4	S2S3	2B.2	null	Chaparral, Cismontane woodland, Coastal scrub, Marsh & swamp, Meadow & seep, Ultramafic
Navarretia prostrata	prostrate vernal pool navarretia	Dicots	PDPLM0C0Q0	60	1	None	None	G2	S2	1B.2	null	Coastal scrub, Meadow & seep, Valley & foothill grassland, Vernal pool, Wetland
Neotoma lepida intermedia	San Diego desert woodrat	Mammals	AMAFF08041	132	4	None	None	G5T3T4	S3S4	null	CDFW_SSC-Species of Special Concern	Coastal scrub
Nyctinomops femorosaccus	pocketed free-tailed bat	Mammals	AMACD04010	90	1	None	None	G4	S3	null	CDFW_SSC-Species of Special Concern, IUCN_LC-Least Concern, WBWG_M-Medium Priority	Joshua tree woodland, Pinon & juniper woodlands, Riparian scrub, Sonoran desert scrub
Nyctinomops macrotis	big free-tailed bat	Mammals	AMACD04020	32	1	None	None	G5	S3	null	CDFW_SSC-Species of Special Concern, IUCN_LC-Least Concern, WBWG_MH-Medium-High Priority	null
Oncorhynchus mykiss irideus pop. 10	steelhead - southern California DPS	Fish	AFCHA0209J	20	1	Endangered	None	G5T1Q	S1	null	AFS_EN-Endangered	Aquatic, South coast flowing waters
Oreonana vestita	woolly mountain-parsley	Dicots	PDAPI1G030	55	2	None	None	G3	S3	1B.3	SB_RSABG-Rancho Santa Ana Botanic Garden, USFS_S-Sensitive	Lower montane coniferous forest, Subalpine coniferous forest, Upper montane coniferous forest
Orobanche valida ssp. valida	Rock Creek broomrape	Dicots	PDORO040G2	12	2	None	None	G4T2	S2	1B.2	USFS_S-Sensitive	Chaparral, Pinon & juniper woodlands
Ovis canadensis nelsoni	desert bighorn sheep	Mammals	AMALE04013	46	1	None	None	G4T4	S3	null	BLM_S-Sensitive, CDFW_FP-Fully Protected, USFS_S-Sensitive	Alpine, Alpine dwarf scrub, Chaparral, Chenopod scrub, Great Basin scrub, Mojavean desert scrub, Montane dwarf scrub, Pinon & juniper woodlands, Riparian

												woodland, Sonoran desert scrub
Perognathus longimembris brevinasus	Los Angeles pocket mouse	Mammals	AMAFD01041	70	4	None	None	G5T1T2	S1S2	null	CDFW_SSC-Species of Special Concern	Coastal scrub
Phacelia stellaris	Brand's star phacelia	Dicots	PDHYD0C510	15	1	None	None	G1	S1	1B.1	SB_RSABG-Rancho Santa Ana Botanic Garden	Coastal dunes, Coastal scrub
Phrynosoma blainvillii	coast horned lizard	Reptiles	ARACF12100	784	5	None	None	G3G4	S3S4	null	BLM_S-Sensitive, CDFW_SSC-Species of Special Concern, IUCN_LC-Least Concern	Chaparral, Cismontane woodland, Coastal bluff scrub, Coastal scrub, Desert wash, Pinon & juniper woodlands, Riparian scrub, Riparian woodland, Valley & foothill grassland
Polioptila californica californica	coastal California gnatcatcher	Birds	ABPBJ08081	846	22	Threatened	None	G4G5T2Q	S2	null	CDFW_SSC-Species of Special Concern, NABCI_YWL-Yellow Watch List	Coastal bluff scrub, Coastal scrub
Pseudognaphalium leucocephalum	white rabbit-tobacco	Dicots	PDAST440C0	62	3	None	None	G4	S2	2B.2	null	Chaparral, Cismontane woodland, Coastal scrub, Riparian woodland
Rana boylii	foothill yellow-legged frog	Amphibians	AAABH01050	2468	1	None	Candidate Threatened	G3	S3	null	BLM_S-Sensitive, CDFW_SSC-Species of Special Concern, IUCN_NT-Near Threatened, USFS_S-Sensitive	Aquatic, Chaparral, Cismontane woodland, Coastal scrub, Klamath/North coast flowing waters, Lower montane coniferous forest, Meadow & seep, Riparian forest, Riparian woodland, Sacramento/San Joaquin flowing waters
Rana muscosa	southern mountain yellow-legged frog	Amphibians	AAABH01330	186	2	Endangered	Endangered	G1	S1	null	CDFW_WL-Watch List, IUCN_EN-Endangered, USFS_S-Sensitive	Aquatic
Rhaphiomidas terminatus abdominalis	Delhi Sands flower-loving fly	Insects	IIDIP05021	36	6	Endangered	None	G1T1	S1	null	null	Interior dunes
Riversidian Alluvial Fan Sage Scrub	Riversidian Alluvial Fan Sage Scrub	Scrub	CTT32720CA	30	5	None	None	G1	S1.1	null	null	Coastal scrub
Senecio aphanactis	chaparral ragwort	Dicots	PDAST8H060	98	1	None	None	G3	S2	2B.2	SB_RSABG-Rancho Santa Ana Botanic Garden	Chaparral, Cismontane woodland, Coastal scrub
Setophaga petechia	yellow warbler	Birds	ABPBX03010	78	1	None	None	G5	S3S4	null	CDFW_SSC-Species of Special Concern, USFWS_BCC-Birds of Conservation Concern	Riparian forest, Riparian scrub, Riparian woodland
Sidalcea neomexicana	salt spring checkerbloom	Dicots	PDMAL110J0	30	3	None	None	G4	S2	2B.2	USFS_S-Sensitive	Alkali playa, Chaparral, Coastal scrub, Lower montane coniferous forest, Mojavean desert scrub, Wetland

Southern California Arroyo Chub/Santa Ana Sucker Stream	Southern California Arroyo Chub/Santa Ana Sucker Stream	Inland Waters	CARE2330CA	4	2	None	None	GNR	SNR	null	null	null
Southern Coast Live Oak Riparian Forest	Southern Coast Live Oak Riparian Forest	Riparian	CTT61310CA	246	5	None	None	G4	S4	null	null	Riparian forest
Southern Cottonwood Willow Riparian Forest	Southern Cottonwood Willow Riparian Forest	Riparian	CTT61330CA	111	3	None	None	G3	S3.2	null	null	Riparian forest
Southern Sycamore Alder Riparian Woodland	Southern Sycamore Alder Riparian Woodland	Riparian	CTT62400CA	230	14	None	None	G4	S4	null	null	Riparian woodland
Southern Willow Scrub	Southern Willow Scrub	Riparian	CTT63320CA	45	1	None	None	G3	S2.1	null	null	Riparian scrub
Spea hammondii	western spadefoot	Amphibians	AAABF02020	1213	6	None	None	G3	S3	null	BLM_S-Sensitive, CDFW_SSC-Species of Special Concern, IUCN_NT-Near Threatened	Cismontane woodland, Coastal scrub, Valley & foothill grassland, Vernal pool, Wetland
Symphyotrichum defoliatum	San Bernardino aster	Dicots	PDASTE80C0	102	5	None	None	G2	S2	1B.2	BLM_S-Sensitive, USFS_S-Sensitive	Cismontane woodland, Coastal scrub, Lower montane coniferous forest, Marsh & swamp, Meadow & seep, Valley & foothill grassland
Symphyotrichum greatae	Greata's aster	Dicots	PDASTE80U0	56	4	None	None	G2	S2	1B.3	BLM_S-Sensitive	Broadleaved upland forest, Chaparral, Cismontane woodland, Lower montane coniferous forest, Riparian woodland
Taricha torosa	Coast Range newt	Amphibians	AAAAF02032	88	2	None	None	G4	S4	null	CDFW_SSC-Species of Special Concern	null
Taxidea taxus	American badger	Mammals	AMAJF04010	592	2	None	None	G5	S3	null	CDFW_SSC-Species of Special Concern, IUCN_LC-Least Concern	Alkali marsh, Alkali playa, Alpine, Alpine dwarf scrub, Bog & fen, Brackish marsh, Broadleaved upland forest, Chaparral, Chenopod scrub, Cismontane woodland, Closed-cone coniferous forest, Coastal bluff scrub, Coastal dunes, Coastal prairie, Coastal scrub, Desert dunes, Desert wash, Freshwater marsh, Great Basin grassland, Great Basin scrub, Interior dunes, Ione formation, Joshua tree woodland, Limestone, Lower montane coniferous forest, Marsh &

												swamp, Meadow & seep, Mojavean desert scrub, Montane dwarf scrub, North coast coniferous forest, Oldgrowth, Pavement plain, Redwood, Riparian forest, Riparian scrub, Riparian woodland, Salt marsh, Sonoran desert scrub, Sonoran thorn woodland, Ultramafic, Upper montane coniferous forest, Upper Sonoran scrub, Valley & foothill grassland
Thamnophis hammondii	two-striped gartersnake	Reptiles	ARADB36160	184	2	None	None	G4	S3S4	null	BLM_S-Sensitive, CDFW_SSC-Species of Special Concern, IUCN_LC-Least Concern, USFS_S-Sensitive	Marsh & swamp, Riparian scrub, Riparian woodland, Wetland
Thysanocarpus rigidus	rigid fringepod	Dicots	PDBRA2Q070	5	1	None	None	G1G2	S1	1B.2	BLM_S-Sensitive, USFS_S-Sensitive	Pinon & juniper woodlands
Vireo bellii pusillus	least Bell's vireo	Birds	ABPBW01114	503	15	Endangered	Endangered	G5T2	S2	null	IUCN_NT-Near Threatened, NABCI_YWL-Yellow Watch List	Riparian forest, Riparian scrub, Riparian woodland
Walnut Forest	Walnut Forest	Forest	CTT81600CA	6	3	None	None	G1	S1.1	null	null	Broadleaved upland forest

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Carlsbad Fish And Wildlife Office
2177 Salk Avenue - Suite 250
Carlsbad, CA 92008-7385
Phone: (760) 431-9440 Fax: (760) 431-5901
http://www.fws.gov/carlsbad/

In Reply Refer To: January 07, 2020
Consultation Code: 08ECAR00-2020-SLI-0426
Event Code: 08ECAR00-2020-E-01015
Project Name: OBMP PEIR Update MZ1

Subject: Updated list of threatened and endangered species that may occur in your proposed project location, and/or may be affected by your proposed project

To Whom It May Concern:

The enclosed species list identifies threatened, endangered, and proposed species, designated critical habitat, and candidate species that may occur within the boundary of your proposed project and/or may be affected by your proposed project. The species list fulfills the requirements of the U.S. Fish and Wildlife Service (Service) under section 7(c) of the Endangered Species Act (Act) of 1973, as amended (16 U.S.C. 1531 *et seq.*).

New information based on updated surveys, changes in the abundance and distribution of species, changed habitat conditions, or other factors could change this list. Please feel free to contact us if you need more current information or assistance regarding the potential impacts to federally proposed, listed, and candidate species and federally designated and proposed critical habitat. Please note that under 50 CFR 402.12(e) of the regulations implementing section 7 of the Act, the accuracy of this species list should be verified after 90 days. This verification can be completed formally or informally as desired. The Service recommends that verification be completed by visiting the ECOS-IPaC website at regular intervals during project planning and implementation for updates to species lists and information. An updated list may be requested through the ECOS-IPaC system by completing the same process used to receive the enclosed list.

The purpose of the Act is to provide a means whereby threatened and endangered species and the ecosystems upon which they depend may be conserved. Under sections 7(a)(1) and 7(a)(2) of the Act and its implementing regulations (50 CFR 402 *et seq.*), Federal agencies are required to utilize their authorities to carry out programs for the conservation of threatened and endangered species and to determine whether projects may affect threatened and endangered species and/or designated critical habitat.

A Biological Assessment is required for construction projects (or other undertakings having similar physical impacts) that are major Federal actions significantly affecting the quality of the human environment as defined in the National Environmental Policy Act (42 U.S.C. 4332(2)(c)). For projects other than major construction activities, the Service suggests that a biological evaluation similar to a Biological Assessment be prepared to determine whether the project may affect listed or proposed species and/or designated or proposed critical habitat. Recommended contents of a Biological Assessment are described at 50 CFR 402.12.

If a Federal agency determines, based on the Biological Assessment or biological evaluation, that listed species and/or designated critical habitat may be affected by the proposed project, the agency is required to consult with the Service pursuant to 50 CFR 402. In addition, the Service recommends that candidate species, proposed species and proposed critical habitat be addressed within the consultation. More information on the regulations and procedures for section 7 consultation, including the role of permit or license applicants, can be found in the "Endangered Species Consultation Handbook" at:

http://www.fws.gov/endangered/esa-library/pdf/TOC-GLOS.PDF

Please be aware that bald and golden eagles are protected under the Bald and Golden Eagle Protection Act (16 U.S.C. 668 *et seq.*), and projects affecting these species may require development of an eagle conservation plan (http://www.fws.gov/windenergy/eagle_guidance.html). Additionally, wind energy projects should follow the wind energy guidelines (http://www.fws.gov/windenergy/) for minimizing impacts to migratory birds and bats.

Guidance for minimizing impacts to migratory birds for projects including communications towers (e.g., cellular, digital television, radio, and emergency broadcast) can be found at: http://www.fws.gov/migratorybirds/CurrentBirdIssues/Hazards/towers/towers.htm; http://www.towerkill.com; and http://www.fws.gov/migratorybirds/CurrentBirdIssues/Hazards/towers/comtow.html.

We appreciate your concern for threatened and endangered species. The Service encourages Federal agencies to include conservation of threatened and endangered species into their project planning to further the purposes of the Act. Please include the Consultation Tracking Number in the header of this letter with any request for consultation or correspondence about your project that you submit to our office.

Attachment(s):

- Official Species List

Official Species List

This list is provided pursuant to Section 7 of the Endangered Species Act, and fulfills the requirement for Federal agencies to "request of the Secretary of the Interior information whether any species which is listed or proposed to be listed may be present in the area of a proposed action".

This species list is provided by:

Carlsbad Fish And Wildlife Office
2177 Salk Avenue - Suite 250
Carlsbad, CA 92008-7385
(760) 431-9440

Project Summary

Consultation Code: 08ECAR00-2020-SLI-0426

Event Code: 08ECAR00-2020-E-01015

Project Name: OBMP PEIR Update MZ1

Project Type: WATER SUPPLY / DELIVERY

Project Description: Optimum Basin Management Plan PEIR Update - MZ1

Project Location:

Approximate location of the project can be viewed in Google Maps: https://www.google.com/maps/place/34.02331759100005N117.695348353335432W

Counties: Los Angeles, CA | Riverside, CA | San Bernardino, CA

Endangered Species Act Species

There is a total of 12 threatened, endangered, or candidate species on this species list.

Species on this list should be considered in an effects analysis for your project and could include species that exist in another geographic area. For example, certain fish may appear on the species list because a project could affect downstream species.

IPaC does not display listed species or critical habitats under the sole jurisdiction of NOAA Fisheries[1], as USFWS does not have the authority to speak on behalf of NOAA and the Department of Commerce.

See the "Critical habitats" section below for those critical habitats that lie wholly or partially within your project area under this office's jurisdiction. Please contact the designated FWS office if you have questions.

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1. NOAA Fisheries, also known as the National Marine Fisheries Service (NMFS), is an office of the National Oceanic and Atmospheric Administration within the Department of Commerce.

Mammals

NAME	STATUS
San Bernardino Merriam's Kangaroo Rat *Dipodomys merriami parvus* There is **final** critical habitat for this species. Your location is outside the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/2060	Endangered

Birds

NAME	STATUS
California Condor *Gymnogyps californianus* Population: U.S.A. only, except where listed as an experimental population There is **final** critical habitat for this species. Your location is outside the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/8193	Endangered
Coastal California Gnatcatcher *Polioptila californica californica* There is **final** critical habitat for this species. Your location is outside the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/8178	Threatened
Least Bell's Vireo *Vireo bellii pusillus* There is **final** critical habitat for this species. Your location overlaps the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/5945	Endangered
Southwestern Willow Flycatcher *Empidonax traillii extimus* There is **final** critical habitat for this species. Your location overlaps the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/6749	Endangered

Amphibians

NAME	STATUS
Arroyo (=arroyo Southwestern) Toad *Anaxyrus californicus* There is **final** critical habitat for this species. Your location is outside the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/3762	Endangered

Fishes

NAME	STATUS
Santa Ana Sucker *Catostomus santaanae* Population: 3 CA river basins There is **final** critical habitat for this species. Your location is outside the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/3785	Threatened

Insects

NAME	STATUS
Delhi Sands Flower-loving Fly *Rhaphiomidas terminatus abdominalis* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/1540	Endangered

Flowering Plants

NAME	STATUS
Braunton's Milk-vetch *Astragalus brauntonii* There is **final** critical habitat for this species. Your location is outside the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/5674	Endangered
Nevin's Barberry *Berberis nevinii* There is **final** critical habitat for this species. Your location is outside the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/8025	Endangered
San Diego Ambrosia *Ambrosia pumila* There is **final** critical habitat for this species. Your location is outside the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/8287	Endangered
Thread-leaved Brodiaea *Brodiaea filifolia* There is **final** critical habitat for this species. Your location is outside the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/6087	Threatened

Critical habitats

There are 3 critical habitats wholly or partially within your project area under this office's jurisdiction.

NAME	STATUS
Least Bell's Vireo *Vireo bellii pusillus* https://ecos.fws.gov/ecp/species/5945#crithab	Final
Southwestern Willow Flycatcher *Empidonax traillii extimus* https://ecos.fws.gov/ecp/species/6749#crithab	Final
Yellow-billed Cuckoo *Coccyzus americanus* For information on why this critical habitat appears for your project, even though Yellow-billed Cuckoo is not on the list of potentially affected species at this location, contact the local field office. https://ecos.fws.gov/ecp/species/3911#crithab	Proposed

Program Natural Environment Study
Optimum Basin Management Program Update

Chino Basin Watermaster and Inland Empire Utilities Agency

Management Zone 2
CNDDB and IPaC Lists

CALIFORNIA DEPARTMENT OF FISH and WILDLIFE RareFind

OBMPU Management Zone 2

Query Summary:
Quad IS (Prado Dam (3311786) OR Ontario (3411716) OR Guasti (3411715) OR Cucamonga Peak (3411725) OR Devore (3411724) OR Corona North (3311785) OR Fontana (3411714))

Print Close

CNDDB Element Query Results

Scientific Name	Common Name	Taxonomic Group	Element Code	Total Occs	Returned Occs	Federal Status	State Status	Global Rank	State Rank	CA Rare Plant Rank	Other Status	Habitats
Abronia villosa var. aurita	chaparral sand-verbena	Dicots	PDNYC010P1	98	2	None	None	G5T2?	S2	1B.1	BLM_S-Sensitive, SB_RSABG-Rancho Santa Ana Botanic Garden, USFS_S-Sensitive	Chaparral, Coastal scrub, Desert dunes
Accipiter cooperii	Cooper's hawk	Birds	ABNKC12040	118	1	None	None	G5	S4	null	CDFW_WL-Watch List, IUCN_LC-Least Concern	Cismontane woodland, Riparian forest, Riparian woodland, Upper montane coniferous forest
Agelaius tricolor	tricolored blackbird	Birds	ABPBXB0020	955	8	None	Threatened	G2G3	S1S2	null	BLM_S-Sensitive, CDFW_SSC-Species of Special Concern, IUCN_EN-Endangered, NABCI_RWL-Red Watch List, USFWS_BCC-Birds of Conservation Concern	Freshwater marsh, Marsh & swamp, Swamp, Wetland
Aimophila ruficeps canescens	southern California rufous-crowned sparrow	Birds	ABPBX91091	235	3	None	None	G5T3	S3	null	CDFW_WL-Watch List	Chaparral, Coastal scrub
Ambrosia monogyra	singlewhorl burrobrush	Dicots	PDAST50010	30	1	None	None	G5	S2	2B.2	null	Chaparral, Sonoran desert scrub
Ammodramus savannarum	grasshopper sparrow	Birds	ABPBXA0020	27	1	None	None	G5	S3	null	CDFW_SSC-Species of Special Concern, IUCN_LC-Least Concern	Valley & foothill grassland
Anniella stebbinsi	southern California legless lizard	Reptiles	ARACC01060	417	29	None	None	G3	S3	null	CDFW_SSC-Species of Special Concern, USFS_S-Sensitive	Broadleaved upland forest, Chaparral, Coastal dunes, Coastal scrub
Antrozous pallidus	pallid bat	Mammals	AMACC10010	420	1	None	None	G5	S3	null	BLM_S-Sensitive, CDFW_SSC-Species of Special Concern, IUCN_LC-Least Concern, USFS_S-Sensitive, WBWG_H-High Priority	Chaparral, Coastal scrub, Desert wash, Great Basin grassland, Great Basin scrub, Mojavean desert scrub, Riparian woodland, Sonoran desert scrub, Upper montane coniferous forest, Valley & foothill grassland
Aquila chrysaetos	golden eagle	Birds	ABNKC22010	321	3	None	None	G5	S3	null	BLM_S-Sensitive, CDF_S-Sensitive,	Broadleaved upland forest, Cismontane woodland,

											CDFW_FP-Fully Protected, CDFW_WL-Watch List, IUCN_LC-Least Concern, USFWS_BCC-Birds of Conservation Concern	Coastal prairie, Great Basin grassland, Great Basin scrub, Lower montane coniferous forest, Pinon & juniper woodlands, Upper montane coniferous forest, Valley & foothill grassland
Arctostaphylos glandulosa ssp. gabrielensis	San Gabriel manzanita	Dicots	PDERI042P0	35	1	None	None	G5T3	S3	1B.2	BLM_S-Sensitive, SB_RSABG-Rancho Santa Ana Botanic Garden, USFS_S-Sensitive	Chaparral
Arenaria paludicola	marsh sandwort	Dicots	PDCAR040L0	16	1	Endangered	Endangered	G1	S1	1B.1	SB_SBBG-Santa Barbara Botanic Garden	Freshwater marsh, Marsh & swamp, Wetland
Arizona elegans occidentalis	California glossy snake	Reptiles	ARADB01017	260	10	None	None	G5T2	S2	null	CDFW_SSC-Species of Special Concern	null
Artemisiospiza belli belli	Bell's sage sparrow	Birds	ABPBX97021	61	2	None	None	G5T2T3	S3	null	CDFW_WL-Watch List, USFWS_BCC-Birds of Conservation Concern	Chaparral, Coastal scrub
Asio otus	long-eared owl	Birds	ABNSB13010	48	1	None	None	G5	S3?	null	CDFW_SSC-Species of Special Concern, IUCN_LC-Least Concern	Cismontane woodland, Great Basin scrub, Riparian forest, Riparian woodland, Upper montane coniferous forest
Aspidoscelis hyperythra	orange-throated whiptail	Reptiles	ARACJ02060	369	5	None	None	G5	S2S3	null	CDFW_WL-Watch List, IUCN_LC-Least Concern, USFS_S-Sensitive	Chaparral, Cismontane woodland, Coastal scrub
Astragalus brauntonii	Braunton's milk-vetch	Dicots	PDFAB0F1G0	44	1	Endangered	None	G2	S2	1B.1	SB_RSABG-Rancho Santa Ana Botanic Garden, SB_SBBG-Santa Barbara Botanic Garden	Chaparral, Coastal scrub, Limestone, Valley & foothill grassland
Athene cunicularia	burrowing owl	Birds	ABNSB10010	1989	48	None	None	G4	S3	null	BLM_S-Sensitive, CDFW_SSC-Species of Special Concern, IUCN_LC-Least Concern, USFWS_BCC-Birds of Conservation Concern	Coastal prairie, Coastal scrub, Great Basin grassland, Great Basin scrub, Mojavean desert scrub, Sonoran desert scrub, Valley & foothill grassland
Atriplex coulteri	Coulter's saltbush	Dicots	PDCHE040E0	121	1	None	None	G3	S1S2	1B.2	SB_RSABG-Rancho Santa Ana Botanic Garden	Coastal bluff scrub, Coastal dunes, Coastal scrub, Valley & foothill grassland
Batrachoseps gabrieli	San Gabriel slender salamander	Amphibians	AAAAD02110	8	1	None	None	G2G3	S2S3	null	IUCN_DD-Data Deficient, USFS_S-Sensitive	Talus slope
Berberis nevinii	Nevin's barberry	Dicots	PDBER060A0	32	1	Endangered	Endangered	G1	S1	1B.1	SB_RSABG-Rancho Santa Ana Botanic Garden, SB_SBBG-Santa Barbara	Chaparral, Cismontane woodland, Coastal scrub, Riparian scrub

											Botanic Garden	
Bombus crotchii	Crotch bumble bee	Insects	IIHYM24480	234	9	None	Candidate Endangered	G3G4	S1S2	null	null	null
Buteo swainsoni	Swainson's hawk	Birds	ABNKC19070	2518	2	None	Threatened	G5	S3	null	BLM_S-Sensitive, IUCN_LC-Least Concern, USFWS_BCC-Birds of Conservation Concern	Great Basin grassland, Riparian forest, Riparian woodland, Valley & foothill grassland
California Walnut Woodland	California Walnut Woodland	Woodland	CTT71210CA	76	10	None	None	G2	S2.1	null	null	Cismontane woodland
Calochortus plummerae	Plummer's mariposa-lily	Monocots	PMLIL0D150	230	25	None	None	G4	S4	4.2	SB_RSABG-Rancho Santa Ana Botanic Garden	Chaparral, Cismontane woodland, Coastal scrub, Lower montane coniferous forest, Valley & foothill grassland
Calochortus weedii var. intermedius	intermediate mariposa-lily	Monocots	PMLIL0D1J1	140	4	None	None	G3G4T2	S2	1B.2	SB_RSABG-Rancho Santa Ana Botanic Garden, USFS_S-Sensitive	Chaparral, Coastal scrub, Valley & foothill grassland
Calystegia felix	lucky morning-glory	Dicots	PDCON040P0	10	6	None	None	G1Q	S1	1B.1	null	Meadow & seep, Riparian scrub
Campylorhynchus brunneicapillus sandiegensis	coastal cactus wren	Birds	ABPBG02095	156	1	None	None	G5T3Q	S3	null	CDFW_SSC-Species of Special Concern, USFS_S-Sensitive, USFWS_BCC-Birds of Conservation Concern	Coastal scrub
Catostomus santaanae	Santa Ana sucker	Fish	AFCJC02190	28	6	Threatened	None	G1	S1	null	AFS_TH-Threatened, IUCN_VU-Vulnerable	Aquatic, South coast flowing waters
Centromadia pungens ssp. laevis	smooth tarplant	Dicots	PDAST4R0R4	126	2	None	None	G3G4T2	S2	1B.1	SB_RSABG-Rancho Santa Ana Botanic Garden	Alkali playa, Chenopod scrub, Meadow & seep, Riparian woodland, Valley & foothill grassland, Wetland
Chaetodipus fallax fallax	northwestern San Diego pocket mouse	Mammals	AMAFD05031	101	9	None	None	G5T3T4	S3S4	null	CDFW_SSC-Species of Special Concern	Chaparral, Coastal scrub
Chaetodipus fallax pallidus	pallid San Diego pocket mouse	Mammals	AMAFD05032	79	1	None	None	G5T34	S3S4	null	CDFW_SSC-Species of Special Concern	Desert wash, Pinon & juniper woodlands, Sonoran desert scrub
Chloropyron maritimum ssp. maritimum	salt marsh bird's-beak	Dicots	PDSCR0J0C2	30	1	Endangered	Endangered	G4?T1	S1	1B.2	SB_CRES-San Diego Zoo CRES Native Gene Seed Bank, SB_RSABG-Rancho Santa Ana Botanic Garden, SB_SBBG-Santa Barbara Botanic Garden	Coastal dunes, Marsh & swamp, Salt marsh, Wetland
Chorizanthe parryi var. parryi	Parry's spineflower	Dicots	PDPGN040J2	150	13	None	None	G3T2	S2	1B.1	BLM_S-Sensitive, SB_RSABG-Rancho Santa Ana Botanic Garden, USFS_S-Sensitive	Chaparral, Cismontane woodland, Coastal scrub, Valley & foothill grassland
Chorizanthe xanti var. leucotheca	white-bracted spineflower	Dicots	PDPGN040Z1	59	4	None	None	G4T3	S3	1B.2	BLM_S-Sensitive,	Coastal scrub, Mojavean desert

											SB_RSABG-Rancho Santa Ana Botanic Garden, SB_USDA-US Dept of Agriculture, USFS_S-Sensitive	scrub, Pinon & juniper woodlands
Cicindela tranquebarica viridissima	greenest tiger beetle	Insects	IICOL02201	1	1	None	None	G5T1	S1	null	null	Riparian woodland
Cladium californicum	California saw-grass	Monocots	PMCYP04010	13	1	None	None	G4	S2	2B.2	SB_RSABG-Rancho Santa Ana Botanic Garden, USFS_S-Sensitive	Alkali marsh, Freshwater marsh, Meadow & seep, Wetland
Claytonia peirsonii ssp. peirsonii	Peirson's spring beauty	Dicots	PDPOR03121	9	2	None	None	G2G3T2	S2	1B.2	SB_RSABG-Rancho Santa Ana Botanic Garden, USFS_S-Sensitive	Subalpine coniferous forest, Upper montane coniferous forest
Coastal and Valley Freshwater Marsh	Coastal and Valley Freshwater Marsh	Marsh	CTT52410CA	60	1	None	None	G3	S2.1	null	null	Marsh & swamp, Wetland
Coccyzus americanus occidentalis	western yellow-billed cuckoo	Birds	ABNRB02022	156	4	Threatened	Endangered	G5T2T3	S1	null	BLM_S-Sensitive, NABCI_RWL-Red Watch List, USFS_S-Sensitive, USFWS_BCC-Birds of Conservation Concern	Riparian forest
Coleonyx variegatus abbotti	San Diego banded gecko	Reptiles	ARACD01031	8	1	None	None	G5T3T4	S1S2	null	CDFW_SSC-Species of Special Concern	Chaparral, Coastal scrub
Coturnicops noveboracensis	yellow rail	Birds	ABNME01010	45	1	None	None	G4	S1S2	null	CDFW_SSC-Species of Special Concern, IUCN_LC-Least Concern, NABCI_RWL-Red Watch List, USFS_S-Sensitive, USFWS_BCC-Birds of Conservation Concern	Freshwater marsh, Meadow & seep
Crotalus ruber	red-diamond rattlesnake	Reptiles	ARADE02090	192	3	None	None	G4	S3	null	CDFW_SSC-Species of Special Concern, USFS_S-Sensitive	Chaparral, Mojavean desert scrub, Sonoran desert scrub
Diplectrona californica	California diplectronan caddisfly	Insects	IITRI23010	1	1	None	None	G1G2	S1S2	null	null	Aquatic
Dipodomys merriami parvus	San Bernardino kangaroo rat	Mammals	AMAFD03143	81	37	Endangered	Candidate Endangered	G5T1	S1	null	CDFW_SSC-Species of Special Concern	Coastal scrub
Dipodomys stephensi	Stephens' kangaroo rat	Mammals	AMAFD03100	220	4	Endangered	Threatened	G2	S2	null	IUCN_EN-Endangered	Coastal scrub, Valley & foothill grassland
Dodecahema leptoceras	slender-horned spineflower	Dicots	PDPGN0V010	41	5	Endangered	Endangered	G1	S1	1B.1	SB_RSABG-Rancho Santa Ana Botanic Garden	Chaparral, Cismontane woodland, Coastal scrub
Dudleya multicaulis	many-stemmed dudleya	Dicots	PDCRA040H0	154	4	None	None	G2	S2	1B.2	BLM_S-Sensitive, SB_RSABG-Rancho Santa Ana Botanic Garden, USFS_S-Sensitive	Chaparral, Coastal scrub, Valley & foothill grassland
Elanus leucurus	white-tailed kite	Birds	ABNKC06010	180	3	None	None	G5	S3S4	null	BLM_S-Sensitive,	Cismontane woodland,

											CDFW_FP-Fully Protected, IUCN_LC-Least Concern	Marsh & swamp, Riparian woodland, Valley & foothill grassland, Wetland
Empidonax traillii extimus	southwestern willow flycatcher	Birds	ABPAE33043	70	3	Endangered	Endangered	G5T2	S1	null	NABCI_RWL-Red Watch List	Riparian woodland
Emys marmorata	western pond turtle	Reptiles	ARAAD02030	1385	3	None	None	G3G4	S3	null	BLM_S-Sensitive, CDFW_SSC-Species of Special Concern, IUCN_VU-Vulnerable, USFS_S-Sensitive	Aquatic, Artificial flowing waters, Klamath/North coast flowing waters, Klamath/North coast standing waters, Marsh & swamp, Sacramento/San Joaquin flowing waters, Sacramento/San Joaquin standing waters, South coast flowing waters, South coast standing waters, Wetland
Eriastrum densifolium ssp. sanctorum	Santa Ana River woollystar	Dicots	PDPLM03035	31	9	Endangered	Endangered	G4T1	S1	1B.1	SB_RSABG-Rancho Santa Ana Botanic Garden	Chaparral, Coastal scrub
Eriogonum microthecum var. johnstonii	Johnston's buckwheat	Dicots	PDPGN083W5	7	2	None	None	G5T2	S2	1B.3	SB_RSABG-Rancho Santa Ana Botanic Garden, USFS_S-Sensitive	Limestone, Subalpine coniferous forest, Upper montane coniferous forest
Eumops perotis californicus	western mastiff bat	Mammals	AMACD02011	296	6	None	None	G5T4	S3S4	null	BLM_S-Sensitive, CDFW_SSC-Species of Special Concern, WBWG_H-High Priority	Chaparral, Cismontane woodland, Coastal scrub, Valley & foothill grassland
Gila orcuttii	arroyo chub	Fish	AFCJB13120	49	2	None	None	G2	S2	null	AFS_VU-Vulnerable, CDFW_SSC-Species of Special Concern, USFS_S-Sensitive	Aquatic, South coast flowing waters
Horkelia cuneata var. puberula	mesa horkelia	Dicots	PDROS0W045	103	10	None	None	G4T1	S1	1B.1	USFS_S-Sensitive	Chaparral, Cismontane woodland, Coastal scrub
Icteria virens	yellow-breasted chat	Birds	ABPBX24010	100	1	None	None	G5	S3	null	CDFW_SSC-Species of Special Concern, IUCN_LC-Least Concern	Riparian forest, Riparian scrub, Riparian woodland
Lasiurus xanthinus	western yellow bat	Mammals	AMACC05070	58	5	None	None	G5	S3	null	CDFW_SSC-Species of Special Concern, IUCN_LC-Least Concern, WBWG_H-High Priority	Desert wash
Laterallus jamaicensis coturniculus	California black rail	Birds	ABNME03041	303	1	None	Threatened	G3G4T1	S1	null	BLM_S-Sensitive, CDFW_FP-Fully Protected, IUCN_NT-Near Threatened, NABCI_RWL-Red Watch List, USFWS_BCC-Birds of Conservation Concern	Brackish marsh, Freshwater marsh, Marsh & swamp, Salt marsh, Wetland

Lepidium virginicum var. robinsonii	Robinson's pepper-grass	Dicots	PDBRA1M114	142	8	None	None	G5T3	S3	4.3	null	Chaparral, Coastal scrub
Lepus californicus bennettii	San Diego black-tailed jackrabbit	Mammals	AMAEB03051	103	4	None	None	G5T3T4	S3S4	null	CDFW_SSC-Species of Special Concern	Coastal scrub
Lilium parryi	lemon lily	Monocots	PMLIL1A0J0	160	2	None	None	G3	S3	1B.2	SB_RSABG-Rancho Santa Ana Botanic Garden, USFS_S-Sensitive	Lower montane coniferous forest, Meadow & seep, Riparian forest, Upper montane coniferous forest, Wetland
Linanthus concinnus	San Gabriel linanthus	Dicots	PDPLM090D0	43	4	None	None	G2	S2	1B.2	SB_RSABG-Rancho Santa Ana Botanic Garden, USFS_S-Sensitive	Chaparral, Lower montane coniferous forest, Upper montane coniferous forest
Lycium parishii	Parish's desert-thorn	Dicots	PDSOL0G0D0	21	1	None	None	G4	S1	2B.3	null	Coastal scrub, Sonoran desert scrub
Malacothamnus parishii	Parish's bush-mallow	Dicots	PDMAL0Q0C0	1	1	None	None	GXQ	SX	1A	null	Chaparral, Coastal scrub
Monardella australis ssp. jokerstii	Jokerst's monardella	Dicots	PDLAM18112	3	2	None	None	G4T1?	S1?	1B.1	USFS_S-Sensitive	Chaparral, Lower montane coniferous forest
Monardella pringlei	Pringle's monardella	Dicots	PDLAM180J0	2	1	None	None	GX	SX	1A	null	Coastal scrub
Muhlenbergia californica	California muhly	Monocots	PMPOA480A0	5	1	None	None	G4	S4	4.3	null	Chaparral, Coastal scrub, Lower montane coniferous forest, Meadow & seep
Muhlenbergia utilis	aparejo grass	Monocots	PMPOA481X0	14	1	None	None	G4	S2S3	2B.2	null	Chaparral, Cismontane woodland, Coastal scrub, Marsh & swamp, Meadow & seep, Ultramafic
Navarretia prostrata	prostrate vernal pool navarretia	Dicots	PDPLM0C0Q0	60	1	None	None	G2	S2	1B.2	null	Coastal scrub, Meadow & seep, Valley & foothill grassland, Vernal pool, Wetland
Neotoma lepida intermedia	San Diego desert woodrat	Mammals	AMAFF08041	132	5	None	None	G5T3T4	S3S4	null	CDFW_SSC-Species of Special Concern	Coastal scrub
Nyctinomops femorosaccus	pocketed free-tailed bat	Mammals	AMACD04010	90	2	None	None	G4	S3	null	CDFW_SSC-Species of Special Concern, IUCN_LC-Least Concern, WBWG_M-Medium Priority	Joshua tree woodland, Pinon & juniper woodlands, Riparian scrub, Sonoran desert scrub
Nyctinomops macrotis	big free-tailed bat	Mammals	AMACD04020	32	1	None	None	G5	S3	null	CDFW_SSC-Species of Special Concern, IUCN_LC-Least Concern, WBWG_MH-Medium-High Priority	null
Oncorhynchus mykiss irideus pop. 10	steelhead - southern California DPS	Fish	AFCHA0209J	20	1	Endangered	None	G5T1Q	S1	null	AFS_EN-Endangered	Aquatic, South coast flowing waters
Opuntia basilaris var. brachyclada	short-joint beavertail	Dicots	PDCAC0D053	199	1	None	None	G5T3	S3	1B.2	BLM_S-Sensitive, SB_RSABG-Rancho Santa Ana Botanic Garden, USFS_S-Sensitive	Chaparral, Joshua tree woodland, Mojavean desert scrub, Pinon & juniper woodlands

Oreonana vestita	woolly mountain-parsley	Dicots	PDAPI1G030	55	6	None	None	G3	S3	1B.3	SB_RSABG-Rancho Santa Ana Botanic Garden, USFS_S-Sensitive	Lower montane coniferous forest, Subalpine coniferous forest, Upper montane coniferous forest
Ovis canadensis nelsoni	desert bighorn sheep	Mammals	AMALE04013	46	1	None	None	G4T4	S3	null	BLM_S-Sensitive, CDFW_FP-Fully Protected, USFS_S-Sensitive	Alpine, Alpine dwarf scrub, Chaparral, Chenopod scrub, Great Basin scrub, Mojavean desert scrub, Montane dwarf scrub, Pinon & juniper woodlands, Riparian woodland, Sonoran desert scrub
Perognathus longimembris brevinasus	Los Angeles pocket mouse	Mammals	AMAFD01041	70	6	None	None	G5T1T2	S1S2	null	CDFW_SSC-Species of Special Concern	Coastal scrub
Phacelia stellaris	Brand's star phacelia	Dicots	PDHYD0C510	15	1	None	None	G1	S1	1B.1	SB_RSABG-Rancho Santa Ana Botanic Garden	Coastal dunes, Coastal scrub
Phrynosoma blainvillii	coast horned lizard	Reptiles	ARACF12100	784	17	None	None	G3G4	S3S4	null	BLM_S-Sensitive, CDFW_SSC-Species of Special Concern, IUCN_LC-Least Concern	Chaparral, Cismontane woodland, Coastal bluff scrub, Coastal scrub, Desert wash, Pinon & juniper woodlands, Riparian scrub, Riparian woodland, Valley & foothill grassland
Polioptila californica californica	coastal California gnatcatcher	Birds	ABPBJ08081	846	31	Threatened	None	G4G5T2Q	S2	null	CDFW_SSC-Species of Special Concern, NABCI_YWL-Yellow Watch List	Coastal bluff scrub, Coastal scrub
Pseudognaphalium leucocephalum	white rabbit-tobacco	Dicots	PDAST440C0	62	3	None	None	G4	S2	2B.2	null	Chaparral, Cismontane woodland, Coastal scrub, Riparian woodland
Rana muscosa	southern mountain yellow-legged frog	Amphibians	AAABH01330	186	4	Endangered	Endangered	G1	S1	null	CDFW_WL-Watch List, IUCN_EN-Endangered, USFS_S-Sensitive	Aquatic
Rhaphiomidas terminatus abdominalis	Delhi Sands flower-loving fly	Insects	IIDIP05021	36	18	Endangered	None	G1T1	S1	null	null	Interior dunes
Rhinichthys osculus ssp. 3	Santa Ana speckled dace	Fish	AFCJB3705K	13	2	None	None	G5T1	S1	null	AFS_TH-Threatened, CDFW_SSC-Species of Special Concern, USFS_S-Sensitive	Aquatic, South coast flowing waters
Riversidian Alluvial Fan Sage Scrub	Riversidian Alluvial Fan Sage Scrub	Scrub	CTT32720CA	30	7	None	None	G1	S1.1	null	null	Coastal scrub
Sagittaria sanfordii	Sanford's arrowhead	Monocots	PMALI040Q0	126	1	None	None	G3	S3	1B.2	BLM_S-Sensitive	Marsh & swamp, Wetland
Senecio aphanactis	chaparral ragwort	Dicots	PDAST8H060	98	1	None	None	G3	S2	2B.2	SB_RSABG-Rancho Santa Ana Botanic Garden	Chaparral, Cismontane woodland, Coastal scrub
Setophaga petechia	yellow warbler	Birds	ABPBX03010	78	1	None	None	G5	S3S4	null	CDFW_SSC-Species of Special	Riparian forest, Riparian scrub,

											Concern, USFWS_BCC-Birds of Conservation Concern	Riparian woodland
Sidalcea neomexicana	salt spring checkerbloom	Dicots	PDMAL110J0	30	3	None	None	G4	S2	2B.2	USFS_S-Sensitive	Alkali playa, Chaparral, Coastal scrub, Lower montane coniferous forest, Mojavean desert scrub, Wetland
Southern California Arroyo Chub/Santa Ana Sucker Stream	Southern California Arroyo Chub/Santa Ana Sucker Stream	Inland Waters	CARE2330CA	4	1	None	None	GNR	SNR	null	null	null
Southern Cottonwood Willow Riparian Forest	Southern Cottonwood Willow Riparian Forest	Riparian	CTT61330CA	111	3	None	None	G3	S3.2	null	null	Riparian forest
Southern Riparian Forest	Southern Riparian Forest	Riparian	CTT61300CA	20	1	None	None	G4	S4	null	null	Riparian forest
Southern Sycamore Alder Riparian Woodland	Southern Sycamore Alder Riparian Woodland	Riparian	CTT62400CA	230	10	None	None	G4	S4	null	null	Riparian woodland
Southern Willow Scrub	Southern Willow Scrub	Riparian	CTT63320CA	45	1	None	None	G3	S2.1	null	null	Riparian scrub
Spea hammondii	western spadefoot	Amphibians	AAABF02020	1213	6	None	None	G3	S3	null	BLM_S-Sensitive, CDFW_SSC-Species of Special Concern, IUCN_NT-Near Threatened	Cismontane woodland, Coastal scrub, Valley & foothill grassland, Vernal pool, Wetland
Sphenopholis obtusata	prairie wedge grass	Monocots	PMPOA5T030	19	1	None	None	G5	S2	2B.2	null	Cismontane woodland, Meadow & seep, Wetland
Streptanthus bernardinus	Laguna Mountains jewelflower	Dicots	PDBRA2G060	22	2	None	None	G3G4	S3S4	4.3	SB_RSABG-Rancho Santa Ana Botanic Garden	Chaparral, Lower montane coniferous forest, Upper montane coniferous forest
Symphyotrichum defoliatum	San Bernardino aster	Dicots	PDASTE80C0	102	5	None	None	G2	S2	1B.2	BLM_S-Sensitive, USFS_S-Sensitive	Cismontane woodland, Coastal scrub, Lower montane coniferous forest, Marsh & swamp, Meadow & seep, Valley & foothill grassland
Thamnophis hammondii	two-striped gartersnake	Reptiles	ARADB36160	184	2	None	None	G4	S3S4	null	BLM_S-Sensitive, CDFW_SSC-Species of Special Concern, IUCN_LC-Least Concern, USFS_S-Sensitive	Marsh & swamp, Riparian scrub, Riparian woodland, Wetland
Thysanocarpus rigidus	rigid fringepod	Dicots	PDBRA2Q070	5	1	None	None	G1G2	S1	1B.2	BLM_S-Sensitive, USFS_S-Sensitive	Pinon & juniper woodlands
Viola pinetorum ssp. grisea	grey-leaved violet	Dicots	PDVIO04431	90	1	None	None	G4G5T3	S3	1B.2	null	Meadow & seep, Subalpine coniferous forest, Upper montane coniferous forest
Vireo bellii pusillus	least Bell's vireo	Birds	ABPBW01114	503	22	Endangered	Endangered	G5T2	S2	null	IUCN_NT-Near Threatened,	Riparian forest, Riparian scrub,

											NABCI_YWL-Yellow Watch List	Riparian woodland

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Carlsbad Fish And Wildlife Office
2177 Salk Avenue - Suite 250
Carlsbad, CA 92008-7385
Phone: (760) 431-9440 Fax: (760) 431-5901
http://www.fws.gov/carlsbad/

In Reply Refer To:
Consultation Code: 08ECAR00-2020-SLI-0427
Event Code: 08ECAR00-2020-E-01019
Project Name: OBMP PEIR Update MZ2

January 07, 2020

Subject: Updated list of threatened and endangered species that may occur in your proposed project location, and/or may be affected by your proposed project

To Whom It May Concern:

The enclosed species list identifies threatened, endangered, and proposed species, designated critical habitat, and candidate species that may occur within the boundary of your proposed project and/or may be affected by your proposed project. The species list fulfills the requirements of the U.S. Fish and Wildlife Service (Service) under section 7(c) of the Endangered Species Act (Act) of 1973, as amended (16 U.S.C. 1531 *et seq.*).

New information based on updated surveys, changes in the abundance and distribution of species, changed habitat conditions, or other factors could change this list. Please feel free to contact us if you need more current information or assistance regarding the potential impacts to federally proposed, listed, and candidate species and federally designated and proposed critical habitat. Please note that under 50 CFR 402.12(e) of the regulations implementing section 7 of the Act, the accuracy of this species list should be verified after 90 days. This verification can be completed formally or informally as desired. The Service recommends that verification be completed by visiting the ECOS-IPaC website at regular intervals during project planning and implementation for updates to species lists and information. An updated list may be requested through the ECOS-IPaC system by completing the same process used to receive the enclosed list.

The purpose of the Act is to provide a means whereby threatened and endangered species and the ecosystems upon which they depend may be conserved. Under sections 7(a)(1) and 7(a)(2) of the Act and its implementing regulations (50 CFR 402 *et seq.*), Federal agencies are required to utilize their authorities to carry out programs for the conservation of threatened and endangered species and to determine whether projects may affect threatened and endangered species and/or designated critical habitat.

A Biological Assessment is required for construction projects (or other undertakings having similar physical impacts) that are major Federal actions significantly affecting the quality of the human environment as defined in the National Environmental Policy Act (42 U.S.C. 4332(2)(c)). For projects other than major construction activities, the Service suggests that a biological evaluation similar to a Biological Assessment be prepared to determine whether the project may affect listed or proposed species and/or designated or proposed critical habitat. Recommended contents of a Biological Assessment are described at 50 CFR 402.12.

If a Federal agency determines, based on the Biological Assessment or biological evaluation, that listed species and/or designated critical habitat may be affected by the proposed project, the agency is required to consult with the Service pursuant to 50 CFR 402. In addition, the Service recommends that candidate species, proposed species and proposed critical habitat be addressed within the consultation. More information on the regulations and procedures for section 7 consultation, including the role of permit or license applicants, can be found in the "Endangered Species Consultation Handbook" at:

http://www.fws.gov/endangered/esa-library/pdf/TOC-GLOS.PDF

Please be aware that bald and golden eagles are protected under the Bald and Golden Eagle Protection Act (16 U.S.C. 668 *et seq.*), and projects affecting these species may require development of an eagle conservation plan (http://www.fws.gov/windenergy/eagle_guidance.html). Additionally, wind energy projects should follow the wind energy guidelines (http://www.fws.gov/windenergy/) for minimizing impacts to migratory birds and bats.

Guidance for minimizing impacts to migratory birds for projects including communications towers (e.g., cellular, digital television, radio, and emergency broadcast) can be found at: http://www.fws.gov/migratorybirds/CurrentBirdIssues/Hazards/towers/towers.htm; http://www.towerkill.com; and http://www.fws.gov/migratorybirds/CurrentBirdIssues/Hazards/towers/comtow.html.

We appreciate your concern for threatened and endangered species. The Service encourages Federal agencies to include conservation of threatened and endangered species into their project planning to further the purposes of the Act. Please include the Consultation Tracking Number in the header of this letter with any request for consultation or correspondence about your project that you submit to our office.

Attachment(s):

- Official Species List

Official Species List

This list is provided pursuant to Section 7 of the Endangered Species Act, and fulfills the requirement for Federal agencies to "request of the Secretary of the Interior information whether any species which is listed or proposed to be listed may be present in the area of a proposed action".

This species list is provided by:

Carlsbad Fish And Wildlife Office
2177 Salk Avenue - Suite 250
Carlsbad, CA 92008-7385
(760) 431-9440

Project Summary

Consultation Code: 08ECAR00-2020-SLI-0427

Event Code: 08ECAR00-2020-E-01019

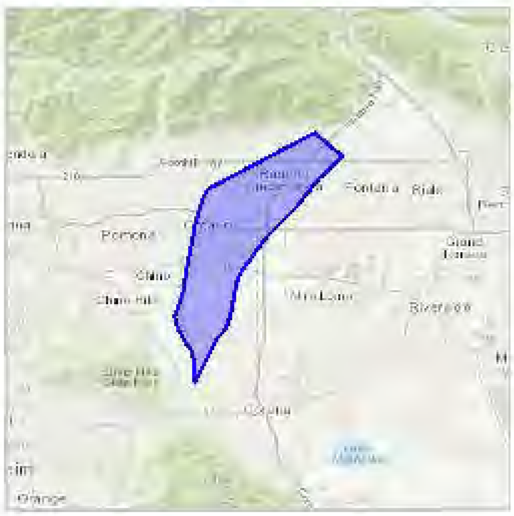
Project Name: OBMP PEIR Update MZ2

Project Type: WATER SUPPLY / DELIVERY

Project Description: Optimum Basin Management Plan PEIR Update - MZ2

Project Location:

Approximate location of the project can be viewed in Google Maps: https://www.google.com/maps/place/34.037629519000035N117.60389695221778W



Counties: Riverside, CA | San Bernardino, CA

Endangered Species Act Species

There is a total of 15 threatened, endangered, or candidate species on this species list.

Species on this list should be considered in an effects analysis for your project and could include species that exist in another geographic area. For example, certain fish may appear on the species list because a project could affect downstream species.

IPaC does not display listed species or critical habitats under the sole jurisdiction of NOAA Fisheries[1], as USFWS does not have the authority to speak on behalf of NOAA and the Department of Commerce.

See the "Critical habitats" section below for those critical habitats that lie wholly or partially within your project area under this office's jurisdiction. Please contact the designated FWS office if you have questions.

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1. NOAA Fisheries, also known as the National Marine Fisheries Service (NMFS), is an office of the National Oceanic and Atmospheric Administration within the Department of Commerce.

Mammals

NAME	STATUS
San Bernardino Merriam's Kangaroo Rat *Dipodomys merriami parvus* There is **final** critical habitat for this species. Your location overlaps the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/2060	Endangered
Stephens' Kangaroo Rat *Dipodomys stephensi (incl. D. cascus)* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/3495	Endangered

Birds

NAME	STATUS
California Condor *Gymnogyps californianus* Population: U.S.A. only, except where listed as an experimental population There is **final** critical habitat for this species. Your location is outside the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/8193	Endangered
Coastal California Gnatcatcher *Polioptila californica californica* There is **final** critical habitat for this species. Your location is outside the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/8178	Threatened
Least Bell's Vireo *Vireo bellii pusillus* There is **final** critical habitat for this species. Your location overlaps the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/5945	Endangered
Southwestern Willow Flycatcher *Empidonax traillii extimus* There is **final** critical habitat for this species. Your location overlaps the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/6749	Endangered

Amphibians

NAME	STATUS
Arroyo (=arroyo Southwestern) Toad *Anaxyrus californicus* There is **final** critical habitat for this species. Your location is outside the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/3762	Endangered
Mountain Yellow-legged Frog *Rana muscosa* Population: Southern California DPS There is **final** critical habitat for this species. Your location is outside the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/8037	Endangered

Fishes

NAME	STATUS
Santa Ana Sucker *Catostomus santaanae* Population: 3 CA river basins There is **final** critical habitat for this species. Your location is outside the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/3785	Threatened

Insects

NAME	STATUS
Delhi Sands Flower-loving Fly *Rhaphiomidas terminatus abdominalis* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/1540	Endangered

Flowering Plants

NAME	STATUS
Braunton's Milk-vetch *Astragalus brauntonii* There is **final** critical habitat for this species. Your location is outside the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/5674	Endangered
San Diego Ambrosia *Ambrosia pumila* There is **final** critical habitat for this species. Your location is outside the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/8287	Endangered
Santa Ana River Woolly-star *Eriastrum densifolium ssp. sanctorum* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/6575	Endangered
Slender-horned Spineflower *Dodecahema leptoceras* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/4007	Endangered
Thread-leaved Brodiaea *Brodiaea filifolia* There is **final** critical habitat for this species. Your location is outside the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/6087	Threatened

Critical habitats

There are 4 critical habitats wholly or partially within your project area under this office's jurisdiction.

NAME	STATUS
Least Bell's Vireo *Vireo bellii pusillus* https://ecos.fws.gov/ecp/species/5945#crithab	Final
San Bernardino Merriam's Kangaroo Rat *Dipodomys merriami parvus* https://ecos.fws.gov/ecp/species/2060#crithab	Final
Southwestern Willow Flycatcher *Empidonax traillii extimus* https://ecos.fws.gov/ecp/species/6749#crithab	Final
Yellow-billed Cuckoo *Coccyzus americanus* For information on why this critical habitat appears for your project, even though Yellow-billed Cuckoo is not on the list of potentially affected species at this location, contact the local field office. https://ecos.fws.gov/ecp/species/3911#crithab	Proposed

Program Natural Environment Study
Optimum Basin Management Program Update

Chino Basin Watermaster and Inland Empire Utilities Agency

Management Zone 3
CNDDB and IPaC Lists

CALIFORNIA DEPARTMENT OF FISH and WILDLIFE RareFind

OBMPU Management Zone 3

Query Summary:
Quad IS (Corona North (3311785) OR Guasti (3411715) OR Fontana (3411714) OR Devore (3411724))

Print Close

CNDDB Element Query Results

Scientific Name	Common Name	Taxonomic Group	Element Code	Total Occs	Returned Occs	Federal Status	State Status	Global Rank	State Rank	CA Rare Plant Rank	Other Status	Habitats
Abronia villosa var. aurita	chaparral sand-verbena	Dicots	PDNYC010P1	98	1	None	None	G5T2?	S2	1B.1	BLM_S-Sensitive, SB_RSABG-Rancho Santa Ana Botanic Garden, USFS_S-Sensitive	Chaparral, Coastal scrub, Desert dunes
Agelaius tricolor	tricolored blackbird	Birds	ABPBXB0020	955	5	None	Threatened	G2G3	S1S2	null	BLM_S-Sensitive, CDFW_SSC-Species of Special Concern, IUCN_EN-Endangered, NABCI_RWL-Red Watch List, USFWS_BCC-Birds of Conservation Concern	Freshwater marsh, Marsh & swamp, Swamp, Wetland
Aimophila ruficeps canescens	southern California rufous-crowned sparrow	Birds	ABPBX91091	235	2	None	None	G5T3	S3	null	CDFW_WL-Watch List	Chaparral, Coastal scrub
Ambrosia monogyra	singlewhorl burrobrush	Dicots	PDAST50010	30	1	None	None	G5	S2	2B.2	null	Chaparral, Sonoran desert scrub
Anniella stebbinsi	southern California legless lizard	Reptiles	ARACC01060	417	19	None	None	G3	S3	null	CDFW_SSC-Species of Special Concern, USFS_S-Sensitive	Broadleaved upland forest, Chaparral, Coastal dunes, Coastal scrub
Arenaria paludicola	marsh sandwort	Dicots	PDCAR040L0	16	1	Endangered	Endangered	G1	S1	1B.1	SB_SBBG-Santa Barbara Botanic Garden	Freshwater marsh, Marsh & swamp, Wetland
Arizona elegans occidentalis	California glossy snake	Reptiles	ARADB01017	260	8	None	None	G5T2	S2	null	CDFW_SSC-Species of Special Concern	null
Artemisiospiza belli belli	Bell's sage sparrow	Birds	ABPBX97021	61	2	None	None	G5T2T3	S3	null	CDFW_WL-Watch List, USFWS_BCC-Birds of Conservation Concern	Chaparral, Coastal scrub
Aspidoscelis hyperythra	orange-throated whiptail	Reptiles	ARACJ02060	369	3	None	None	G5	S2S3	null	CDFW_WL-Watch List, IUCN_LC-Least Concern, USFS_S-Sensitive	Chaparral, Cismontane woodland, Coastal scrub
Athene cunicularia	burrowing owl	Birds	ABNSB10010	1989	34	None	None	G4	S3	null	BLM_S-Sensitive, CDFW_SSC-Species of Special Concern, IUCN_LC-Least Concern, USFWS_BCC-Birds of	Coastal prairie, Coastal scrub, Great Basin grassland, Great Basin scrub, Mojavean desert scrub, Sonoran desert scrub, Valley & foothill grassland

											Conservation Concern	
Batrachoseps gabrieli	San Gabriel slender salamander	Amphibians	AAAAD02110	8	1	None	None	G2G3	S2S3	null	IUCN_DD-Data Deficient, USFS_S-Sensitive	Talus slope
Bombus crotchii	Crotch bumble bee	Insects	IIHYM24480	234	5	None	Candidate Endangered	G3G4	S1S2	null	null	null
Buteo swainsoni	Swainson's hawk	Birds	ABNKC19070	2518	1	None	Threatened	G5	S3	null	BLM_S-Sensitive, IUCN_LC-Least Concern, USFWS_BCC-Birds of Conservation Concern	Great Basin grassland, Riparian forest, Riparian woodland, Valley & foothill grassland
Calochortus plummerae	Plummer's mariposa-lily	Monocots	PMLIL0D150	230	16	None	None	G4	S4	4.2	SB_RSABG-Rancho Santa Ana Botanic Garden	Chaparral, Cismontane woodland, Coastal scrub, Lower montane coniferous forest, Valley & foothill grassland
Catostomus santaanae	Santa Ana sucker	Fish	AFCJC02190	28	5	Threatened	None	G1	S1	null	AFS_TH-Threatened, IUCN_VU-Vulnerable	Aquatic, South coast flowing waters
Centromadia pungens ssp. laevis	smooth tarplant	Dicots	PDAST4R0R4	126	1	None	None	G3G4T2	S2	1B.1	SB_RSABG-Rancho Santa Ana Botanic Garden	Alkali playa, Chenopod scrub, Meadow & seep, Riparian woodland, Valley & foothill grassland, Wetland
Chaetodipus fallax fallax	northwestern San Diego pocket mouse	Mammals	AMAFD05031	101	6	None	None	G5T3T4	S3S4	null	CDFW_SSC-Species of Special Concern	Chaparral, Coastal scrub
Chaetodipus fallax pallidus	pallid San Diego pocket mouse	Mammals	AMAFD05032	79	1	None	None	G5T34	S3S4	null	CDFW_SSC-Species of Special Concern	Desert wash, Pinon & juniper woodlands, Sonoran desert scrub
Chloropyron maritimum ssp. maritimum	salt marsh bird's-beak	Dicots	PDSCR0J0C2	30	1	Endangered	Endangered	G4?T1	S1	1B.2	SB_CRES-San Diego Zoo CRES Native Gene Seed Bank, SB_RSABG-Rancho Santa Ana Botanic Garden, SB_SBBG-Santa Barbara Botanic Garden	Coastal dunes, Marsh & swamp, Salt marsh, Wetland
Chorizanthe parryi var. parryi	Parry's spineflower	Dicots	PDPGN040J2	150	10	None	None	G3T2	S2	1B.1	BLM_S-Sensitive, SB_RSABG-Rancho Santa Ana Botanic Garden, USFS_S-Sensitive	Chaparral, Cismontane woodland, Coastal scrub, Valley & foothill grassland
Chorizanthe xanti var. leucotheca	white-bracted spineflower	Dicots	PDPGN040Z1	59	4	None	None	G4T3	S3	1B.2	BLM_S-Sensitive, SB_RSABG-Rancho Santa Ana Botanic Garden, SB_USDA-US Dept of Agriculture, USFS_S-Sensitive	Coastal scrub, Mojavean desert scrub, Pinon & juniper woodlands
Cicindela tranquebarica viridissima	greenest tiger beetle	Insects	IICOL02201	1	1	None	None	G5T1	S1	null	null	Riparian woodland
Cladium californicum	California saw-grass	Monocots	PMCYP04010	13	1	None	None	G4	S2	2B.2	SB_RSABG-Rancho Santa Ana Botanic Garden,	Alkali marsh, Freshwater marsh, Meadow & seep, Wetland

											USFS_S-Sensitive	
Coccyzus americanus occidentalis	western yellow-billed cuckoo	Birds	ABNRB02022	156	2	Threatened	Endangered	G5T2T3	S1	null	BLM_S-Sensitive, NABCI_RWL-Red Watch List, USFS_S-Sensitive, USFWS_BCC-Birds of Conservation Concern	Riparian forest
Coleonyx variegatus abbotti	San Diego banded gecko	Reptiles	ARACD01031	8	1	None	None	G5T3T4	S1S2	null	CDFW_SSC-Species of Special Concern	Chaparral, Coastal scrub
Coturnicops noveboracensis	yellow rail	Birds	ABNME01010	45	1	None	None	G4	S1S2	null	CDFW_SSC-Species of Special Concern, IUCN_LC-Least Concern, NABCI_RWL-Red Watch List, USFS_S-Sensitive, USFWS_BCC-Birds of Conservation Concern	Freshwater marsh, Meadow & seep
Crotalus ruber	red-diamond rattlesnake	Reptiles	ARADE02090	192	1	None	None	G4	S3	null	CDFW_SSC-Species of Special Concern, USFS_S-Sensitive	Chaparral, Mojavean desert scrub, Sonoran desert scrub
Dipodomys merriami parvus	San Bernardino kangaroo rat	Mammals	AMAFD03143	81	29	Endangered	Candidate Endangered	G5T1	S1	null	CDFW_SSC-Species of Special Concern	Coastal scrub
Dipodomys stephensi	Stephens' kangaroo rat	Mammals	AMAFD03100	220	4	Endangered	Threatened	G2	S2	null	IUCN_EN-Endangered	Coastal scrub, Valley & foothill grassland
Dodecahema leptoceras	slender-horned spineflower	Dicots	PDPGN0V010	41	4	Endangered	Endangered	G1	S1	1B.1	SB_RSABG-Rancho Santa Ana Botanic Garden	Chaparral, Cismontane woodland, Coastal scrub
Dudleya multicaulis	many-stemmed dudleya	Dicots	PDCRA040H0	154	1	None	None	G2	S2	1B.2	BLM_S-Sensitive, SB_RSABG-Rancho Santa Ana Botanic Garden, USFS_S-Sensitive	Chaparral, Coastal scrub, Valley & foothill grassland
Empidonax traillii extimus	southwestern willow flycatcher	Birds	ABPAE33043	70	3	Endangered	Endangered	G5T2	S1	null	NABCI_RWL-Red Watch List	Riparian woodland
Emys marmorata	western pond turtle	Reptiles	ARAAD02030	1385	1	None	None	G3G4	S3	null	BLM_S-Sensitive, CDFW_SSC-Species of Special Concern, IUCN_VU-Vulnerable, USFS_S-Sensitive	Aquatic, Artificial flowing waters, Klamath/North coast flowing waters, Klamath/North coast standing waters, Marsh & swamp, Sacramento/San Joaquin flowing waters, Sacramento/San Joaquin standing waters, South coast flowing waters, South coast standing waters, Wetland
Eriastrum densifolium ssp. sanctorum	Santa Ana River woollystar	Dicots	PDPLM03035	31	8	Endangered	Endangered	G4T1	S1	1B.1	SB_RSABG-Rancho Santa Ana Botanic Garden	Chaparral, Coastal scrub
Eumops perotis californicus	western mastiff bat	Mammals	AMACD02011	296	2	None	None	G5T4	S3S4	null	BLM_S-Sensitive, CDFW_SSC-Species of	Chaparral, Cismontane woodland, Coastal scrub,

											Special Concern, WBWG_H-High Priority	Valley & foothill grassland
Gila orcuttii	arroyo chub	Fish	AFCJB13120	49	2	None	None	G2	S2	null	AFS_VU-Vulnerable, CDFW_SSC-Species of Special Concern, USFS_S-Sensitive	Aquatic, South coast flowing waters
Horkelia cuneata var. puberula	mesa horkelia	Dicots	PDROS0W045	103	5	None	None	G4T1	S1	1B.1	USFS_S-Sensitive	Chaparral, Cismontane woodland, Coastal scrub
Icteria virens	yellow-breasted chat	Birds	ABPBX24010	100	1	None	None	G5	S3	null	CDFW_SSC-Species of Special Concern, IUCN_LC-Least Concern	Riparian forest, Riparian scrub, Riparian woodland
Lasiurus xanthinus	western yellow bat	Mammals	AMACC05070	58	4	None	None	G5	S3	null	CDFW_SSC-Species of Special Concern, IUCN_LC-Least Concern, WBWG_H-High Priority	Desert wash
Laterallus jamaicensis coturniculus	California black rail	Birds	ABNME03041	303	1	None	Threatened	G3G4T1	S1	null	BLM_S-Sensitive, CDFW_FP-Fully Protected, IUCN_NT-Near Threatened, NABCI_RWL-Red Watch List, USFWS_BCC-Birds of Conservation Concern	Brackish marsh, Freshwater marsh, Marsh & swamp, Salt marsh, Wetland
Lepidium virginicum var. robinsonii	Robinson's pepper-grass	Dicots	PDBRA1M114	142	3	None	None	G5T3	S3	4.3	null	Chaparral, Coastal scrub
Lepus californicus bennettii	San Diego black-tailed jackrabbit	Mammals	AMAEB03051	103	3	None	None	G5T3T4	S3S4	null	CDFW_SSC-Species of Special Concern	Coastal scrub
Lilium parryi	lemon lily	Monocots	PMLIL1A0J0	160	1	None	None	G3	S3	1B.2	SB_RSABG-Rancho Santa Ana Botanic Garden, USFS_S-Sensitive	Lower montane coniferous forest, Meadow & seep, Riparian forest, Upper montane coniferous forest, Wetland
Lycium parishii	Parish's desert-thorn	Dicots	PDSOL0G0D0	21	1	None	None	G4	S1	2B.3	null	Coastal scrub, Sonoran desert scrub
Malacothamnus parishii	Parish's bush-mallow	Dicots	PDMAL0Q0C0	1	1	None	None	GXQ	SX	1A	null	Chaparral, Coastal scrub
Monardella pringlei	Pringle's monardella	Dicots	PDLAM180J0	2	1	None	None	GX	SX	1A	null	Coastal scrub
Muhlenbergia californica	California muhly	Monocots	PMPOA480A0	5	1	None	None	G4	S4	4.3	null	Chaparral, Coastal scrub, Lower montane coniferous forest, Meadow & seep
Muhlenbergia utilis	aparejo grass	Monocots	PMPOA481X0	14	1	None	None	G4	S2S3	2B.2	null	Chaparral, Cismontane woodland, Coastal scrub, Marsh & swamp, Meadow & seep, Ultramafic
Navarretia prostrata	prostrate vernal pool navarretia	Dicots	PDPLM0C0Q0	60	1	None	None	G2	S2	1B.2	null	Coastal scrub, Meadow & seep, Valley & foothill grassland,

												Vernal pool, Wetland
Neotoma lepida intermedia	San Diego desert woodrat	Mammals	AMAFF08041	132	2	None	None	G5T3T4	S3S4	null	CDFW_SSC-Species of Special Concern	Coastal scrub
Nyctinomops femorosaccus	pocketed free-tailed bat	Mammals	AMACD04010	90	2	None	None	G4	S3	null	CDFW_SSC-Species of Special Concern, IUCN_LC-Least Concern, WBWG_M-Medium Priority	Joshua tree woodland, Pinon & juniper woodlands, Riparian scrub, Sonoran desert scrub
Oncorhynchus mykiss irideus pop. 10	steelhead - southern California DPS	Fish	AFCHA0209J	20	1	Endangered	None	G5T1Q	S1	null	AFS_EN-Endangered	Aquatic, South coast flowing waters
Opuntia basilaris var. brachyclada	short-joint beavertail	Dicots	PDCAC0D053	199	1	None	None	G5T3	S3	1B.2	BLM_S-Sensitive, SB_RSABG-Rancho Santa Ana Botanic Garden, USFS_S-Sensitive	Chaparral, Joshua tree woodland, Mojavean desert scrub, Pinon & juniper woodlands
Perognathus longimembris brevinasus	Los Angeles pocket mouse	Mammals	AMAFD01041	70	5	None	None	G5T1T2	S1S2	null	CDFW_SSC-Species of Special Concern	Coastal scrub
Phacelia stellaris	Brand's star phacelia	Dicots	PDHYD0C510	15	1	None	None	G1	S1	1B.1	SB_RSABG-Rancho Santa Ana Botanic Garden	Coastal dunes, Coastal scrub
Phrynosoma blainvillii	coast horned lizard	Reptiles	ARACF12100	784	14	None	None	G3G4	S3S4	null	BLM_S-Sensitive, CDFW_SSC-Species of Special Concern, IUCN_LC-Least Concern	Chaparral, Cismontane woodland, Coastal bluff scrub, Coastal scrub, Desert wash, Pinon & juniper woodlands, Riparian scrub, Riparian woodland, Valley & foothill grassland
Polioptila californica californica	coastal California gnatcatcher	Birds	ABPBJ08081	846	13	Threatened	None	G4G5T2Q	S2	null	CDFW_SSC-Species of Special Concern, NABCI_YWL-Yellow Watch List	Coastal bluff scrub, Coastal scrub
Pseudognaphalium leucocephalum	white rabbit-tobacco	Dicots	PDAST440C0	62	1	None	None	G4	S2	2B.2	null	Chaparral, Cismontane woodland, Coastal scrub, Riparian woodland
Rana muscosa	southern mountain yellow-legged frog	Amphibians	AAABH01330	186	1	Endangered	Endangered	G1	S1	null	CDFW_WL-Watch List, IUCN_EN-Endangered, USFS_S-Sensitive	Aquatic
Rhaphiomidas terminatus abdominalis	Delhi Sands flower-loving fly	Insects	IIDIP05021	36	18	Endangered	None	G1T1	S1	null	null	Interior dunes
Rhinichthys osculus ssp. 3	Santa Ana speckled dace	Fish	AFCJB3705K	13	2	None	None	G5T1	S1	null	AFS_TH-Threatened, CDFW_SSC-Species of Special Concern, USFS_S-Sensitive	Aquatic, South coast flowing waters
Riversidian Alluvial Fan Sage Scrub	Riversidian Alluvial Fan Sage Scrub	Scrub	CTT32720CA	30	3	None	None	G1	S1.1	null	null	Coastal scrub
Senecio aphanactis	chaparral ragwort	Dicots	PDAST8H060	98	1	None	None	G3	S2	2B.2	SB_RSABG-Rancho Santa	Chaparral, Cismontane

											Ana Botanic Garden	woodland, Coastal scrub
Setophaga petechia	yellow warbler	Birds	ABPBX03010	78	1	None	None	G5	S3S4	null	CDFW_SSC-Species of Special Concern, USFWS_BCC-Birds of Conservation Concern	Riparian forest, Riparian scrub, Riparian woodland
Southern California Arroyo Chub/Santa Ana Sucker Stream	Southern California Arroyo Chub/Santa Ana Sucker Stream	Inland Waters	CARE2330CA	4	1	None	None	GNR	SNR	null	null	null
Southern Cottonwood Willow Riparian Forest	Southern Cottonwood Willow Riparian Forest	Riparian	CTT61330CA	111	1	None	None	G3	S3.2	null	null	Riparian forest
Southern Riparian Forest	Southern Riparian Forest	Riparian	CTT61300CA	20	1	None	None	G4	S4	null	null	Riparian forest
Southern Sycamore Alder Riparian Woodland	Southern Sycamore Alder Riparian Woodland	Riparian	CTT62400CA	230	5	None	None	G4	S4	null	null	Riparian woodland
Spea hammondii	western spadefoot	Amphibians	AAABF02020	1213	1	None	None	G3	S3	null	BLM_S-Sensitive, CDFW_SSC-Species of Special Concern, IUCN_NT-Near Threatened	Cismontane woodland, Coastal scrub, Valley & foothill grassland, Vernal pool, Wetland
Sphenopholis obtusata	prairie wedge grass	Monocots	PMPOA5T030	19	1	None	None	G5	S2	2B.2	null	Cismontane woodland, Meadow & seep, Wetland
Streptanthus bernardinus	Laguna Mountains jewelflower	Dicots	PDBRA2G060	22	1	None	None	G3G4	S3S4	4.3	SB_RSABG-Rancho Santa Ana Botanic Garden	Chaparral, Lower montane coniferous forest, Upper montane coniferous forest
Symphyotrichum defoliatum	San Bernardino aster	Dicots	PDASTE80C0	102	2	None	None	G2	S2	1B.2	BLM_S-Sensitive, USFS_S-Sensitive	Cismontane woodland, Coastal scrub, Lower montane coniferous forest, Marsh & swamp, Meadow & seep, Valley & foothill grassland
Vireo bellii pusillus	least Bell's vireo	Birds	ABPBW01114	503	10	Endangered	Endangered	G5T2	S2	null	IUCN_NT-Near Threatened, NABCI_YWL-Yellow Watch List	Riparian forest, Riparian scrub, Riparian woodland

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Carlsbad Fish And Wildlife Office
2177 Salk Avenue - Suite 250
Carlsbad, CA 92008-7385
Phone: (760) 431-9440 Fax: (760) 431-5901
http://www.fws.gov/carlsbad/

In Reply Refer To: January 07, 2020
Consultation Code: 08ECAR00-2020-SLI-0428
Event Code: 08ECAR00-2020-E-01022
Project Name: OBMP PEIR Update MZ3

Subject: List of threatened and endangered species that may occur in your proposed project location, and/or may be affected by your proposed project

To Whom It May Concern:

The enclosed species list identifies threatened, endangered, and proposed species, designated critical habitat, and candidate species that may occur within the boundary of your proposed project and/or may be affected by your proposed project. The species list fulfills the requirements of the U.S. Fish and Wildlife Service (Service) under section 7(c) of the Endangered Species Act (Act) of 1973, as amended (16 U.S.C. 1531 *et seq.*).

New information based on updated surveys, changes in the abundance and distribution of species, changed habitat conditions, or other factors could change this list. Please feel free to contact us if you need more current information or assistance regarding the potential impacts to federally proposed, listed, and candidate species and federally designated and proposed critical habitat. Please note that under 50 CFR 402.12(e) of the regulations implementing section 7 of the Act, the accuracy of this species list should be verified after 90 days. This verification can be completed formally or informally as desired. The Service recommends that verification be completed by visiting the ECOS-IPaC website at regular intervals during project planning and implementation for updates to species lists and information. An updated list may be requested through the ECOS-IPaC system by completing the same process used to receive the enclosed list.

The purpose of the Act is to provide a means whereby threatened and endangered species and the ecosystems upon which they depend may be conserved. Under sections 7(a)(1) and 7(a)(2) of the Act and its implementing regulations (50 CFR 402 *et seq.*), Federal agencies are required to utilize their authorities to carry out programs for the conservation of threatened and endangered species and to determine whether projects may affect threatened and endangered species and/or designated critical habitat.

A Biological Assessment is required for construction projects (or other undertakings having similar physical impacts) that are major Federal actions significantly affecting the quality of the human environment as defined in the National Environmental Policy Act (42 U.S.C. 4332(2)(c)). For projects other than major construction activities, the Service suggests that a biological evaluation similar to a Biological Assessment be prepared to determine whether the project may affect listed or proposed species and/or designated or proposed critical habitat. Recommended contents of a Biological Assessment are described at 50 CFR 402.12.

If a Federal agency determines, based on the Biological Assessment or biological evaluation, that listed species and/or designated critical habitat may be affected by the proposed project, the agency is required to consult with the Service pursuant to 50 CFR 402. In addition, the Service recommends that candidate species, proposed species and proposed critical habitat be addressed within the consultation. More information on the regulations and procedures for section 7 consultation, including the role of permit or license applicants, can be found in the "Endangered Species Consultation Handbook" at:

http://www.fws.gov/endangered/esa-library/pdf/TOC-GLOS.PDF

Please be aware that bald and golden eagles are protected under the Bald and Golden Eagle Protection Act (16 U.S.C. 668 *et seq.*), and projects affecting these species may require development of an eagle conservation plan (http://www.fws.gov/windenergy/eagle_guidance.html). Additionally, wind energy projects should follow the wind energy guidelines (http://www.fws.gov/windenergy/) for minimizing impacts to migratory birds and bats.

Guidance for minimizing impacts to migratory birds for projects including communications towers (e.g., cellular, digital television, radio, and emergency broadcast) can be found at: http://www.fws.gov/migratorybirds/CurrentBirdIssues/Hazards/towers/towers.htm; http://www.towerkill.com; and http://www.fws.gov/migratorybirds/CurrentBirdIssues/Hazards/towers/comtow.html.

We appreciate your concern for threatened and endangered species. The Service encourages Federal agencies to include conservation of threatened and endangered species into their project planning to further the purposes of the Act. Please include the Consultation Tracking Number in the header of this letter with any request for consultation or correspondence about your project that you submit to our office.

Attachment(s):

- Official Species List

Official Species List

This list is provided pursuant to Section 7 of the Endangered Species Act, and fulfills the requirement for Federal agencies to "request of the Secretary of the Interior information whether any species which is listed or proposed to be listed may be present in the area of a proposed action".

This species list is provided by:

Carlsbad Fish And Wildlife Office
2177 Salk Avenue - Suite 250
Carlsbad, CA 92008-7385
(760) 431-9440

Project Summary

Consultation Code: 08ECAR00-2020-SLI-0428

Event Code: 08ECAR00-2020-E-01022

Project Name: OBMP PEIR Update MZ3

Project Type: WATER SUPPLY / DELIVERY

Project Description: Optimum Basin Management Plan PEIR Update - MZ3

Project Location:

Approximate location of the project can be viewed in Google Maps: https://www.google.com/maps/place/34.039474964500045N117.52218800533493W

Counties: Riverside, CA | San Bernardino, CA

Endangered Species Act Species

There is a total of 14 threatened, endangered, or candidate species on this species list.

Species on this list should be considered in an effects analysis for your project and could include species that exist in another geographic area. For example, certain fish may appear on the species list because a project could affect downstream species.

IPaC does not display listed species or critical habitats under the sole jurisdiction of NOAA Fisheries[1], as USFWS does not have the authority to speak on behalf of NOAA and the Department of Commerce.

See the "Critical habitats" section below for those critical habitats that lie wholly or partially within your project area under this office's jurisdiction. Please contact the designated FWS office if you have questions.

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1. NOAA Fisheries, also known as the National Marine Fisheries Service (NMFS), is an office of the National Oceanic and Atmospheric Administration within the Department of Commerce.

Mammals

NAME	STATUS
San Bernardino Merriam's Kangaroo Rat *Dipodomys merriami parvus* There is **final** critical habitat for this species. Your location is outside the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/2060	Endangered
Stephens' Kangaroo Rat *Dipodomys stephensi (incl. D. cascus)* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/3495	Endangered

Birds

NAME	STATUS
California Condor *Gymnogyps californianus* Population: U.S.A. only, except where listed as an experimental population There is **final** critical habitat for this species. Your location is outside the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/8193	Endangered
Coastal California Gnatcatcher *Polioptila californica californica* There is **final** critical habitat for this species. Your location overlaps the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/8178	Threatened
Least Bell's Vireo *Vireo bellii pusillus* There is **final** critical habitat for this species. Your location is outside the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/5945	Endangered
Southwestern Willow Flycatcher *Empidonax traillii extimus* There is **final** critical habitat for this species. Your location is outside the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/6749	Endangered

Amphibians

NAME	STATUS
Arroyo (=arroyo Southwestern) Toad *Anaxyrus californicus* There is **final** critical habitat for this species. Your location is outside the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/3762	Endangered

Fishes

NAME	STATUS
Santa Ana Sucker *Catostomus santaanae* Population: 3 CA river basins There is **final** critical habitat for this species. Your location is outside the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/3785	Threatened

Insects

NAME	STATUS
Delhi Sands Flower-loving Fly *Rhaphiomidas terminatus abdominalis* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/1540	Endangered

Flowering Plants

NAME	STATUS
Gambel's Watercress *Rorippa gambellii* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/4201	Endangered
San Diego Ambrosia *Ambrosia pumila* There is **final** critical habitat for this species. Your location is outside the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/8287	Endangered
Santa Ana River Woolly-star *Eriastrum densifolium ssp. sanctorum* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/6575	Endangered
Slender-horned Spineflower *Dodecahema leptoceras* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/4007	Endangered
Thread-leaved Brodiaea *Brodiaea filifolia* There is **final** critical habitat for this species. Your location is outside the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/6087	Threatened

Critical habitats

There is 1 critical habitat wholly or partially within your project area under this office's jurisdiction.

NAME	STATUS
Coastal California Gnatcatcher *Polioptila californica californica* https://ecos.fws.gov/ecp/species/8178#crithab	Final

Program Natural Environment Study
Optimum Basin Management Program Update

Chino Basin Watermaster and Inland Empire Utilities Agency

Management Zone 4
CNDDB and IPaC Lists

CALIFORNIA DEPARTMENT OF FISH and WILDLIFE RareFind

OBMPU Management Zone 4

Query Summary:
Quad IS (Guasti (3411715) OR Fontana (3411714) OR Riverside West (3311784) OR Corona North (3311785))

Print Close

CNDDB Element Query Results

Scientific Name	Common Name	Taxonomic Group	Element Code	Total Occs	Returned Occs	Federal Status	State Status	Global Rank	State Rank	CA Rare Plant Rank	Other Status	Habitats
Abronia villosa var. aurita	chaparral sand-verbena	Dicots	PDNYC010P1	98	1	None	None	G5T2?	S2	1B.1	BLM_S-Sensitive, SB_RSABG-Rancho Santa Ana Botanic Garden, USFS_S-Sensitive	Chaparral, Coastal scrub, Desert dunes
Accipiter cooperii	Cooper's hawk	Birds	ABNKC12040	118	1	None	None	G5	S4	null	CDFW_WL-Watch List, IUCN_LC-Least Concern	Cismontane woodland, Riparian forest, Riparian woodland, Upper montane coniferous forest
Agelaius tricolor	tricolored blackbird	Birds	ABPBXB0020	955	5	None	Threatened	G2G3	S1S2	null	BLM_S-Sensitive, CDFW_SSC-Species of Special Concern, IUCN_EN-Endangered, NABCI_RWL-Red Watch List, USFWS_BCC-Birds of Conservation Concern	Freshwater marsh, Marsh & swamp, Swamp, Wetland
Aimophila ruficeps canescens	southern California rufous-crowned sparrow	Birds	ABPBX91091	235	4	None	None	G5T3	S3	null	CDFW_WL-Watch List	Chaparral, Coastal scrub
Ambrosia pumila	San Diego ambrosia	Dicots	PDAST0C0M0	59	1	Endangered	None	G1	S1	1B.1	null	Chaparral, Coastal scrub, Valley & foothill grassland
Anniella stebbinsi	southern California legless lizard	Reptiles	ARACC01060	417	20	None	None	G3	S3	null	CDFW_SSC-Species of Special Concern, USFS_S-Sensitive	Broadleaved upland forest, Chaparral, Coastal dunes, Coastal scrub
Arenaria paludicola	marsh sandwort	Dicots	PDCAR040L0	16	1	Endangered	Endangered	G1	S1	1B.1	SB_SBBG-Santa Barbara Botanic Garden	Freshwater marsh, Marsh & swamp, Wetland
Arizona elegans occidentalis	California glossy snake	Reptiles	ARADB01017	260	5	None	None	G5T2	S2	null	CDFW_SSC-Species of Special Concern	null
Artemisiospiza belli belli	Bell's sage sparrow	Birds	ABPBX97021	61	2	None	None	G5T2T3	S3	null	CDFW_WL-Watch List, USFWS_BCC-Birds of Conservation Concern	Chaparral, Coastal scrub
Aspidoscelis hyperythra	orange-throated whiptail	Reptiles	ARACJ02060	369	7	None	None	G5	S2S3	null	CDFW_WL-Watch List, IUCN_LC-Least Concern, USFS_S-Sensitive	Chaparral, Cismontane woodland, Coastal scrub
Aspidoscelis tigris stejnegeri	coastal whiptail	Reptiles	ARACJ02143	148	1	None	None	G5T5	S3	null	CDFW_SSC-Species of	null

											Special Concern	
Athene cunicularia	burrowing owl	Birds	ABNSB10010	1989	34	None	None	G4	S3	null	BLM_S-Sensitive, CDFW_SSC-Species of Special Concern, IUCN_LC-Least Concern, USFWS_BCC-Birds of Conservation Concern	Coastal prairie, Coastal scrub, Great Basin grassland, Great Basin scrub, Mojavean desert scrub, Sonoran desert scrub, Valley & foothill grassland
Bombus crotchii	Crotch bumble bee	Insects	IIHYM24480	234	4	None	Candidate Endangered	G3G4	S1S2	null	null	null
Buteo swainsoni	Swainson's hawk	Birds	ABNKC19070	2518	2	None	Threatened	G5	S3	null	BLM_S-Sensitive, IUCN_LC-Least Concern, USFWS_BCC-Birds of Conservation Concern	Great Basin grassland, Riparian forest, Riparian woodland, Valley & foothill grassland
Calochortus plummerae	Plummer's mariposa-lily	Monocots	PMLIL0D150	230	2	None	None	G4	S4	4.2	SB_RSABG-Rancho Santa Ana Botanic Garden	Chaparral, Cismontane woodland, Coastal scrub, Lower montane coniferous forest, Valley & foothill grassland
Carolella busckana	Busck's gallmoth	Insects	IILEM2X090	4	1	None	None	G1G3	SH	null	null	Coastal dunes, Coastal scrub
Catostomus santaanae	Santa Ana sucker	Fish	AFCJC02190	28	7	Threatened	None	G1	S1	null	AFS_TH-Threatened, IUCN_VU-Vulnerable	Aquatic, South coast flowing waters
Centromadia pungens ssp. laevis	smooth tarplant	Dicots	PDAST4R0R4	126	1	None	None	G3G4T2	S2	1B.1	SB_RSABG-Rancho Santa Ana Botanic Garden	Alkali playa, Chenopod scrub, Meadow & seep, Riparian woodland, Valley & foothill grassland, Wetland
Ceratochrysis longimala	Desert cuckoo wasp	Insects	IIHYM71040	2	1	None	None	G1	S1	null	null	null
Chaetodipus fallax fallax	northwestern San Diego pocket mouse	Mammals	AMAFD05031	101	2	None	None	G5T3T4	S3S4	null	CDFW_SSC-Species of Special Concern	Chaparral, Coastal scrub
Chloropyron maritimum ssp. maritimum	salt marsh bird's-beak	Dicots	PDSCR0J0C2	30	1	Endangered	Endangered	G4?T1	S1	1B.2	SB_CRES-San Diego Zoo CRES Native Gene Seed Bank, SB_RSABG-Rancho Santa Ana Botanic Garden, SB_SBBG-Santa Barbara Botanic Garden	Coastal dunes, Marsh & swamp, Salt marsh, Wetland
Chorizanthe parryi var. parryi	Parry's spineflower	Dicots	PDPGN040J2	150	2	None	None	G3T2	S2	1B.1	BLM_S-Sensitive, SB_RSABG-Rancho Santa Ana Botanic Garden, USFS_S-Sensitive	Chaparral, Cismontane woodland, Coastal scrub, Valley & foothill grassland
Cicindela tranquebarica viridissima	greenest tiger beetle	Insects	IICOL02201	1	1	None	None	G5T1	S1	null	null	Riparian woodland
Cladium californicum	California saw-grass	Monocots	PMCYP04010	13	1	None	None	G4	S2	2B.2	SB_RSABG-Rancho Santa Ana Botanic Garden, USFS_S-Sensitive	Alkali marsh, Freshwater marsh, Meadow & seep, Wetland
Coccyzus	western	Birds	ABNRB02022	156	4	Threatened	Endangered	G5T2T3	S1	null	BLM_S-	Riparian forest

americanus occidentalis	yellow-billed cuckoo										Sensitive, NABCI_RWL-Red Watch List, USFS_S-Sensitive, USFWS_BCC-Birds of Conservation Concern	
Coleonyx variegatus abbotti	San Diego banded gecko	Reptiles	ARACD01031	8	1	None	None	G5T3T4	S1S2	null	CDFW_SSC-Species of Special Concern	Chaparral, Coastal scrub
Coturnicops noveboracensis	yellow rail	Birds	ABNME01010	45	1	None	None	G4	S1S2	null	CDFW_SSC-Species of Special Concern, IUCN_LC-Least Concern, NABCI_RWL-Red Watch List, USFS_S-Sensitive, USFWS_BCC-Birds of Conservation Concern	Freshwater marsh, Meadow & seep
Crotalus ruber	red-diamond rattlesnake	Reptiles	ARADE02090	192	4	None	None	G4	S3	null	CDFW_SSC-Species of Special Concern, USFS_S-Sensitive	Chaparral, Mojavean desert scrub, Sonoran desert scrub
Dipodomys merriami parvus	San Bernardino kangaroo rat	Mammals	AMAFD03143	81	5	Endangered	Candidate Endangered	G5T1	S1	null	CDFW_SSC-Species of Special Concern	Coastal scrub
Dipodomys stephensi	Stephens' kangaroo rat	Mammals	AMAFD03100	220	10	Endangered	Threatened	G2	S2	null	IUCN_EN-Endangered	Coastal scrub, Valley & foothill grassland
Dudleya multicaulis	many-stemmed dudleya	Dicots	PDCRA040H0	154	1	None	None	G2	S2	1B.2	BLM_S-Sensitive, SB_RSABG-Rancho Santa Ana Botanic Garden, USFS_S-Sensitive	Chaparral, Coastal scrub, Valley & foothill grassland
Empidonax traillii extimus	southwestern willow flycatcher	Birds	ABPAE33043	70	3	Endangered	Endangered	G5T2	S1	null	NABCI_RWL-Red Watch List	Riparian woodland
Emys marmorata	western pond turtle	Reptiles	ARAAD02030	1385	1	None	None	G3G4	S3	null	BLM_S-Sensitive, CDFW_SSC-Species of Special Concern, IUCN_VU-Vulnerable, USFS_S-Sensitive	Aquatic, Artificial flowing waters, Klamath/North coast flowing waters, Klamath/North coast standing waters, Marsh & swamp, Sacramento/San Joaquin flowing waters, Sacramento/San Joaquin standing waters, South coast flowing waters, South coast standing waters, Wetland
Eriastrum densifolium ssp. sanctorum	Santa Ana River woollystar	Dicots	PDPLM03035	31	4	Endangered	Endangered	G4T1	S1	1B.1	SB_RSABG-Rancho Santa Ana Botanic Garden	Chaparral, Coastal scrub
Eumops perotis californicus	western mastiff bat	Mammals	AMACD02011	296	3	None	None	G5T4	S3S4	null	BLM_S-Sensitive, CDFW_SSC-Species of Special Concern, WBWG_H-High Priority	Chaparral, Cismontane woodland, Coastal scrub, Valley & foothill grassland
Euphydryas editha quino	quino checkerspot butterfly	Insects	IILEPK405L	127	1	Endangered	None	G5T1T2	S1S2	null	XERCES_CI-Critically Imperiled	Chaparral, Coastal scrub

Gila orcuttii	arroyo chub	Fish	AFCJB13120	49	4	None	None	G2	S2	null	AFS_VU-Vulnerable, CDFW_SSC-Species of Special Concern, USFS_S-Sensitive	Aquatic, South coast flowing waters
Horkelia cuneata var. puberula	mesa horkelia	Dicots	PDROS0W045	103	4	None	None	G4T1	S1	1B.1	USFS_S-Sensitive	Chaparral, Cismontane woodland, Coastal scrub
Icteria virens	yellow-breasted chat	Birds	ABPBX24010	100	2	None	None	G5	S3	null	CDFW_SSC-Species of Special Concern, IUCN_LC-Least Concern	Riparian forest, Riparian scrub, Riparian woodland
Lasiurus xanthinus	western yellow bat	Mammals	AMACC05070	58	5	None	None	G5	S3	null	CDFW_SSC-Species of Special Concern, IUCN_LC-Least Concern, WBWG_H-High Priority	Desert wash
Lasthenia glabrata ssp. coulteri	Coulter's goldfields	Dicots	PDAST5L0A1	111	1	None	None	G4T2	S2	1B.1	BLM_S-Sensitive, SB_RSABG-Rancho Santa Ana Botanic Garden, SB_SBBG-Santa Barbara Botanic Garden	Alkali playa, Marsh & swamp, Salt marsh, Vernal pool, Wetland
Laterallus jamaicensis coturniculus	California black rail	Birds	ABNME03041	303	2	None	Threatened	G3G4T1	S1	null	BLM_S-Sensitive, CDFW_FP-Fully Protected, IUCN_NT-Near Threatened, NABCI_RWL-Red Watch List, USFWS_BCC-Birds of Conservation Concern	Brackish marsh, Freshwater marsh, Marsh & swamp, Salt marsh, Wetland
Lepidium virginicum var. robinsonii	Robinson's pepper-grass	Dicots	PDBRA1M114	142	3	None	None	G5T3	S3	4.3	null	Chaparral, Coastal scrub
Lepus californicus bennettii	San Diego black-tailed jackrabbit	Mammals	AMAEB03051	103	3	None	None	G5T3T4	S3S4	null	CDFW_SSC-Species of Special Concern	Coastal scrub
Lycium parishii	Parish's desert-thorn	Dicots	PDSOL0G0D0	21	1	None	None	G4	S1	2B.3	null	Coastal scrub, Sonoran desert scrub
Malacothamnus parishii	Parish's bush-mallow	Dicots	PDMAL0Q0C0	1	1	None	None	GXQ	SX	1A	null	Chaparral, Coastal scrub
Monardella pringlei	Pringle's monardella	Dicots	PDLAM180J0	2	1	None	None	GX	SX	1A	null	Coastal scrub
Muhlenbergia californica	California muhly	Monocots	PMPOA480A0	5	1	None	None	G4	S4	4.3	null	Chaparral, Coastal scrub, Lower montane coniferous forest, Meadow & seep
Muhlenbergia utilis	aparejo grass	Monocots	PMPOA481X0	14	1	None	None	G4	S2S3	2B.2	null	Chaparral, Cismontane woodland, Coastal scrub, Marsh & swamp, Meadow & seep, Ultramafic
Navarretia prostrata	prostrate vernal pool navarretia	Dicots	PDPLM0C0Q0	60	1	None	None	G2	S2	1B.2	null	Coastal scrub, Meadow & seep, Valley & foothill grassland, Vernal pool, Wetland
Neotoma lepida	San Diego	Mammals	AMAFF08041	132	2	None	None	G5T3T4	S3S4	null	CDFW_SSC-	Coastal scrub

intermedia	desert woodrat										Species of Special Concern	
Nyctinomops femorosaccus	pocketed free-tailed bat	Mammals	AMACD04010	90	3	None	None	G4	S3	null	CDFW_SSC-Species of Special Concern, IUCN_LC-Least Concern, WBWG_M-Medium Priority	Joshua tree woodland, Pinon & juniper woodlands, Riparian scrub, Sonoran desert scrub
Oncorhynchus mykiss irideus pop. 10	steelhead - southern California DPS	Fish	AFCHA0209J	20	1	Endangered	None	G5T1Q	S1	null	AFS_EN-Endangered	Aquatic, South coast flowing waters
Perognathus longimembris brevinasus	Los Angeles pocket mouse	Mammals	AMAFD01041	70	4	None	None	G5T1T2	S1S2	null	CDFW_SSC-Species of Special Concern	Coastal scrub
Phacelia stellaris	Brand's star phacelia	Dicots	PDHYD0C510	15	2	None	None	G1	S1	1B.1	SB_RSABG-Rancho Santa Ana Botanic Garden	Coastal dunes, Coastal scrub
Phrynosoma blainvillii	coast horned lizard	Reptiles	ARACF12100	784	8	None	None	G3G4	S3S4	null	BLM_S-Sensitive, CDFW_SSC-Species of Special Concern, IUCN_LC-Least Concern	Chaparral, Cismontane woodland, Coastal bluff scrub, Coastal scrub, Desert wash, Pinon & juniper woodlands, Riparian scrub, Riparian woodland, Valley & foothill grassland
Polioptila californica californica	coastal California gnatcatcher	Birds	ABPBJ08081	846	18	Threatened	None	G4G5T2Q	S2	null	CDFW_SSC-Species of Special Concern, NABCI_YWL-Yellow Watch List	Coastal bluff scrub, Coastal scrub
Pseudognaphalium leucocephalum	white rabbit-tobacco	Dicots	PDAST440C0	62	1	None	None	G4	S2	2B.2	null	Chaparral, Cismontane woodland, Coastal scrub, Riparian woodland
Rhaphiomidas terminatus abdominalis	Delhi Sands flower-loving fly	Insects	IIDIP05021	36	18	Endangered	None	G1T1	S1	null	null	Interior dunes
Rhinichthys osculus ssp. 3	Santa Ana speckled dace	Fish	AFCJB3705K	13	1	None	None	G5T1	S1	null	AFS_TH-Threatened, CDFW_SSC-Species of Special Concern, USFS_S-Sensitive	Aquatic, South coast flowing waters
Riversidian Alluvial Fan Sage Scrub	Riversidian Alluvial Fan Sage Scrub	Scrub	CTT32720CA	30	1	None	None	G1	S1.1	null	null	Coastal scrub
Senecio aphanactis	chaparral ragwort	Dicots	PDAST8H060	98	1	None	None	G3	S2	2B.2	SB_RSABG-Rancho Santa Ana Botanic Garden	Chaparral, Cismontane woodland, Coastal scrub
Setophaga petechia	yellow warbler	Birds	ABPBX03010	78	2	None	None	G5	S3S4	null	CDFW_SSC-Species of Special Concern, USFWS_BCC-Birds of Conservation Concern	Riparian forest, Riparian scrub, Riparian woodland
Southern California Arroyo Chub/Santa Ana Sucker Stream	Southern California Arroyo Chub/Santa Ana Sucker Stream	Inland Waters	CARE2330CA	4	1	None	None	GNR	SNR	null	null	null
Southern Cottonwood Willow	Southern Cottonwood	Riparian	CTT61330CA	111	4	None	None	G3	S3.2	null	null	Riparian forest

Riparian Forest	Willow Riparian Forest											
Southern Sycamore Alder Riparian Woodland	Southern Sycamore Alder Riparian Woodland	Riparian	CTT62400CA	230	1	None	None	G4	S4	null	null	Riparian woodland
Southern Willow Scrub	Southern Willow Scrub	Riparian	CTT63320CA	45	1	None	None	G3	S2.1	null	null	Riparian scrub
Spea hammondii	western spadefoot	Amphibians	AAABF02020	1213	1	None	None	G3	S3	null	BLM_S-Sensitive, CDFW_SSC-Species of Special Concern, IUCN_NT-Near Threatened	Cismontane woodland, Coastal scrub, Valley & foothill grassland, Vernal pool, Wetland
Sphenopholis obtusata	prairie wedge grass	Monocots	PMPOA5T030	19	1	None	None	G5	S2	2B.2	null	Cismontane woodland, Meadow & seep, Wetland
Spinus lawrencei	Lawrence's goldfinch	Birds	ABPBY06100	4	1	None	None	G3G4	S3S4	null	IUCN_LC-Least Concern, NABCI_YWL-Yellow Watch List, USFWS_BCC-Birds of Conservation Concern	Broadleaved upland forest, Chaparral, Pinon & juniper woodlands, Riparian woodland
Symphyotrichum defoliatum	San Bernardino aster	Dicots	PDASTE80C0	102	2	None	None	G2	S2	1B.2	BLM_S-Sensitive, USFS_S-Sensitive	Cismontane woodland, Coastal scrub, Lower montane coniferous forest, Marsh & swamp, Meadow & seep, Valley & foothill grassland
Vireo bellii pusillus	least Bell's vireo	Birds	ABPBW01114	503	14	Endangered	Endangered	G5T2	S2	null	IUCN_NT-Near Threatened, NABCI_YWL-Yellow Watch List	Riparian forest, Riparian scrub, Riparian woodland

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Carlsbad Fish And Wildlife Office
2177 Salk Avenue - Suite 250
Carlsbad, CA 92008-7385
Phone: (760) 431-9440 Fax: (760) 431-5901
http://www.fws.gov/carlsbad/

In Reply Refer To:
Consultation Code: 08ECAR00-2020-SLI-0429
Event Code: 08ECAR00-2020-E-01024
Project Name: OBMP PEIR Update MZ4

January 07, 2020

Subject: List of threatened and endangered species that may occur in your proposed project location, and/or may be affected by your proposed project

To Whom It May Concern:

The enclosed species list identifies threatened, endangered, and proposed species, designated critical habitat, and candidate species that may occur within the boundary of your proposed project and/or may be affected by your proposed project. The species list fulfills the requirements of the U.S. Fish and Wildlife Service (Service) under section 7(c) of the Endangered Species Act (Act) of 1973, as amended (16 U.S.C. 1531 *et seq.*).

New information based on updated surveys, changes in the abundance and distribution of species, changed habitat conditions, or other factors could change this list. Please feel free to contact us if you need more current information or assistance regarding the potential impacts to federally proposed, listed, and candidate species and federally designated and proposed critical habitat. Please note that under 50 CFR 402.12(e) of the regulations implementing section 7 of the Act, the accuracy of this species list should be verified after 90 days. This verification can be completed formally or informally as desired. The Service recommends that verification be completed by visiting the ECOS-IPaC website at regular intervals during project planning and implementation for updates to species lists and information. An updated list may be requested through the ECOS-IPaC system by completing the same process used to receive the enclosed list.

The purpose of the Act is to provide a means whereby threatened and endangered species and the ecosystems upon which they depend may be conserved. Under sections 7(a)(1) and 7(a)(2) of the Act and its implementing regulations (50 CFR 402 *et seq.*), Federal agencies are required to utilize their authorities to carry out programs for the conservation of threatened and endangered species and to determine whether projects may affect threatened and endangered species and/or designated critical habitat.

A Biological Assessment is required for construction projects (or other undertakings having similar physical impacts) that are major Federal actions significantly affecting the quality of the human environment as defined in the National Environmental Policy Act (42 U.S.C. 4332(2)(c)). For projects other than major construction activities, the Service suggests that a biological evaluation similar to a Biological Assessment be prepared to determine whether the project may affect listed or proposed species and/or designated or proposed critical habitat. Recommended contents of a Biological Assessment are described at 50 CFR 402.12.

If a Federal agency determines, based on the Biological Assessment or biological evaluation, that listed species and/or designated critical habitat may be affected by the proposed project, the agency is required to consult with the Service pursuant to 50 CFR 402. In addition, the Service recommends that candidate species, proposed species and proposed critical habitat be addressed within the consultation. More information on the regulations and procedures for section 7 consultation, including the role of permit or license applicants, can be found in the "Endangered Species Consultation Handbook" at:

http://www.fws.gov/endangered/esa-library/pdf/TOC-GLOS.PDF

Please be aware that bald and golden eagles are protected under the Bald and Golden Eagle Protection Act (16 U.S.C. 668 *et seq.*), and projects affecting these species may require development of an eagle conservation plan (http://www.fws.gov/windenergy/eagle_guidance.html). Additionally, wind energy projects should follow the wind energy guidelines (http://www.fws.gov/windenergy/) for minimizing impacts to migratory birds and bats.

Guidance for minimizing impacts to migratory birds for projects including communications towers (e.g., cellular, digital television, radio, and emergency broadcast) can be found at: http://www.fws.gov/migratorybirds/CurrentBirdIssues/Hazards/towers/towers.htm; http://www.towerkill.com; and http://www.fws.gov/migratorybirds/CurrentBirdIssues/Hazards/towers/comtow.html.

We appreciate your concern for threatened and endangered species. The Service encourages Federal agencies to include conservation of threatened and endangered species into their project planning to further the purposes of the Act. Please include the Consultation Tracking Number in the header of this letter with any request for consultation or correspondence about your project that you submit to our office.

Attachment(s):

- Official Species List

Official Species List

This list is provided pursuant to Section 7 of the Endangered Species Act, and fulfills the requirement for Federal agencies to "request of the Secretary of the Interior information whether any species which is listed or proposed to be listed may be present in the area of a proposed action".

This species list is provided by:

Carlsbad Fish And Wildlife Office
2177 Salk Avenue - Suite 250
Carlsbad, CA 92008-7385
(760) 431-9440

Project Summary

Consultation Code: 08ECAR00-2020-SLI-0429

Event Code: 08ECAR00-2020-E-01024

Project Name: OBMP PEIR Update MZ4

Project Type: WATER SUPPLY / DELIVERY

Project Description: Optimum Basin Management Plan PEIR Update - MZ4

Project Location:

Approximate location of the project can be viewed in Google Maps: https://www.google.com/maps/place/34.003541719000054N117.48346827371635W

Counties: Riverside, CA

Endangered Species Act Species

There is a total of 11 threatened, endangered, or candidate species on this species list.

Species on this list should be considered in an effects analysis for your project and could include species that exist in another geographic area. For example, certain fish may appear on the species list because a project could affect downstream species.

IPaC does not display listed species or critical habitats under the sole jurisdiction of NOAA Fisheries[1], as USFWS does not have the authority to speak on behalf of NOAA and the Department of Commerce.

See the "Critical habitats" section below for those critical habitats that lie wholly or partially within your project area under this office's jurisdiction. Please contact the designated FWS office if you have questions.

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1. NOAA Fisheries, also known as the National Marine Fisheries Service (NMFS), is an office of the National Oceanic and Atmospheric Administration within the Department of Commerce.

Mammals

NAME	STATUS
San Bernardino Merriam's Kangaroo Rat *Dipodomys merriami parvus* There is **final** critical habitat for this species. Your location is outside the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/2060	Endangered
Stephens' Kangaroo Rat *Dipodomys stephensi (incl. D. cascus)* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/3495	Endangered

Birds

NAME	STATUS
Coastal California Gnatcatcher *Polioptila californica californica* There is **final** critical habitat for this species. Your location overlaps the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/8178	Threatened
Least Bell's Vireo *Vireo bellii pusillus* There is **final** critical habitat for this species. Your location is outside the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/5945	Endangered
Southwestern Willow Flycatcher *Empidonax traillii extimus* There is **final** critical habitat for this species. Your location is outside the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/6749	Endangered

Fishes

NAME	STATUS
Santa Ana Sucker *Catostomus santaanae* Population: 3 CA river basins There is **final** critical habitat for this species. Your location is outside the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/3785	Threatened

Insects

NAME	STATUS
Delhi Sands Flower-loving Fly *Rhaphiomidas terminatus abdominalis* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/1540	Endangered

Flowering Plants

NAME	STATUS
Nevin's Barberry *Berberis nevinii* There is **final** critical habitat for this species. Your location is outside the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/8025	Endangered
San Diego Ambrosia *Ambrosia pumila* There is **final** critical habitat for this species. Your location is outside the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/8287	Endangered
Santa Ana River Woolly-star *Eriastrum densifolium ssp. sanctorum* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/6575	Endangered
Thread-leaved Brodiaea *Brodiaea filifolia* There is **final** critical habitat for this species. Your location is outside the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/6087	Threatened

Critical habitats

There is 1 critical habitat wholly or partially within your project area under this office's jurisdiction.

NAME	STATUS
Coastal California Gnatcatcher *Polioptila californica californica* https://ecos.fws.gov/ecp/species/8178#crithab	Final

Program Natural Environment Study
Optimum Basin Management Program Update

Chino Basin Watermaster and Inland Empire Utilities Agency

Management Zone 5
CNDDB and IPaC Lists

CALIFORNIA DEPARTMENT OF FISH and WILDLIFE RareFind

OBMPU Management Zone 5

Query Summary:
Quad IS (Corona North (3311785) OR Riverside West (3311784) OR Prado Dam (3311786))

Print Close

CNDDB Element Query Results

Scientific Name	Common Name	Taxonomic Group	Element Code	Total Occs	Returned Occs	Federal Status	State Status	Global Rank	State Rank	CA Rare Plant Rank	Other Status	Habitats
Abronia villosa var. aurita	chaparral sand-verbena	Dicots	PDNYC010P1	98	2	None	None	G5T2?	S2	1B.1	BLM_S-Sensitive, SB_RSABG-Rancho Santa Ana Botanic Garden, USFS_S-Sensitive	Chaparral, Coastal scrub, Desert dunes
Accipiter cooperii	Cooper's hawk	Birds	ABNKC12040	118	2	None	None	G5	S4	null	CDFW_WL-Watch List, IUCN_LC-Least Concern	Cismontane woodland, Riparian forest, Riparian woodland, Upper montane coniferous forest
Agelaius tricolor	tricolored blackbird	Birds	ABPBXB0020	955	7	None	Threatened	G2G3	S1S2	null	BLM_S-Sensitive, CDFW_SSC-Species of Special Concern, IUCN_EN-Endangered, NABCI_RWL-Red Watch List, USFWS_BCC-Birds of Conservation Concern	Freshwater marsh, Marsh & swamp, Swamp, Wetland
Aimophila ruficeps canescens	southern California rufous-crowned sparrow	Birds	ABPBX91091	235	5	None	None	G5T3	S3	null	CDFW_WL-Watch List	Chaparral, Coastal scrub
Ambrosia pumila	San Diego ambrosia	Dicots	PDAST0C0M0	59	1	Endangered	None	G1	S1	1B.1	null	Chaparral, Coastal scrub, Valley & foothill grassland
Ammodramus savannarum	grasshopper sparrow	Birds	ABPBXA0020	27	1	None	None	G5	S3	null	CDFW_SSC-Species of Special Concern, IUCN_LC-Least Concern	Valley & foothill grassland
Anniella stebbinsi	southern California legless lizard	Reptiles	ARACC01060	417	11	None	None	G3	S3	null	CDFW_SSC-Species of Special Concern, USFS_S-Sensitive	Broadleaved upland forest, Chaparral, Coastal dunes, Coastal scrub
Aquila chrysaetos	golden eagle	Birds	ABNKC22010	321	3	None	None	G5	S3	null	BLM_S-Sensitive, CDF_S-Sensitive, CDFW_FP-Fully Protected, CDFW_WL-Watch List, IUCN_LC-Least Concern, USFWS_BCC-Birds of Conservation Concern	Broadleaved upland forest, Cismontane woodland, Coastal prairie, Great Basin grassland, Great Basin scrub, Lower montane coniferous forest, Pinon & juniper woodlands, Upper montane coniferous forest, Valley & foothill grassland
Arizona elegans	California	Reptiles	ARADB01017	260	2	None	None	G5T2	S2	null	CDFW_SSC-	null

occidentalis	glossy snake										Species of Special Concern	
Artemisiospiza belli belli	Bell's sage sparrow	Birds	ABPBX97021	61	2	None	None	G5T2T3	S3	null	CDFW_WL-Watch List, USFWS_BCC-Birds of Conservation Concern	Chaparral, Coastal scrub
Asio otus	long-eared owl	Birds	ABNSB13010	48	1	None	None	G5	S3?	null	CDFW_SSC-Species of Special Concern, IUCN_LC-Least Concern	Cismontane woodland, Great Basin scrub, Riparian forest, Riparian woodland, Upper montane coniferous forest
Aspidoscelis hyperythra	orange-throated whiptail	Reptiles	ARACJ02060	369	9	None	None	G5	S2S3	null	CDFW_WL-Watch List, IUCN_LC-Least Concern, USFS_S-Sensitive	Chaparral, Cismontane woodland, Coastal scrub
Aspidoscelis tigris stejnegeri	coastal whiptail	Reptiles	ARACJ02143	148	1	None	None	G5T5	S3	null	CDFW_SSC-Species of Special Concern	null
Astragalus brauntonii	Braunton's milk-vetch	Dicots	PDFAB0F1G0	44	1	Endangered	None	G2	S2	1B.1	SB_RSABG-Rancho Santa Ana Botanic Garden, SB_SBBG-Santa Barbara Botanic Garden	Chaparral, Coastal scrub, Limestone, Valley & foothill grassland
Athene cunicularia	burrowing owl	Birds	ABNSB10010	1989	28	None	None	G4	S3	null	BLM_S-Sensitive, CDFW_SSC-Species of Special Concern, IUCN_LC-Least Concern, USFWS_BCC-Birds of Conservation Concern	Coastal prairie, Coastal scrub, Great Basin grassland, Great Basin scrub, Mojavean desert scrub, Sonoran desert scrub, Valley & foothill grassland
Atriplex coulteri	Coulter's saltbush	Dicots	PDCHE040E0	121	1	None	None	G3	S1S2	1B.2	SB_RSABG-Rancho Santa Ana Botanic Garden	Coastal bluff scrub, Coastal dunes, Coastal scrub, Valley & foothill grassland
Bombus crotchii	Crotch bumble bee	Insects	IIHYM24480	234	2	None	Candidate Endangered	G3G4	S1S2	null	null	null
Buteo swainsoni	Swainson's hawk	Birds	ABNKC19070	2518	2	None	Threatened	G5	S3	null	BLM_S-Sensitive, IUCN_LC-Least Concern, USFWS_BCC-Birds of Conservation Concern	Great Basin grassland, Riparian forest, Riparian woodland, Valley & foothill grassland
California Walnut Woodland	California Walnut Woodland	Woodland	CTT71210CA	76	9	None	None	G2	S2.1	null	null	Cismontane woodland
Calochortus weedii var. intermedius	intermediate mariposa-lily	Monocots	PMLIL0D1J1	140	4	None	None	G3G4T2	S2	1B.2	SB_RSABG-Rancho Santa Ana Botanic Garden, USFS_S-Sensitive	Chaparral, Coastal scrub, Valley & foothill grassland
Calystegia felix	lucky morning-glory	Dicots	PDCON040P0	10	6	None	None	G1Q	S1	1B.1	null	Meadow & seep, Riparian scrub
Campylorhynchus brunneicapillus sandiegensis	coastal cactus wren	Birds	ABPBG02095	156	1	None	None	G5T3Q	S3	null	CDFW_SSC-Species of Special Concern, USFS_S-Sensitive, USFWS_BCC-Birds of Conservation Concern	Coastal scrub

Carolella busckana	Busck's gallmoth	Insects	IILEM2X090	4	1	None	None	G1G3	SH	null	null	Coastal dunes, Coastal scrub
Catostomus santaanae	Santa Ana sucker	Fish	AFCJC02190	28	7	Threatened	None	G1	S1	null	AFS_TH-Threatened, IUCN_VU-Vulnerable	Aquatic, South coast flowing waters
Centromadia pungens ssp. laevis	smooth tarplant	Dicots	PDAST4R0R4	126	2	None	None	G3G4T2	S2	1B.1	SB_RSABG-Rancho Santa Ana Botanic Garden	Alkali playa, Chenopod scrub, Meadow & seep, Riparian woodland, Valley & foothill grassland, Wetland
Ceratochrysis longimala	Desert cuckoo wasp	Insects	IIHYM71040	2	1	None	None	G1	S1	null	null	null
Coccyzus americanus occidentalis	western yellow-billed cuckoo	Birds	ABNRB02022	156	6	Threatened	Endangered	G5T2T3	S1	null	BLM_S-Sensitive, NABCI_RWL-Red Watch List, USFS_S-Sensitive, USFWS_BCC-Birds of Conservation Concern	Riparian forest
Coleonyx variegatus abbotti	San Diego banded gecko	Reptiles	ARACD01031	8	1	None	None	G5T3T4	S1S2	null	CDFW_SSC-Species of Special Concern	Chaparral, Coastal scrub
Coturnicops noveboracensis	yellow rail	Birds	ABNME01010	45	1	None	None	G4	S1S2	null	CDFW_SSC-Species of Special Concern, IUCN_LC-Least Concern, NABCI_RWL-Red Watch List, USFS_S-Sensitive, USFWS_BCC-Birds of Conservation Concern	Freshwater marsh, Meadow & seep
Crotalus ruber	red-diamond rattlesnake	Reptiles	ARADE02090	192	6	None	None	G4	S3	null	CDFW_SSC-Species of Special Concern, USFS_S-Sensitive	Chaparral, Mojavean desert scrub, Sonoran desert scrub
Dipodomys merriami parvus	San Bernardino kangaroo rat	Mammals	AMAFD03143	81	1	Endangered	Candidate Endangered	G5T1	S1	null	CDFW_SSC-Species of Special Concern	Coastal scrub
Dipodomys stephensi	Stephens' kangaroo rat	Mammals	AMAFD03100	220	10	Endangered	Threatened	G2	S2	null	IUCN_EN-Endangered	Coastal scrub, Valley & foothill grassland
Dudleya multicaulis	many-stemmed dudleya	Dicots	PDCRA040H0	154	4	None	None	G2	S2	1B.2	BLM_S-Sensitive, SB_RSABG-Rancho Santa Ana Botanic Garden, USFS_S-Sensitive	Chaparral, Coastal scrub, Valley & foothill grassland
Elanus leucurus	white-tailed kite	Birds	ABNKC06010	180	3	None	None	G5	S3S4	null	BLM_S-Sensitive, CDFW_FP-Fully Protected, IUCN_LC-Least Concern	Cismontane woodland, Marsh & swamp, Riparian woodland, Valley & foothill grassland, Wetland
Empidonax traillii extimus	southwestern willow flycatcher	Birds	ABPAE33043	70	3	Endangered	Endangered	G5T2	S1	null	NABCI_RWL-Red Watch List	Riparian woodland
Emys marmorata	western pond turtle	Reptiles	ARAAD02030	1385	3	None	None	G3G4	S3	null	BLM_S-Sensitive, CDFW_SSC-Species of Special Concern, IUCN_VU-Vulnerable, USFS_S-Sensitive	Aquatic, Artificial flowing waters, Klamath/North coast flowing waters, Klamath/North coast standing waters, Marsh & swamp, Sacramento/San

												Joaquin flowing waters, Sacramento/San Joaquin standing waters, South coast flowing waters, South coast standing waters, Wetland
Eriastrum densifolium ssp. sanctorum	Santa Ana River woollystar	Dicots	PDPLM03035	31	3	Endangered	Endangered	G4T1	S1	1B.1	SB_RSABG-Rancho Santa Ana Botanic Garden	Chaparral, Coastal scrub
Eumops perotis californicus	western mastiff bat	Mammals	AMACD02011	296	3	None	None	G5T4	S3S4	null	BLM_S-Sensitive, CDFW_SSC-Species of Special Concern, WBWG_H-High Priority	Chaparral, Cismontane woodland, Coastal scrub, Valley & foothill grassland
Euphydryas editha quino	quino checkerspot butterfly	Insects	IILEPK405L	127	1	Endangered	None	G5T1T2	S1S2	null	XERCES_CI-Critically Imperiled	Chaparral, Coastal scrub
Gila orcuttii	arroyo chub	Fish	AFCJB13120	49	3	None	None	G2	S2	null	AFS_VU-Vulnerable, CDFW_SSC-Species of Special Concern, USFS_S-Sensitive	Aquatic, South coast flowing waters
Icteria virens	yellow-breasted chat	Birds	ABPBX24010	100	2	None	None	G5	S3	null	CDFW_SSC-Species of Special Concern, IUCN_LC-Least Concern	Riparian forest, Riparian scrub, Riparian woodland
Lasiurus xanthinus	western yellow bat	Mammals	AMACC05070	58	3	None	None	G5	S3	null	CDFW_SSC-Species of Special Concern, IUCN_LC-Least Concern, WBWG_H-High Priority	Desert wash
Lasthenia glabrata ssp. coulteri	Coulter's goldfields	Dicots	PDAST5L0A1	111	1	None	None	G4T2	S2	1B.1	BLM_S-Sensitive, SB_RSABG-Rancho Santa Ana Botanic Garden, SB_SBBG-Santa Barbara Botanic Garden	Alkali playa, Marsh & swamp, Salt marsh, Vernal pool, Wetland
Laterallus jamaicensis coturniculus	California black rail	Birds	ABNME03041	303	2	None	Threatened	G3G4T1	S1	null	BLM_S-Sensitive, CDFW_FP-Fully Protected, IUCN_NT-Near Threatened, NABCI_RWL-Red Watch List, USFWS_BCC-Birds of Conservation Concern	Brackish marsh, Freshwater marsh, Marsh & swamp, Salt marsh, Wetland
Lepidium virginicum var. robinsonii	Robinson's pepper-grass	Dicots	PDBRA1M114	142	3	None	None	G5T3	S3	4.3	null	Chaparral, Coastal scrub
Lepus californicus bennettii	San Diego black-tailed jackrabbit	Mammals	AMAEB03051	103	2	None	None	G5T3T4	S3S4	null	CDFW_SSC-Species of Special Concern	Coastal scrub
Monardella australis ssp. jokerstii	Jokerst's monardella	Dicots	PDLAM18112	3	1	None	None	G4T1?	S1?	1B.1	USFS_S-Sensitive	Chaparral, Lower montane coniferous forest
Nyctinomops femorosaccus	pocketed free-tailed bat	Mammals	AMACD04010	90	2	None	None	G4	S3	null	CDFW_SSC-Species of Special Concern,	Joshua tree woodland, Pinon & juniper woodlands,

											IUCN_LC-Least Concern, WBWG_M-Medium Priority	Riparian scrub, Sonoran desert scrub
Oncorhynchus mykiss irideus pop. 10	steelhead - southern California DPS	Fish	AFCHA0209J	20	1	Endangered	None	G5T1Q	S1	null	AFS_EN-Endangered	Aquatic, South coast flowing waters
Phacelia stellaris	Brand's star phacelia	Dicots	PDHYD0C510	15	1	None	None	G1	S1	1B.1	SB_RSABG-Rancho Santa Ana Botanic Garden	Coastal dunes, Coastal scrub
Phrynosoma blainvillii	coast horned lizard	Reptiles	ARACF12100	784	3	None	None	G3G4	S3S4	null	BLM_S-Sensitive, CDFW_SSC-Species of Special Concern, IUCN_LC-Least Concern	Chaparral, Cismontane woodland, Coastal bluff scrub, Coastal scrub, Desert wash, Pinon & juniper woodlands, Riparian scrub, Riparian woodland, Valley & foothill grassland
Polioptila californica californica	coastal California gnatcatcher	Birds	ABPBJ08081	846	22	Threatened	None	G4G5T2Q	S2	null	CDFW_SSC-Species of Special Concern, NABCI_YWL-Yellow Watch List	Coastal bluff scrub, Coastal scrub
Pseudognaphalium leucocephalum	white rabbit-tobacco	Dicots	PDAST440C0	62	1	None	None	G4	S2	2B.2	null	Chaparral, Cismontane woodland, Coastal scrub, Riparian woodland
Rhinichthys osculus ssp. 3	Santa Ana speckled dace	Fish	AFCJB3705K	13	1	None	None	G5T1	S1	null	AFS_TH-Threatened, CDFW_SSC-Species of Special Concern, USFS_S-Sensitive	Aquatic, South coast flowing waters
Setophaga petechia	yellow warbler	Birds	ABPBX03010	78	2	None	None	G5	S3S4	null	CDFW_SSC-Species of Special Concern, USFWS_BCC-Birds of Conservation Concern	Riparian forest, Riparian scrub, Riparian woodland
Sidalcea neomexicana	salt spring checkerbloom	Dicots	PDMAL110J0	30	1	None	None	G4	S2	2B.2	USFS_S-Sensitive	Alkali playa, Chaparral, Coastal scrub, Lower montane coniferous forest, Mojavean desert scrub, Wetland
Southern California Arroyo Chub/Santa Ana Sucker Stream	Southern California Arroyo Chub/Santa Ana Sucker Stream	Inland Waters	CARE2330CA	4	1	None	None	GNR	SNR	null	null	null
Southern Cottonwood Willow Riparian Forest	Southern Cottonwood Willow Riparian Forest	Riparian	CTT61330CA	111	6	None	None	G3	S3.2	null	null	Riparian forest
Southern Sycamore Alder Riparian Woodland	Southern Sycamore Alder Riparian Woodland	Riparian	CTT62400CA	230	5	None	None	G4	S4	null	null	Riparian woodland
Southern Willow Scrub	Southern Willow Scrub	Riparian	CTT63320CA	45	2	None	None	G3	S2.1	null	null	Riparian scrub
Spea hammondii	western spadefoot	Amphibians	AAABF02020	1213	4	None	None	G3	S3	null	BLM_S-Sensitive, CDFW_SSC-Species of	Cismontane woodland, Coastal scrub, Valley & foothill

											Special Concern, IUCN_NT-Near Threatened	grassland, Vernal pool, Wetland
Spinus lawrencei	Lawrence's goldfinch	Birds	ABPBY06100	4	1	None	None	G3G4	S3S4	null	IUCN_LC-Least Concern, NABCI_YWL-Yellow Watch List, USFWS_BCC-Birds of Conservation Concern	Broadleaved upland forest, Chaparral, Pinon & juniper woodlands, Riparian woodland
Symphyotrichum defoliatum	San Bernardino aster	Dicots	PDASTE80C0	102	1	None	None	G2	S2	1B.2	BLM_S-Sensitive, USFS_S-Sensitive	Cismontane woodland, Coastal scrub, Lower montane coniferous forest, Marsh & swamp, Meadow & seep, Valley & foothill grassland
Vireo bellii pusillus	least Bell's vireo	Birds	ABPBW01114	503	26	Endangered	Endangered	G5T2	S2	null	IUCN_NT-Near Threatened, NABCI_YWL-Yellow Watch List	Riparian forest, Riparian scrub, Riparian woodland

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Carlsbad Fish And Wildlife Office
2177 Salk Avenue - Suite 250
Carlsbad, CA 92008-7385
Phone: (760) 431-9440 Fax: (760) 431-5901
http://www.fws.gov/carlsbad/

In Reply Refer To: January 07, 2020
Consultation Code: 08ECAR00-2020-SLI-0430
Event Code: 08ECAR00-2020-E-01026
Project Name: OBMP PEIR Update MZ5

Subject: List of threatened and endangered species that may occur in your proposed project location, and/or may be affected by your proposed project

To Whom It May Concern:

The enclosed species list identifies threatened, endangered, and proposed species, designated critical habitat, and candidate species that may occur within the boundary of your proposed project and/or may be affected by your proposed project. The species list fulfills the requirements of the U.S. Fish and Wildlife Service (Service) under section 7(c) of the Endangered Species Act (Act) of 1973, as amended (16 U.S.C. 1531 *et seq.*).

New information based on updated surveys, changes in the abundance and distribution of species, changed habitat conditions, or other factors could change this list. Please feel free to contact us if you need more current information or assistance regarding the potential impacts to federally proposed, listed, and candidate species and federally designated and proposed critical habitat. Please note that under 50 CFR 402.12(e) of the regulations implementing section 7 of the Act, the accuracy of this species list should be verified after 90 days. This verification can be completed formally or informally as desired. The Service recommends that verification be completed by visiting the ECOS-IPaC website at regular intervals during project planning and implementation for updates to species lists and information. An updated list may be requested through the ECOS-IPaC system by completing the same process used to receive the enclosed list.

The purpose of the Act is to provide a means whereby threatened and endangered species and the ecosystems upon which they depend may be conserved. Under sections 7(a)(1) and 7(a)(2) of the Act and its implementing regulations (50 CFR 402 *et seq.*), Federal agencies are required to utilize their authorities to carry out programs for the conservation of threatened and endangered species and to determine whether projects may affect threatened and endangered species and/or designated critical habitat.

A Biological Assessment is required for construction projects (or other undertakings having similar physical impacts) that are major Federal actions significantly affecting the quality of the human environment as defined in the National Environmental Policy Act (42 U.S.C. 4332(2)(c)). For projects other than major construction activities, the Service suggests that a biological evaluation similar to a Biological Assessment be prepared to determine whether the project may affect listed or proposed species and/or designated or proposed critical habitat. Recommended contents of a Biological Assessment are described at 50 CFR 402.12.

If a Federal agency determines, based on the Biological Assessment or biological evaluation, that listed species and/or designated critical habitat may be affected by the proposed project, the agency is required to consult with the Service pursuant to 50 CFR 402. In addition, the Service recommends that candidate species, proposed species and proposed critical habitat be addressed within the consultation. More information on the regulations and procedures for section 7 consultation, including the role of permit or license applicants, can be found in the "Endangered Species Consultation Handbook" at:

http://www.fws.gov/endangered/esa-library/pdf/TOC-GLOS.PDF

Please be aware that bald and golden eagles are protected under the Bald and Golden Eagle Protection Act (16 U.S.C. 668 *et seq.*), and projects affecting these species may require development of an eagle conservation plan (http://www.fws.gov/windenergy/eagle_guidance.html). Additionally, wind energy projects should follow the wind energy guidelines (http://www.fws.gov/windenergy/) for minimizing impacts to migratory birds and bats.

Guidance for minimizing impacts to migratory birds for projects including communications towers (e.g., cellular, digital television, radio, and emergency broadcast) can be found at: http://www.fws.gov/migratorybirds/CurrentBirdIssues/Hazards/towers/towers.htm; http://www.towerkill.com; and http://www.fws.gov/migratorybirds/CurrentBirdIssues/Hazards/towers/comtow.html.

We appreciate your concern for threatened and endangered species. The Service encourages Federal agencies to include conservation of threatened and endangered species into their project planning to further the purposes of the Act. Please include the Consultation Tracking Number in the header of this letter with any request for consultation or correspondence about your project that you submit to our office.

Attachment(s):

- Official Species List

Official Species List

This list is provided pursuant to Section 7 of the Endangered Species Act, and fulfills the requirement for Federal agencies to "request of the Secretary of the Interior information whether any species which is listed or proposed to be listed may be present in the area of a proposed action".

This species list is provided by:

Carlsbad Fish And Wildlife Office
2177 Salk Avenue - Suite 250
Carlsbad, CA 92008-7385
(760) 431-9440

Project Summary

Consultation Code: 08ECAR00-2020-SLI-0430

Event Code: 08ECAR00-2020-E-01026

Project Name: OBMP PEIR Update MZ5

Project Type: WATER SUPPLY / DELIVERY

Project Description: Optimum Basin Management Plan PEIR Update - MZ5

Project Location:

Approximate location of the project can be viewed in Google Maps: https://www.google.com/maps/place/33.949007230000035N117.5593827708134W

Counties: Riverside, CA | San Bernardino, CA

Endangered Species Act Species

There is a total of 10 threatened, endangered, or candidate species on this species list.

Species on this list should be considered in an effects analysis for your project and could include species that exist in another geographic area. For example, certain fish may appear on the species list because a project could affect downstream species.

IPaC does not display listed species or critical habitats under the sole jurisdiction of NOAA Fisheries[1], as USFWS does not have the authority to speak on behalf of NOAA and the Department of Commerce.

See the "Critical habitats" section below for those critical habitats that lie wholly or partially within your project area under this office's jurisdiction. Please contact the designated FWS office if you have questions.

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1. NOAA Fisheries, also known as the National Marine Fisheries Service (NMFS), is an office of the National Oceanic and Atmospheric Administration within the Department of Commerce.

Mammals

NAME	STATUS
Stephens' Kangaroo Rat *Dipodomys stephensi (incl. D. cascus)* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/3495	Endangered

Birds

NAME	STATUS
Coastal California Gnatcatcher *Polioptila californica californica* There is **final** critical habitat for this species. Your location is outside the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/8178	Threatened
Least Bell's Vireo *Vireo bellii pusillus* There is **final** critical habitat for this species. Your location overlaps the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/5945	Endangered
Southwestern Willow Flycatcher *Empidonax traillii extimus* There is **final** critical habitat for this species. Your location overlaps the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/6749	Endangered

Fishes

NAME	STATUS
Santa Ana Sucker *Catostomus santaanae* Population: 3 CA river basins There is **final** critical habitat for this species. Your location overlaps the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/3785	Threatened

Insects

NAME	STATUS
Delhi Sands Flower-loving Fly *Rhaphiomidas terminatus abdominalis* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/1540	Endangered

Flowering Plants

NAME	STATUS
Nevin's Barberry *Berberis nevinii* There is **final** critical habitat for this species. Your location is outside the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/8025	Endangered
San Diego Ambrosia *Ambrosia pumila* There is **final** critical habitat for this species. Your location is outside the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/8287	Endangered
Santa Ana River Woolly-star *Eriastrum densifolium ssp. sanctorum* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/6575	Endangered
Thread-leaved Brodiaea *Brodiaea filifolia* There is **final** critical habitat for this species. Your location is outside the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/6087	Threatened

Critical habitats

There are 4 critical habitats wholly or partially within your project area under this office's jurisdiction.

NAME	STATUS
Least Bell's Vireo *Vireo bellii pusillus* https://ecos.fws.gov/ecp/species/5945#crithab	Final
Santa Ana Sucker *Catostomus santaanae* https://ecos.fws.gov/ecp/species/3785#crithab	Final
Southwestern Willow Flycatcher *Empidonax traillii extimus*	Final

NAME	STATUS
https://ecos.fws.gov/ecp/species/6749#crithab	
Yellow-billed Cuckoo *Coccyzus americanus* For information on why this critical habitat appears for your project, even though Yellow-billed Cuckoo is not on the list of potentially affected species at this location, contact the local field office. https://ecos.fws.gov/ecp/species/3911#crithab	Proposed

Program Natural Environment Study
Optimum Basin Management Program Update

Chino Basin Watermaster and Inland Empire Utilities Agency

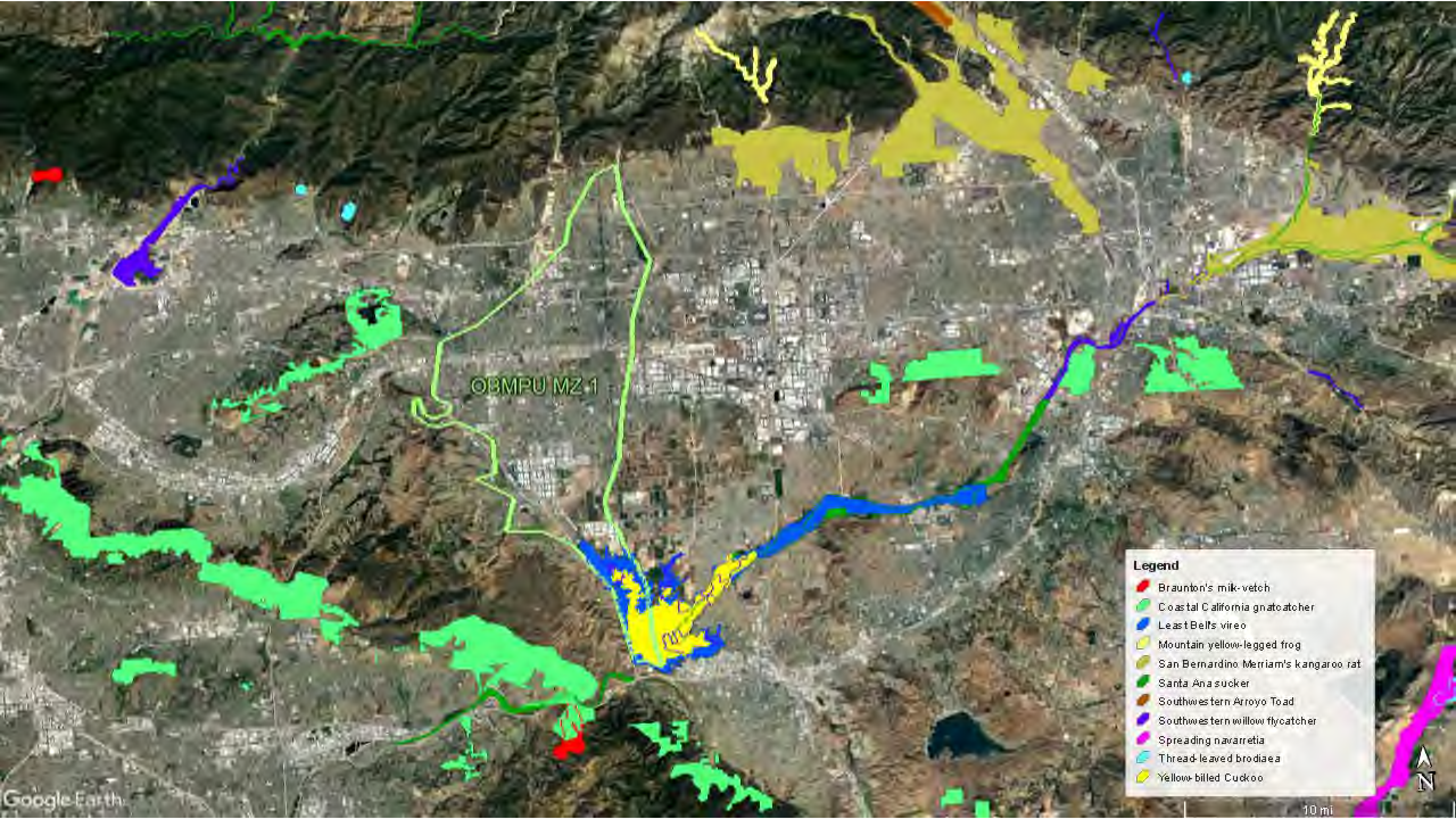
USFWS Critical Habitat
Overview

OBMPU MZ 1
OBMPU MZ 2
OBMPU MZ 3
OBMPU MZ 4
OBMPU MZ 5
Legend
Braunton's milk-vetch
Coastal California gnatcatcher
Least Bell's vireo
Mountain yellow-legged frog
San Bernardino Merriam's kangaroo rat
Santa Ana sucker
Southwestern Arroyo Toad
Southwestern willow flycatcher
Spreading navarretia
Thread-leaved brodiaea
Yellow-billed Cuckoo
N
10 mi
Google Earth

Program Natural Environment Study
Optimum Basin Management Program Update

Chino Basin Watermaster and Inland Empire Utilities Agency

USFWS Critical Habitat
Management Zone 1


OBMPU MZ 1
Legend
Braunton's milk-vetch
Coastal California gnatcatcher
Least Bell's vireo
Mountain yellow-legged frog
San Bernardino Merriam's kangaroo rat
Santa Ana sucker
Southwestern Arroyo Toad
Southwestern willow flycatcher
Spreading navarretia
Thread-leaved brodiaea
Yellow-billed Cuckoo
10 mi
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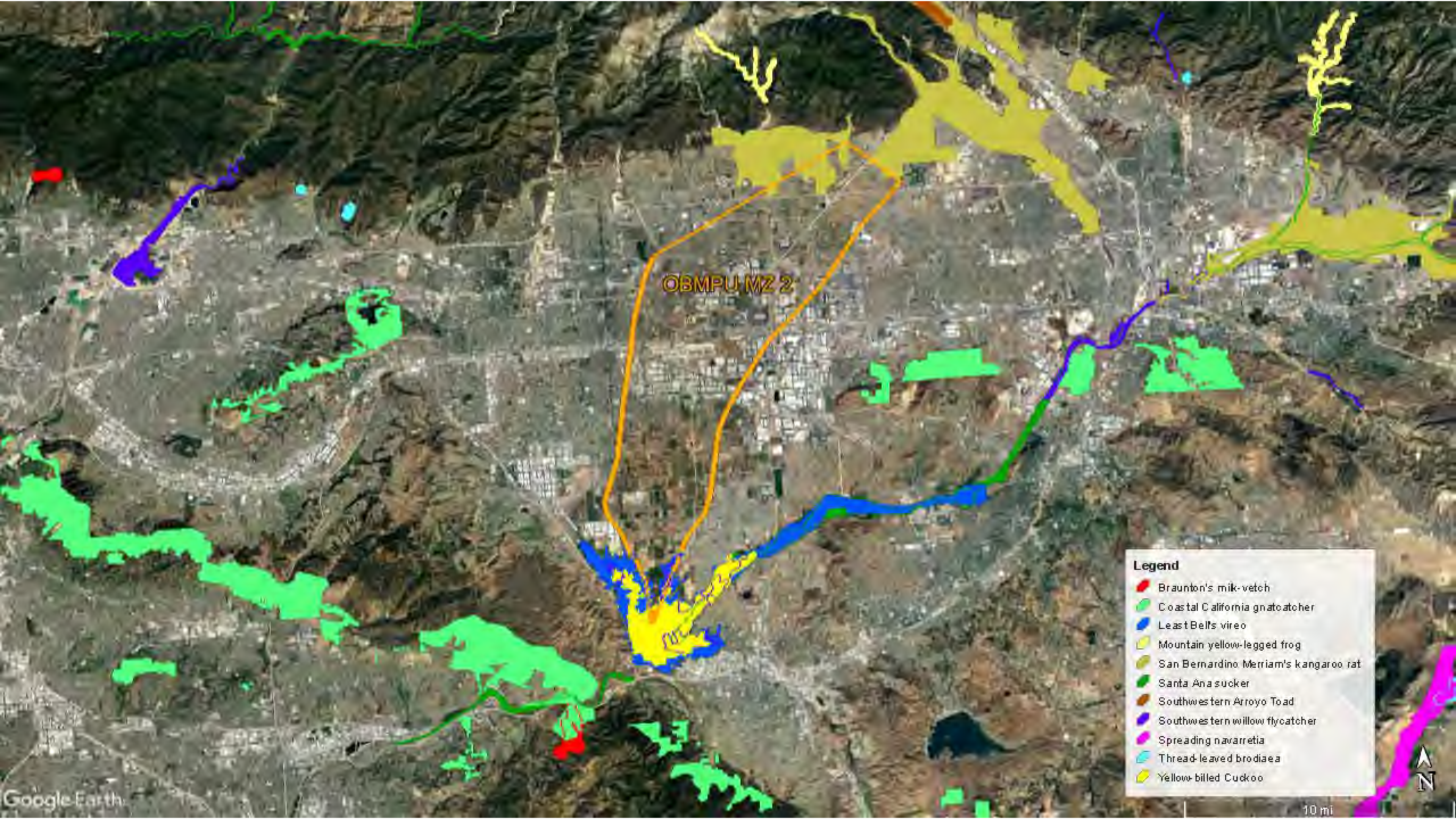
Google Earth

Program Natural Environment Study
Optimum Basin Management Program Update

Chino Basin Watermaster and Inland Empire Utilities Agency

USFWS Critical Habitat
Management Zone 2

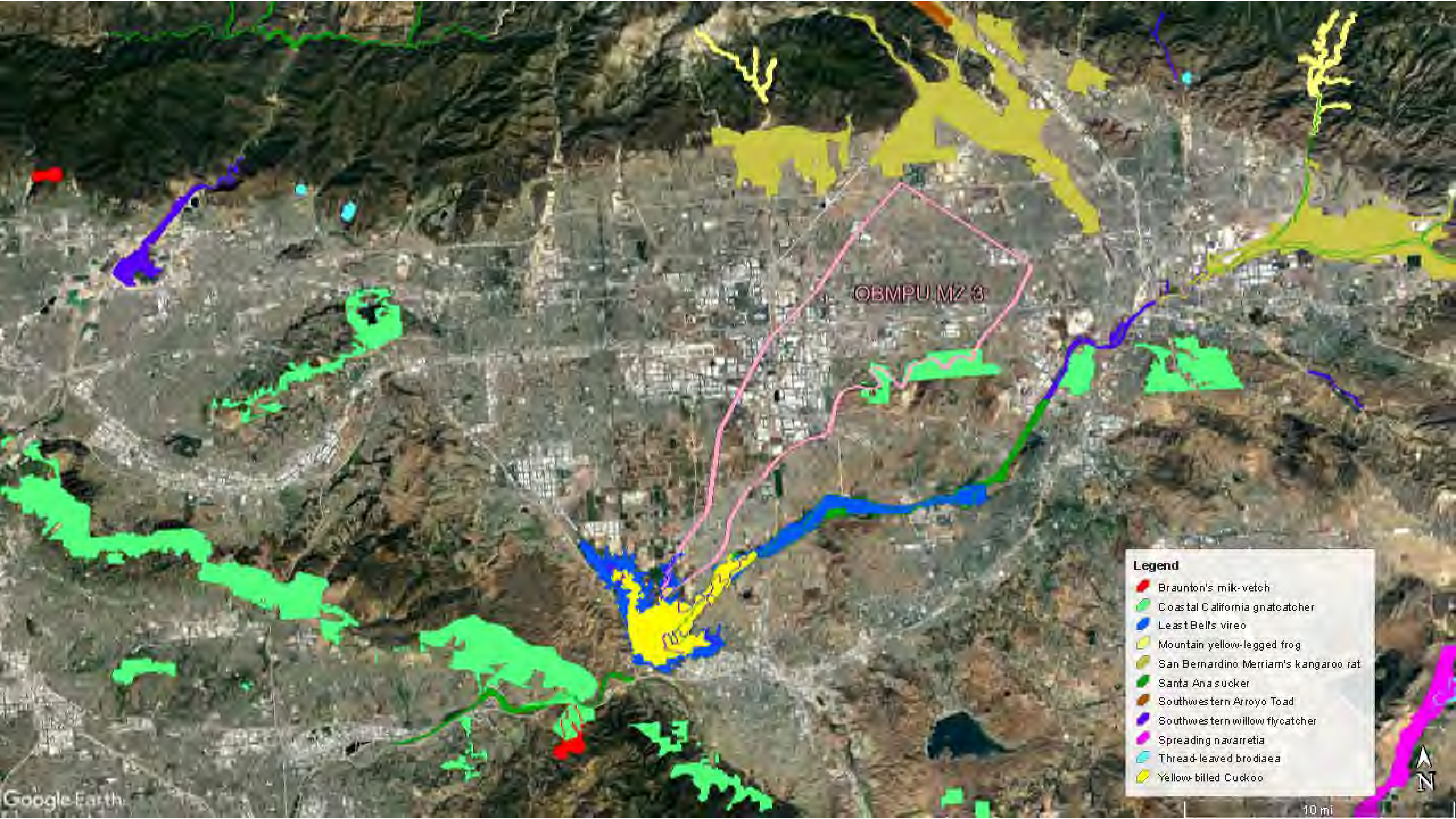


OBMPU MZ 2
Legend
Braunton's milk-vetch
Coastal California gnatcatcher
Least Bell's vireo
Mountain yellow-legged frog
San Bernardino Merriam's kangaroo rat
Santa Ana sucker
Southwestern Arroyo Toad
Southwestern willow flycatcher
Spreading navarretia
Thread-leaved brodiaea
Yellow-billed Cuckoo
10 mi
N
Google Earth

Program Natural Environment Study
Optimum Basin Management Program Update

Chino Basin Watermaster and Inland Empire Utilities Agency

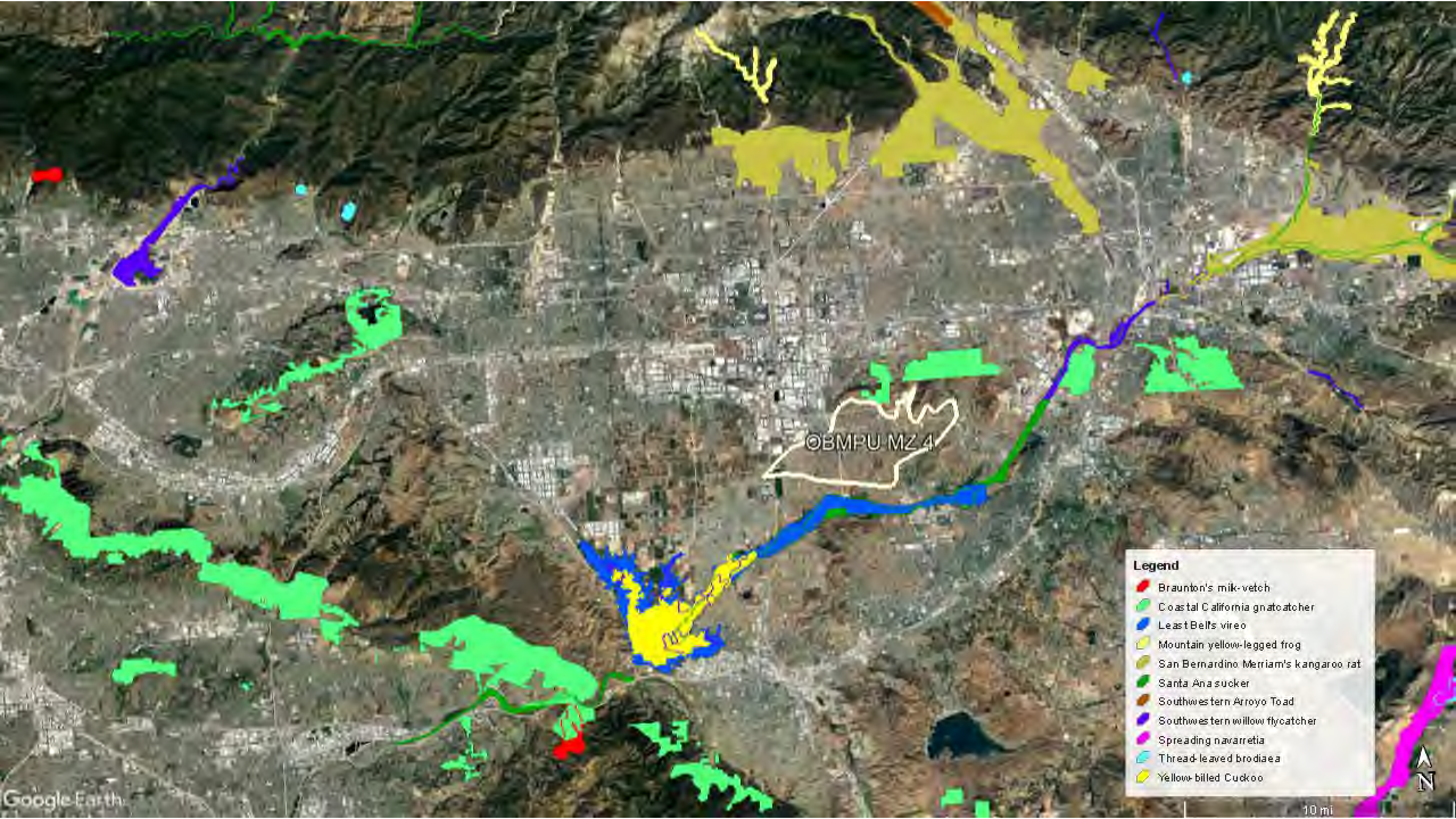
USFWS Critical Habitat
Management Zone 3


OBMPU MZ 3
Legend
Braunton's milk-vetch
Coastal California gnatcatcher
Least Bell's vireo
Mountain yellow-legged frog
San Bernardino Merriam's kangaroo rat
Santa Ana sucker
Southwestern Arroyo Toad
Southwestern willow flycatcher
Spreading navarretia
Thread-leaved brodiaea
Yellow-billed Cuckoo
10 mi
N
Google Earth

Program Natural Environment Study
Optimum Basin Management Program Update

Chino Basin Watermaster and Inland Empire Utilities Agency

USFWS Critical Habitat
Management Zone 4

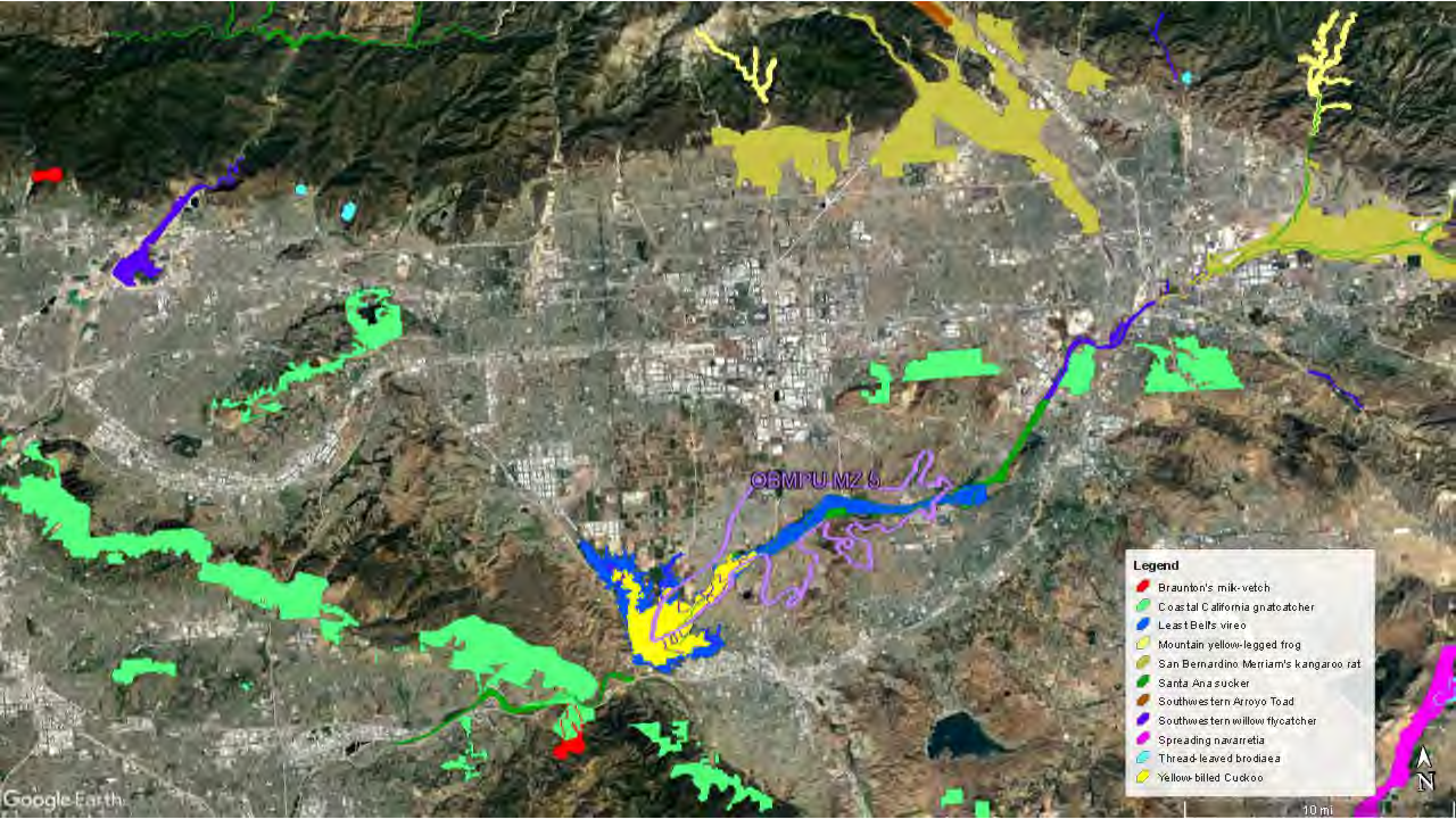


OBMPU MZ 4
Legend
Braunton's milk-vetch
Coastal California gnatcatcher
Least Bell's vireo
Mountain yellow-legged frog
San Bernardino Merriam's kangaroo rat
Santa Ana sucker
Southwestern Arroyo Toad
Southwestern willow flycatcher
Spreading navarretia
Thread-leaved brodiaea
Yellow-billed Cuckoo
10 mi
N
Google Earth

Program Natural Environment Study
Optimum Basin Management Program Update

Chino Basin Watermaster and Inland Empire Utilities Agency

USFWS Critical Habitat
Management Zone 5



OBMPU MZ 5
Legend
Braunton's milk-vetch
Coastal California gnatcatcher
Least Bell's vireo
Mountain yellow-legged frog
San Bernardino Merriam's kangaroo rat
Santa Ana sucker
Southwestern Arroyo Toad
Southwestern willow flycatcher
Spreading navarretia
Thread-leaved brodiaea
Yellow-billed Cuckoo
10 mi
N
Google Earth

APPENDIX 4

Energy Analysis

2020 Optimum Basin Management Program Update

ENERGY ANALYSIS

CHINO BASIN WATERMASTER

PREPARED BY:

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MARCH 20, 2020

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APPENDIX 4.3: CALEEMOD PROJECT CATEGORY 3 ANNUAL CONSTRUCTION EMISSIONS MODEL OUTPUTS
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LIST OF EXHIBITS

LIST OF TABLES

LIST OF ABBREVIATED TERMS

%	Percent
(1)	Reference
af	Acre-Feet
AQIA	Air Quality Impact Report
ASR	Aquifer Storage and Recovery
BACM	Best Available Control Measures
CalEEMod	California Emissions Estimator Model
CARB	California Air Resources Board
CCR	California Code of Regulations
CEC	California Energy Commission
CEQA	California Environmental Quality Act
CPEP	Clean Power and Electrification Pathway
CPUC	California Public Utilities Commission
DMV	Department of Motor Vehicles
EIA	Energy information Administration
EMFAC	Emissions Factor
FERC	Federal Energy Regulatory Commission
GS-1	General Service Rate Schedule
GWh	Gigawatt Hour
HHDT	Heavy-Heavy-Duty Trucks
Hp-hr/gal	Horsepower-Hour Per Gallon
IEPR	Integrative Energy Policy Report
IEUA	Inland Empire Utilities Agency
ISO	Independent Service Operator
ISTEA	Intermodal Surface Transportation Efficiency Act
kWh	Kilowatt Hours
LDA	Light Duty Auto
LF	Linear Feet
MHDT	Medium-Heavy-Duty Trucks
mpg	Miles Per Gallon
MAR	Managed Aquifer Recharge
MPO	Metropolitan Planning Organization
MS4	Municipal Separate Storm Sewer System
PCL	Power Content Label
PG&E	Pacific Gas and Electric
Project	2020 Optimum Basin Management Program Update

SCAB	South Coast Air Basin
SCAG	Southern California Association of Governments
SCE	Southern California Edison
SDAB	San Diego Air Basin
SDG&E	San Diego Gas & Electric
SoCalGas	Southern California Gas
TEA-21	Transportation Equity Act for the 21st Century
Title 13	Motor Vehicles
Title 24	California Building Code
U.S.	United States
WFA	Water Facilities Authority

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EXECUTIVE SUMMARY

ES.1 SUMMARY OF FINDINGS

The results of this *2020 Optimum Basin Management Program Update* (2020 OBMPU) *Energy Analysis* is summarized below based on the significance criteria in Section 3 of this report consistent with Appendix G of the California Environmental Quality Act (CEQA) Guidelines (1). Table ES-1 shows the findings of significance for potential energy impacts under CEQA.

TABLE ES-1: SUMMARY OF CEQA SIGNIFICANCE FINDINGS

Analysis	Report Section	Significance Findings	
		Unmitigated	Mitigated
Energy Impact #1: Result in potentially significant environmental impact due to wasteful, inefficient, or unnecessary consumption of energy resources, during project construction or operation.	4.5	*Less Than Significant*	*n/a*
Energy Impact #2: Conflict with or obstruct a state or local plan for renewable energy or energy efficiency.	4.5	*Less Than Significant*	*n/a*

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1 INTRODUCTION

This report presents the results of the energy analysis prepared by Urban Crossroads, Inc., for the proposed 2020 OBMPU (Project). The purpose of this report is to ensure that energy implication is considered by the Chino Basin Watermaster, as the lead agency, and to quantify anticipated energy usage associated with construction of the proposed Project, determine if the usage amounts are efficient, typical, or wasteful for the land use type, and to emphasize avoiding or reducing inefficient, wasteful, and unnecessary consumption of energy.

1.1 SITE LOCATION

The proposed 2020 OBMPU Project is generally located within the portions of the San Bernardino, Riverside, and Los Angeles counties, as shown on Exhibit 1-A.

1.2 PROJECT DESCRIPTION

The OBMPU consists of construction and operation of the various facilities which are separated into four project categories: 1) Project Category 1: Well Development and Monitoring Devices; 2) Project Category 2: Conveyance Facilities and Ancillary Facilities; 3) Project Category 3: Storage Basins, Recharge Facilities, and Storage Bands; and, 4) Project Category 4: Desalters and Water Treatment Facilities.

PROJECT CATEGORY 1: WELL DEVELOPMENT AND MONITORING DEVICES

This Project Category includes the development of aquifer storage and recovery (ASR), injection, pumping, groundwater level monitoring, and groundwater quality wells, associated well housing, as well as monitoring devices such as flow meters and extensometers. The proposed wells and monitoring devices will be installed throughout the Chino Basin.

Well development includes: 60 ASR wells, 10 wells relocated, 8 new wells to expand desalter capacity, modification of up to 5 wells, destruction and replacement of 5 wells for a total of 78 pumping wells. This category also includes the development of 100 monitoring wells, for a total of 178 wells, which serve the varying purposes listed above and outlined below. The monitoring devices proposed as part of the OBMPU include 300 flow meters and 3 extensometers.

PROJECT CATEGORY 2: CONVEYANCE FACILITIES AND ANCILLARY FACILITIES

This category includes the construction of 550,000 linear feet (LF) of new pipelines, booster pump stations, reservoirs and minor appurtenances whose number, locations and capacities are presently unknown. The proposed conveyance facilities and ancillary facilities would be implemented throughout the entire Chino Basin.

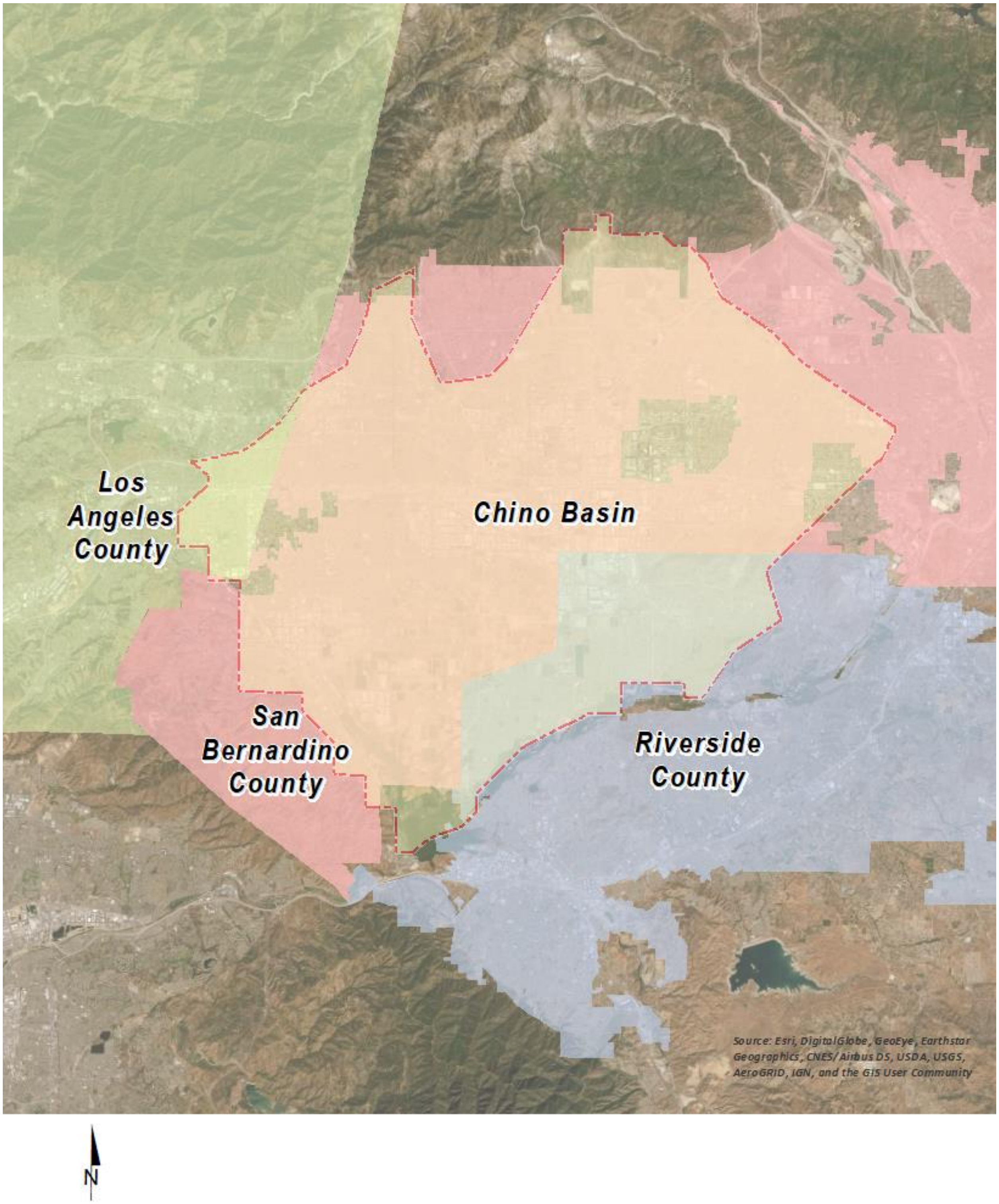
PROJECT CATEGORY 3: STORAGE BASINS, RECHARGE FACILITIES, AND STORAGE BANDS

This Project Category includes the construction of 310 acres of new storage basins—several locations for which are within existing facilities, improvements to existing storage basin(s), 200 acres of flood managed aquifer recharge (MAR) facilities, new municipal separate storm sewer system (MS4) compliance facilities, and expansion of the maximum storage space (safe storage capacity) to be used within the Chino Basin from 600,000 acre-feet (af) (through June 30, 2021) to between 700,000 af and 1,000,000 af going forward with various impacts that may result for each 100,000 af within this range of storage. The specific locations of the storage basins are described in the Project Description above; however, the locations of the flood MAR facilities and MS4 compliant projects are presently unknown.

PROJECT CATEGORY 4: DESALTERS AND WATER TREATMENT FACILITIES

The projects proposed under this category are: upgrades at Inland Empire Utilities Agency's (IEUA) existing Treatment Plants, a new advanced water treatment plant (discussed in IEUA's 2017 FMP PEIR), improvements to the Water Facilities Authority (WFA) Agua de Lejos Treatment Plant, upgrades to the Chino Desalters, new groundwater treatment facilities at or near well sites and at regionally located sites, and improvements to existing groundwater treatment facilities.

EXHIBIT 1-A: PROJECT LOCATION MAP



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2 EXISTING CONDITIONS

This section provides an overview of the existing energy conditions in the Project area and region.

2.1 OVERVIEW

The most recent data for California's estimated total energy consumption is from 2017 and natural gas consumption is from 2018, released by the United States (U.S.) Energy Information Administration's (EIA) California State Profile and Energy Estimates in 2020 and included:

- Approximately 7,881 trillion British Thermal Unit (BTU) of energy was consumed; (2);
- Approximately 2,137 billion cubic feet of natural gas (2)

The California Energy Commission's (CEC) Transportation Energy Demand Forecast 2018-2030 was released in order to support the 2017 Integrated Energy Policy Report. The Transportation energy Demand Forecast 2018-2030 lays out graphs and data supporting their projections of California's future transportation energy demand. The projected inputs consider expected variable changes in fuel prices, income, population, and other variables. Predictions regarding fuel demand included:

- Gasoline demand in the transportation sector is expected to decline from approximately 15.8 billion gallons in 2017 to between 12.3 billion and 12.7 billion gallons in 2030 (3)
- Diesel demand in the transportation sector is expected to rise, increasing from approximately 3.7 billion diesel gallons in 2015 to approximately 4.7 billion in 2030 (3)
    - Data from the Department of Energy states that approximately 3.9 billion gallons of diesel fuel were consumed in 2017 (4)

The most recent data provided by the EIA for energy use in California by demand sector is from 2017 and is reported as follows:

- Approximately 40.3 percent (%) transportation;
- Approximately 23.1% industrial;
- Approximately 18.0% residential; and
- Approximately 18.7% commercial (5)

In 2018, total system electric generation for California was 285,488 gigawatt hours (GWh). California's massive electricity in-state generation system generated approximately 194,842 GWh which accounted for approximately 68% of the electricity it uses; the rest was imported from the Pacific Northwest (14%) and the U.S. Southwest (18%) (6). Natural gas is the main source for electricity generation at 47% of the total in-state electric generation system power as shown in Table 2-1.

TABLE 2-1: TOTAL ELECTRICITY SYSTEM POWER (CALIFORNIA 2018)

Fuel Type	California In-State Generation	Percent of California In-State	Northwest Imports (GWh)	Southwest Imports (GWh)	California Power Mix (GWh)	Percent California Power Mix
Coal	294	0.15%	399	8,740	9,433	3.30%
Large Hydro	22,096	11.34%	7,418	985	30,499	10.68%
Natural Gas	90,691	46.54%	49	8,904	99,644	34.91%
Nuclear	18,268	9.38%	0	7,573	25,841	9.05%
Oil	35	0.02%	0	0	35	0.01%
Other	430	0.22%	0	9	439	0.15%
Renewables	63,028	32.35%	14,074	12,400	89,502	31.36%
Biomass	5,909	3.03%	772	26	6,707	2.35%
Geothermal	11,528	5.92%	171	1,269	12,968	4.54%
Small Hydro	4,248	2.18%	334	1	4,583	1.61%
Solar	27,265	13.99%	174	5,094	32,533	11.40%
Wind	14,078	7.23%	12,623	6,010	32,711	11.46%
Unspecified Sources of Power	N/A	N/A	17,576	12,519	30,095	10.54%
Total	**194,842**	**100%**	**39,517**	**51,130**	**285,488**	**100%**

Source: https://www.energy.ca.gov/almanac/electricity_data/total_system_power.html

An updated summary of, and context for energy consumption and energy demands within the State is presented in "U.S. Energy Information Administration, California State Profile and Energy Estimates, Quick Facts" excerpted below:

- California was the seventh-largest producer of crude oil among the 50 states in 2018, and, as of January 2019, it ranked third in oil refining capacity.
- California is the largest consumer of jet fuel among the 50 states and accounted for one-fifth of the nation's jet fuel consumption in 2018. (7)
- California's total energy consumption is second-highest in the nation, but, in 2018, the state's per capita energy consumption was the fourth-lowest, due in part to its mild climate and its energy efficiency programs. (8)
- In 2018, California ranked first in the nation as a producer of electricity from solar, geothermal, and biomass resources and fourth in the nation in conventional hydroelectric power generation.
- In 2018, large- and small-scale solar PV and solar thermal installations provided 19% of California's net electricity generation (9).

As indicated above, California is one of the nation's leading energy-producing states, and California per capita energy use is among the nation's most efficient. Given the nature of the proposed Project, the remainder of this discussion will focus on the three sources of energy that are most relevant to the project—namely, electricity, natural gas, and transportation fuel for vehicle trips associated with the uses planned for the Project.

2.2 ELECTRICITY

The Southern California region's electricity reliability has been of concern for the past several years due to the planned retirement of aging facilities that depend upon once-through cooling technologies, as well as the June 2013 retirement of the San Onofre Nuclear Generating Station (San Onofre). While the once-through cooling phase-out has been ongoing since the May 2010 adoption of the State Water Resources Control Board's once-through cooling policy, the retirement of San Onofre complicated the situation. California ISO studies had revealed the extent to which the South Coast Air Basin (SCAB) and the San Diego Air Basin (SDAB) region were vulnerable to low-voltage and post-transient voltage instability concerns. A preliminary plan to address these issues was detailed in the 2013 Integrative Energy Policy Report (IEPR) after a collaborative process with other energy agencies, utilities, and air districts (10). If the resource development outlined in the preliminary plan continues as detailed, reliability in Southern California would likely be assured; however, tight resource margins have led energy agencies and the California Air Resources Board (CARB) to develop a contingency plan. This contingency plan was discussed at a public workshop in Los Angeles on August 20, 2014 and is detailed within this Section (11).

Electricity is provided to the Project by Southern California Edison (SCE). SCE provides electric power to more than 15 million persons in 15 counties and in 180 incorporated cities, within a service area encompassing approximately 50,000 square miles. Based on SCE's 2018 Power Content Label Mix, SCE derives electricity from varied energy resources including: fossil fuels, hydroelectric generators, nuclear power plants, geothermal power plants, solar power generation, and wind farms. SCE also purchases from independent power producers and utilities, including out-of-state suppliers (12).

California's electricity industry is an organization of traditional utilities, private generating companies, and state agencies, each with a variety of roles and responsibilities to ensure that electrical power is provided to consumers. The California Independent Service Operator (ISO) is a nonprofit public benefit corporation and is the impartial operator of the State's wholesale power grid and is charged with maintaining grid reliability, and to direct uninterrupted electrical energy supplies to California's homes and communities. While utilities [such as SCE] still own transmission assets, the ISO routes electrical power along these assets, maximizing the use of the transmission system and its power generation resources. The ISO matches buyers and sellers of electricity to ensure that sufficient power is available to meet demand. To these ends, every five minutes the ISO forecasts electrical demands, accounts for operating reserves, and assigns the lowest cost power plant unit to meet demands while ensuring adequate system transmission capacities and capabilities (13).

Part of the ISO's charge is to plan and coordinate grid enhancements to ensure that electrical power is provided to California consumers. To this end, transmission owners (investor-owned utilities such as SCE) file annual transmission expansion/modification plans to accommodate the State's growing electrical needs. The ISO reviews and either approves or denies the proposed additions. In addition, and perhaps most importantly, the ISO works with other areas in the western United States electrical grid to ensure that adequate power supplies are available to the State. In this manner, continuing reliable and affordable electrical power is assured to existing and new consumers throughout the State.

Table 2-2 identifies SCE's specific proportional shares of electricity sources in 2018. As indicated in Table 2-2, the 2018 SCE Power Mix has renewable energy at 36% of the overall energy resources. Geothermal resources are at 8%, wind power is at 13%, large hydroelectric sources are at 1%, solar energy is at 13%, and coal is at 0%. Biomass and waste sources have increased by 1% since 2017. Natural gas remains at 17% since 2017 (14).

TABLE 2-2: SCE 2018 POWER CONTENT MIX

Energy Resources	2018 SCE Power Mix
Eligible Renewable	**36%**
Biomass & waste	1%
Geothermal	8%
Small Hydroelectric	1%
Solar	13%
Wind	13%
Coal	**0%**
Large Hydroelectric	**4%**
Natural Gas	**17%**
Nuclear	**6%**
Other	**0%**
Unspecified Sources of power*	37%
Total	**100%**

* "Unspecified sources of power" means electricity from transactions that are not traceable to specific generation sources

2.3 NATURAL GAS

The usage associated with natural gas use were calculated using the California Emissions Estimator Model (CalEEMod) v2016.3.2 model. The following summary of natural gas resources and service providers, delivery systems, and associated regulation is excerpted from information provided by the California Public Utilities Commission (CPUC).

"The CPUC regulates natural gas utility service for approximately 10.8 million customers that receive natural gas from Pacific Gas and Electric (PG&E), Southern California Gas (SoCalGas), San Diego Gas & Electric (SDG&E), Southwest Gas, and several smaller natural gas utilities. The CPUC also regulates independent storage operators: Lodi Gas Storage, Wild Goose Storage, Central Valley Storage and Gill Ranch Storage.

The vast majority of California's natural gas customers are residential and small commercial customers, referred to as "core" customers, who accounted for approximately 32% of the natural gas delivered by California utilities in 2012. Large consumers, like electric generators and industrial customers, referred to as "noncore" customers, accounted for approximately 68% of the natural gas delivered by California utilities in 2012.

The PUC regulates the California utilities' natural gas rates and natural gas services, including in-state transportation over the utilities' transmission and distribution pipeline systems, storage, procurement, metering and billing. Most of the natural gas used in California comes from out-of-state natural gas basins. In 2012, California customers received 35% of their natural gas supply from basins located in the Southwest, 16% from Canada, 40% from the Rocky Mountains, and 9% from basins located within California. California gas utilities may soon also begin receiving biogas into their pipeline systems.

Natural gas from out-of-state production basins is delivered into California via the interstate natural gas pipeline system. The major interstate pipelines that deliver out-of-state natural gas to California consumers are the Gas Transmission Northwest Pipeline, Kern River Pipeline, Transwestern Pipeline, El Paso Pipeline, Ruby Pipeline, Questar Southern Trails and Mojave Pipeline. Another pipeline, the North Baja – Baja Norte Pipeline, takes gas off the El Paso Pipeline at the California/Arizona border, and delivers that gas through California into Mexico. While the Federal Energy Regulatory Commission (FERC) regulates the transportation of natural gas on the interstate pipelines, the PUC often participates in FERC regulatory proceedings to represent the interests of California natural gas consumers.

Most of the natural gas transported via the interstate pipelines, as well as some of the California-produced natural gas, is delivered into the PG&E and SoCalGas intrastate natural gas transmission pipeline systems (commonly referred to as California's "backbone" natural gas pipeline system). Natural gas on the utilities' backbone pipeline systems is then delivered into the local transmission and distribution pipeline systems, or to natural gas storage fields. Some large noncore customers take natural gas directly off the high-pressure backbone pipeline systems, while core customers and other noncore customers take natural gas off the utilities' distribution pipeline systems. The PUC has regulatory jurisdiction over 150,000 miles of utility-owned natural gas pipelines, which transported 82% of the total amount of natural gas delivered to California's gas consumers in 2012.

SDG&E and Southwest Gas' southern division are wholesale customers of SoCalGas, and currently receive all of their natural gas from the SoCalGas system (Southwest Gas also *provides natural gas distribution service in the Lake Tahoe area). Some other municipal wholesale customers are the cities of Palo Alto, Long Beach, and Vernon, which are not regulated by the CPUC.*

Some of the natural gas delivered to California customers may be delivered directly to them without being transported over the regulated utility systems. For example, the Kern River/Mojave pipeline system can deliver natural gas directly to some large customers, "bypassing" the utilities' systems. Much of California-produced natural gas is also delivered directly to large consumers.

PG&E and SoCalGas own and operate several natural gas storage fields that are located in northern and southern California. These storage fields, and four independently owned storage utilities – Lodi Gas Storage, Wild Goose Storage, Central Valley Storage, and Gill Ranch Storage – help meet peak seasonal natural gas demand and allow California natural gas customers to secure natural gas supplies more efficiently. (A portion of the Gill Ranch facility is owned by PG&E).

California's regulated utilities do not own any natural gas production facilities. All of the natural gas sold by these utilities must be purchased from suppliers and/or marketers. The price of natural gas sold by suppliers and marketers was deregulated by the FERC in the mid-1980's and is determined by "market forces." However, the PUC decides whether California ' s utilities have taken reasonable steps in order to minimize the cost of natural gas purchased on behalf of their core customers." (15)

As indicated in the preceding discussions, natural gas is available from a variety of in-state and out-of-state sources and is provided throughout the state in response to market supply and demand. Complementing available natural gas resources, biogas may soon be available via existing delivery systems, thereby increasing the availability and reliability of resources in total. The PUC oversees utility purchases and transmission of natural gas to ensure reliable and affordable natural gas deliveries to existing and new consumers throughout the State.

2.4 TRANSPORTATION ENERGY RESOURCES

The Project would generate additional vehicle trips with resulting consumption of energy resources, predominantly gasoline and diesel fuel. In March 2018, the Department of Motor Vehicles (DMV) identified 35 million registered vehicles in California (16), and those vehicles (as noted previously) consume an estimated 19 billion gallons of fuel each year[1]. Gasoline (and other vehicle fuels) are commercially provided commodities and would be available to the Project patrons and employees via commercial outlets.

California's on-road transportation system includes 170,000 miles of highways and major roadways, more than 27 million passenger vehicles and light trucks, and almost 8 million medium- and heavy-duty vehicles (16). While gasoline consumption has been declining since 2008 it is still by far the dominant fuel. Petroleum comprises about 92% of all transportation energy use, excluding fuel consumed for aviation and most marine vessels (17). Nearly 19 billion

[1] Fuel consumptions estimated utilizing information from EMFAC2014.

gallons of on-highway fuel are burned each year, including 15.1 billion gallons of gasoline (including ethanol) and 3.9 billion gallons of diesel fuel (including biodiesel and renewable diesel). In 2016, Californians also used 194 million therms of natural gas as a transportation fuel (18), or the equivalent of 155 million gallons of gasoline.

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3 REGULATORY BACKGROUND

Federal and state agencies regulate energy use and consumption through various means and programs. On the federal level, the United States Department of Transportation, the United States Department of Energy, and the United States Environmental Protection Agency are three federal agencies with substantial influence over energy policies and programs. On the state level, the PUC and the CEC are two agencies with authority over different aspects of energy. Relevant federal and state energy-related laws and plans are summarized below. Project consistency with applicable federal and state regulations is also presented in *italicized* text.

3.1 FEDERAL REGULATIONS

INTERMODAL SURFACE TRANSPORTATION EFFICIENCY ACT OF 1991 (ISTEA)

The ISTEA promoted the development of inter-modal transportation systems to maximize mobility as well as address national and local interests in air quality and energy. ISTEA contained factors that Metropolitan Planning Organizations (MPOs) were to address in developing transportation plans and programs, including some energy-related factors. To meet the new ISTEA requirements, MPOs adopted explicit policies defining the social, economic, energy, and environmental values guiding transportation decisions. *Transportation and access to the Project site is provided primarily by the local and regional roadway systems. The Project would not interfere with, nor otherwise obstruct intermodal transportation plans or projects that may be realized pursuant to the ISTEA because Southern California Association of Governments (SCAG) is not planning for intermodal facilities on or through the Project site.*

THE TRANSPORTATION EQUITY ACT FOR THE 21ST CENTURY (TEA-21)

TEA-21 was signed into law in 1998 and builds upon the initiatives established in the ISTEA legislation, discussed above. TEA-21 authorizes highway, highway safety, transit, and other efficient surface transportation programs. TEA-21 continues the program structure established for highways and transit under ISTEA, such as flexibility in the use of funds, emphasis on measures to improve the environment, and focus on a strong planning process as the foundation of good transportation decisions. TEA-21 also provides for investment in research and its application to maximize the performance of the transportation system through, for example, deployment of Intelligent Transportation Systems, to help improve operations and management of transportation systems and vehicle safety. *The Project site is located along major transportation corridors with proximate access to the Interstate freeway system and supports the strong planning processes emphasized under TEA-21. The Project is therefore consistent with, and would not otherwise interfere with, nor obstruct implementation of TEA-21.*

3.2 California Regulations

Integrated Energy Policy Report

Senate Bill 1389 (Bowen, Chapter 568, Statutes of 2002) requires the CEC to prepare a biennial integrated energy policy report that assesses major energy trends and issues facing the state's electricity, natural gas, and transportation fuel sectors and provides policy recommendations to conserve resources; protect the environment; ensure reliable, secure, and diverse energy supplies; enhance the state's economy; and protect public health and safety (Public Resources Code § 25301a]). The Energy Commission prepares these assessments and associated policy recommendations every two years, with updates in alternate years, as part of the Integrated Energy Policy Report.

The 2018 IEPR was adopted February 20, 2019, and continues to work towards improving electricity, natural gas, and transportation fuel energy use in California. The 2018 IEPR focuses on a variety of topics such as including the environmental performance of the electricity generation system, landscape-scale planning, the response to the gas leak at the Aliso Canyon natural gas storage facility, transportation fuel supply reliability issues, updates on Southern California electricity reliability, methane leakage, climate adaptation activities for the energy sector, climate and sea level rise scenarios, and the California Energy Demand Forecast (19). *Electricity would be provided to the Project by Southern California Edison (SCE). SCE's Clean Power and Electrification Pathway (CPEP) white paper builds on existing state programs and policies. As such, the Project is consistent with, and would not otherwise interfere with, nor obstruct implementation the goals presented in the 2018 IEPR*.

State of California Energy Plan

The CEC is responsible for preparing the State Energy Plan, which identifies emerging trends related to energy supply, demand, conservation, public health and safety, and the maintenance of a healthy economy. The Plan calls for the state to assist in the transformation of the transportation system to improve air quality, reduce congestion, and increase the efficient use of fuel supplies with the least environmental and energy costs. To further this policy, the plan identifies a number of strategies, including assistance to public agencies and fleet operators and encouragement of urban designs that reduce VMT and accommodate pedestrian and bicycle access. *The Project does not generate a substantive amount of vehicular travel would not otherwise interfere with, nor obstruct implementation of the State of California Energy Plan.*

California Code Title 24, Part 6, Energy Efficiency Standards

California Code of Regulations Title 24 Part 6: California's Energy Efficiency Standards for Residential and Nonresidential Buildings, was first adopted in 1978 in response to a legislative mandate to reduce California's energy consumption. The standards are updated periodically to allow consideration and possible incorporation of new energy efficient technologies and methods. Energy efficient buildings require less electricity; therefore, increased energy efficiency reduces fossil fuel consumption and decreases GHG emissions. The 2019 version of Title 24 was adopted by the CEC and went into effect on January 1, 2020. The 2019 Title 24 standards go into effect on January 1, 2020 and are applicable to building permit applications submitted on or after that date. The 2019 Title 24 standards require solar photovoltaic systems for new homes, establish requirements for newly constructed healthcare facilities, encourage demand responsive technologies for residential buildings, update indoor and outdoor lighting for nonresidential buildings. The CEC anticipates that single-family homes built with the 2019 standards will use approximately 7% less energy compared to the residential homes built under the 2016 standards. Additionally, after implementation of solar photovoltaic systems, homes built under the 2019 standards will about 53% less energy than homes built under the 2016 standards. Nonresidential buildings will use approximately 30% less energy due to lighting upgrades (20). *The 2019 version of Title 24 was adopted by the CEC and became effective on January 1, 2020.*

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4 PROJECT ENERGY DEMANDS AND ENERGY EFFICIENCY MEASURES

4.1 EVALUATION CRITERIA

In compliance with Appendix G of the *State CEQA Guidelines* (21)*,* this report analyzes the project's anticipated energy use to determine if the Project would:

- Result in potentially significant environmental impact due to wasteful, inefficient, or unnecessary consumption of energy resources, during project construction or operation; or
- Conflict with or obstruct a state or local plan for renewable energy or energy efficiency

In addition, Appendix F of the *State CEQA Guidelines* (22)*,* states that the means of achieving the goal of energy conservation includes the following:

- Decreasing overall per capita energy consumption;
- Decreasing reliance on fossil fuels such as coal, natural gas and oil; and
- Increasing reliance on renewable energy sources.

4.2 METHODOLOGY

Information from the CalEEMod Version 2016.3.2 outputs for the *2020 Optimum Basin Management Program Update Air Quality Impact Analysis* (AQIA) (Urban Crossroads, Inc.) (23) was utilized in this analysis, detailing Project related construction equipment, transportation energy demands, and facility energy demands. These outputs can be referenced in Appendices 4.1 through 4.4.

4.3 CONSTRUCTION ENERGY DEMANDS

The focus within this section is the energy implications of the construction process, specifically the power cost from on-site electricity consumption during construction of the proposed Project.

Because few details are known at this time regarding construction of specific projects, it is assumed that construction any Project facilities may occur simultaneously. As a conservative measure, and in order to identify the maximum daily emissions, this AQIA assumes that the Project would construct the following features simultaneously:

PROJECT CATEGORY 1

- 20 monitoring wells
- 10 production wells
- 65,000 linear feet (LF) of associated conveyance pipeline

PROJECT CATEGORY 2

- 200,000 LF of conveyance pipeline

PROJECT CATEGORY 3

- One new storage reservoir on a 100-acre site
- 60,000 LF of associated conveyance pipeline

PROJECT CATEGORY 4

- One new water treatment facility on a 10-acre site
- One new regional water treatment facility on a 10-acre site
- 60,000 LF of associated conveyance pipeline

4.3.1 CONSTRUCTION DURATION

Based on information provided in the Project Description, construction activities for Project Categories 1 and 2 are expected to occur over a 12-month period while construction activities for Project Categories 3 and 4 will occur over an 18-month period.

4.3.2 CONSTRUCTION EQUIPMENT

Associated equipment was based on information provided by the Project Description. Please refer to specific detailed modeling inputs/outputs contained in Appendices 4.1 through 4.4 of this AQIA. A detailed summary of construction equipment is provided at Table 4-1.

TABLE 4-1: CONSTRUCTION EQUIPMENT ASSUMPTIONS (1 OF 2)

Equipment	CalEEMod Equivalent	Amount	Hours Per Day
Project Category 1			
Bore/Drill Rigs	Bore/Drill Rigs	1	8
Cement Trucks	Off-Highway Trucks	1	8
Project Category 2			
Backhoes	Tractor/Loaders/Backhoes	2	8
Dump Trucks	Off-Highway Trucks	2	8
Excavators	Excavators	2	8
Pavers	Pavers	2	8
Rollers	Rollers	2	8
Water Trucks	Off-Highway Trucks	20	8

TABLE 4-1: CONSTRUCTION EQUIPMENT ASSUMPTIONS (2 OF 2)

Equipment		Amount	Hours Per Day
Project Category 3			
Bulldozers	Rubber Tired Dozers	2	8
Dump Trucks	Off-Highway Trucks	4	8
Excavators	Excavators	2	8
Loaders	Tractors/Loaders/Backhoes	2	8
Scrapers	Scrapers	7	8
Water Trucks	Off-Highway Trucks	2	
Project Category 4			
Backhoes	Tractors/Loaders/Backhoes	3	8
Compactors	Plate Compactors	3	8
Concrete Trucks	Off-Highway Trucks	3	8
Cranes	Cranes	3	8
Delivery Trucks	Off-Highway Trucks	3	8
Dump Trucks	Off-Highway Trucks	3	8
Graders	Graders	3	8
Loaders	Tractors/Loaders/Backhoes	3	8
Other Trucks	Off-Highway Trucks	3	8
Water Trucks	Off-Highway Trucks	3	8

Source: Construction equipment based on information provided by the Project Description.

4.3.3 Construction Electricity Usage Estimates

As shown on Table 4-2, the total power cost of the on-site electricity usage during the construction of the proposed Project is estimated to be approximately $199,551,950.11.

TABLE 4-2: PROJECT CONSTRUCTION POWER COST

Project	**Power Cost** (per 1,000 SF of construction area per month)[2]	**Total Construction Area Size** (1,000 SF)	**Construction Duration** (months)	**Project Construction Power Cost**
Project Category 1	$2.32	477.500	12	$13,293.60
Project Category 2	$2.32	1,400.000	12	$38,976.00
Project Category 3	$2.32	4,776,000.000	18	$199,445,760.00
Project Category 4	$2.32	1,291.200	18	$53,920.51
TOTAL PROJECT CONSTRUCTION POWER COST				***$199,551,950.11***

Additionally, as of January 1, 2020, SCE's general service rate schedule (GS-1) for an industrial land uses is $0.08 per kilowatt hours (kWh) of electricity (24). As shown on Table 4-3, the total electricity usage from on-site Project construction related activities is estimated to be approximately 2,497,677,578 kWh.

TABLE 4-3: PROJECT CONSTRUCTION ELECTRICITY USAGE

Project	Cost per kWh	Project Construction Electricity Usage (kWh)
Project Category 1	$0.08	166,388
Project Category 2	$0.08	487,840
Project Category 3	$0.08	2,496,348,457
Project Category 4	$0.08	674,892
TOTAL PROJECT CONSTURCTION ELECTRICTY		***2,497,677,578***

[1]Assumes the Project will be under the GS-1 General Industrial service rate under SCE

4.3.4 CONSTRUCTION EQUIPMENT FUEL ESTIMATES

Fuel consumed by construction equipment would be the primary energy resource expended over the course of Project construction. Project construction activity timeline estimates, construction equipment schedules, equipment power ratings, load factors, and associated fuel consumption estimates are presented in Table 4-4. Eight-hour daily use of all equipment is assumed. The aggregate fuel consumption rate for all equipment is estimated at 18.5 horsepower-hour per gallon (hp-hr/gal), obtained from CARB 2018 Emissions Factors Tables and cited fuel consumption rate factors presented in Table D-24 of the Moyer guidelines (25). For the purposes of this analysis, the calculations are based on all construction equipment being diesel-powered which is

[2] The *2017 National Construction Estimator*, Richard Pray (2017) (29), the typical power cost per 1,000 sf of construction per month is estimated to be $2.32.

TABLE 4-4: CONSTRUCTION EQUIPMENT FUEL CONSUMPTION ESTIMATES

Equipment	HP Rating	Quantity	Usage Hours	Load Factor	HP-hrs/day	Total Fuel Consumption (gal. diesel fuel)
Project Category 1						
Bore/Drill Rigs	221	1	8	0.50	884	17,489
Off-Highway Trucks	402	1	8	0.38	1,222	24,177
PROJECT CATEGORY 1 - CONSTRUCTION FUEL DEMAND (GALLONS DIESEL FUEL)						***41,666***
Project Category 2						
Excavators	158	2	8	0.38	961	19,005
Off-Highway Trucks	402	22	8	0.38	26,886	531,902
Pavers	130	2	8	0.42	874	17,283
Rollers	80	2	8	0.38	486	9,623
Tractors/Loaders/Backhoes	97	2	8	0.37	574	11,361
PROJECT CATEGORY 2 - CONSTRUCTION FUEL DEMAND (GALLONS DIESEL FUEL)						***589,174***
Project Category 3						
Excavators	158	2	8	0.38	961	28,560
Off-Highway Trucks	402	6	8	0.38	7,332	217,993
Rubber Tired Dozers	247	2	8	0.40	1,581	46,997
Scrapers	367	7	8	0.48	9,865	293,283
Tractors/Loaders/Backhoes	97	2	8	0.37	574	17,072
PROJECT CATEGORY 3 - CONSTRUCTION FUEL DEMAND (GALLONS DIESEL FUEL)						***603,904***
Project Category 4						
Cranes	231	3	8	0.29	1,608	47,538
Graders	187	1	8	0.41	613	18,136
Off-Highway Trucks	402	15	8	0.38	18,331	542,009
Plate Compactors	8	3	8	0.43	83	2,441
Tractors/Loaders/Backhoes	97	6	8	0.37	1,723	50,937
PROJECT CATEGORY 4 - CONSTRUCTION FUEL DEMAND (GALLONS DIESEL FUEL)						***661,060***
TOTAL CONSTRUCTION FUEL DEMAND (GALLONS DIESEL FUEL)						***1,895,803***

standard practice consistent with industry standards. Diesel fuel would be supplied by existing commercial fuel providers serving the region.

As presented in Table 4-4, Project construction activities would consume an estimated 1,895,803 gallons of diesel fuel. Project construction would represent a "single-event" diesel fuel demand and would not require on-going or permanent commitment of diesel fuel resources for this purpose.

4.3.5 CONSTRUCTION WORKER FUEL ESTIMATES

It is assumed that all construction worker trips are from light duty autos (LDA) along area roadways. With respect to estimated VMT, the construction worker trips would generate an estimated 1,308,120 VMT (23). Data regarding Project related construction worker trips were based on CalEEMod defaults utilized within the AQIA.

Vehicle fuel efficiencies for LDA were estimated using information generated within the 2014 version of the Emissions FACtor model (EMFAC) developed by the CARB. EMFAC2014 is a mathematical model that was developed to calculate emission rates, fuel consumption, and VMT from motor vehicles that operate on highways, freeways, and local roads in California and is commonly used by the CARB to project changes in future emissions from on-road mobile sources (26). EMFAC2014 was run for the LDA vehicle class within the California sub-area for a 2021 calendar year. Data from EMFAC2014 is shown in Appendix 4.5.

As generated by EMFAC2014, an aggregated fuel economy of LDAs ranging from model year 1974 to model year 2021 are estimated to have a fuel efficiency of 31.28 miles per gallon (mpg). Table 4-5 provides an estimated annual fuel consumption resulting from the Project generated by LDAs related to construction worker trips. Based on Table 4-5, it is estimated that 41,824 gallons of fuel will be consumed related to construction worker trips during full construction of the proposed Project. Project construction worker trips would represent a "single-event" gasoline fuel demand and would not require on-going or permanent commitment of fuel resources for this purpose.

TABLE 4-5: CONSTRUCTION WORKER FUEL CONSUMPTION ESTIMATES

Project	Worker Trips / Day	Trip Length (miles)	Vehicle Miles Traveled	Average Vehicle Fuel Economy (mpg)	Estimated Fuel Consumption (gallons)
Project Category 1	10	30	109,800	31.28	3,511
Project Category 2	28	40	409,920	31.28	13,106
Project Category 3	6	40	132,000	31.28	4,220
Project Category 4	30	40	656,400	31.28	20,987
TOTAL CONSTRUCTION WORKER FUEL CONSUMPTION					***41,824***

4.3.6 CONSTRUCTION HAULING FUEL ESTIMATES

With respect to estimated VMT, the construction hauling trips would generate an estimated 7,407,000 VMT along area roadways (23). It is assumed that 50% of all vendor trips are from Medium-Heavy-Duty-Trucks (MHDT), 50% of vendor trips are from Heavy-Heavy-Duty Trucks (HHDT), and 100% of hauling trips are from HHDTs. Vehicle fuel efficiencies for MHDTs and HHDTs were estimated using information generated within EMFAC2014. For purposes of this analysis, EMFAC2014 was run for the MHDT and HHDT vehicle class within the California sub-area for the 2021 construction year. Data from EMFAC2014 is shown in Appendix 4.5.

As generated by EMFAC2014, the aggregated fuel economy of MHDTs and HHDTs ranging from model year 1974 to model year 2021 are presented in Table 4-6. Based on Table 4-6, it is estimated that 73,789 gallons of fuel would be consumed in relation to construction vendor trips (MHDTs). Table 4-7 shows the estimated fuel economy of HHDTs accessing the Project site. Based on Table 4-7, fuel consumption from construction vendor and hauling trips (HHDTs) will total approximately 1,071,773 gallons of fuel would be consumed in relation to construction vendor trips (HHDTs) during construction of the Project. The total fuel consumption from construction vendor trips (MHDTs and HHDTs) is 1,145,562 gallons. Project construction vendor trips would represent a "single-event" diesel fuel demand and would not require on-going or permanent commitment of diesel fuel resources for this purpose.

TABLE 4-6: CONSTRUCTION VENDOR FUEL CONSUMPTION ESTIMATES – MHDT

Construction Activity	Vendor Trips / Day	Trip Length (miles)	Vehicle Miles Traveled	Average Vehicle Fuel Economy (mpg)	Estimated Fuel Consumption (gallons)
Vendor					
Project Category 1	15	50	274,500	8.82	31,114
Project Category 2	10	40	146,400	8.82	16,594
Project Category 3	3	40	66,000	8.82	7,481
Project Category 4	8	40	164,100	8.82	18,600
TOTAL FUEL CONSUMPTION – VENDOR (MHDT)					***73,789***

TABLE 4-7: CONSTRUCTION VENDOR/HAULING FUEL CONSUMPTION ESTIMATES – HHDT (1 OF 2)

Construction Activity	Vendor Trips / Day	Trip Length (miles)	Vehicle Miles Traveled	Average Vehicle Fuel Economy (mpg)	Estimated Fuel Consumption (gallons)
Vendor					
Project Category 1	15	50	274,500	6.30	43,547
Project Category 2	10	40	146,400	6.30	23,225
Project Category 3	3	40	66,000	6.30	10,470
Project Category 4	8	40	164,100	6.30	26,033

TABLE 4-7: CONSTRUCTION VENDOR/HAULING FUEL CONSUMPTION ESTIMATES – HHDT (2 OF 2)

Construction Activity	Vendor Trips / Day	Trip Length (miles)	Vehicle Miles Traveled	Average Vehicle Fuel Economy (mpg)	Estimated Fuel Consumption (gallons)
Hauling					
Project Category 3	370	30	6,105,000	6.30	968,499
TOTAL FUEL CONSUMPTION – VENDOR/HAULING (HHDT)					***1,071,773***

4.3.7 Construction Energy Efficiency/Conservation Measures

The equipment used for Project construction would conform to CARB regulations and California emissions standards. There are no unusual Project characteristics or construction processes that would require the use of equipment that would be more energy intensive than is used for comparable activities; or equipment that would not conform to current emissions standards (and related fuel efficiencies). Equipment employed in construction of the Project would therefore not result in inefficient wasteful, or unnecessary consumption of fuel.

The Project would utilize construction contractors which practice compliance with applicable CARB regulation regarding retrofitting, repowering, or replacement of diesel off-road construction equipment. Additionally, CARB has adopted the Airborne Toxic Control Measure to limit heavy-duty diesel motor vehicle idling in order to reduce public exposure to diesel particulate matter and other Toxic Air Contaminants. Compliance with anti-idling and emissions regulations would result in a more efficient use of construction-related energy and the minimization or elimination of wasteful or unnecessary consumption of energy. Idling restrictions and the use of newer engines and equipment would result in less fuel combustion and energy consumption.

Additionally, certain incidental construction-source energy efficiencies would likely accrue through implementation of California regulations and best available control measures (BACM). More specifically, California Code of Regulations Title 13, Motor Vehicles, section 2449(d)(3) Idling, limits idling times of construction vehicles to no more than five minutes, thereby precluding unnecessary and wasteful consumption of fuel due to unproductive idling of construction equipment. To this end, “grading plans shall reference the requirement that a sign shall be posted on-site stating that construction workers need to shut off engines at or before five minutes of idling.” In this manner, construction equipment operators are informed that engines are to be turned off at or prior to five minutes of idling. Enforcement of idling limitations is realized through periodic site inspections conducted by County building officials, and/or in response to citizen complaints.

Indirectly, construction energy efficiencies and energy conservation would be achieved for the proposed development through energy efficiencies realized from bulk purchase, transport and use of construction materials.

A full analysis related to the energy needed to form construction materials is not included in this analysis due to a lack of detailed Project-specific information on construction materials. At this time, an analysis of the energy needed to create Project-related construction materials would be extremely speculative and thus has not been prepared.

In general, the construction processes promote conservation and efficient use of energy by reducing raw materials demands, with related reduction in energy demands associated with raw materials extraction, transportation, processing and refinement. Use of materials in bulk reduces energy demands associated with preparation and transport of construction materials as well as the transport and disposal of construction waste and solid waste in general, with corollary reduced demands on area landfill capacities and energy consumed by waste transport and landfill operations.

4.4 OPERATIONAL ENERGY DEMANDS

In terms of operational energy demands, the proposed Project involves the construction of wells, conveyance facilities and ancillary facilities, storage basins, recharge facilities, storage bands, desalters and water treatment facilities, and associated improvements. The proposed Project does not include any substantive new stationary or mobile sources of emissions, and therefore, by its very nature, will not generate substantive amounts of energy demand from Project operations. The Project does not propose a trip-generating land use or facilities that would generate any substantive amount of on-going energy demands. While it is anticipated that the Project would require intermittent maintenance, such maintenance would be minimal requiring a negligible amount of traffic trips on an annual basis. Therefore, there is no significant operational impact associated with energy demands.

4.5 SUMMARY

4.5.1 CONSTRUCTION ENERGY DEMANDS

The estimated power cost of on-site electricity usage during the construction of the proposed Project is assumed to be around $199,551,950.11. Additionally, based on the assumed power cost, it is estimated that the total electricity usage during construction is calculated to be around 2,497,677,578 kWh.

Construction equipment used by the Project would result in single event consumption of approximately 1,895,803 gallons of diesel fuel. Construction equipment use of fuel would not be atypical for the type of construction proposed because there are no aspects of the Project's proposed construction process that are unusual or energy-intensive, and Project construction equipment would conform to the applicable CARB emissions standards, acting to promote equipment fuel efficiencies.

California Code of Regulations (CCR) Title 13, Title 13, Motor Vehicles, section 2449(d)(3) Idling, limits idling times of construction vehicles to no more than 5 minutes, thereby precluding unnecessary and wasteful consumption of fuel due to unproductive idling of construction equipment. BACMs inform construction equipment operators of this requirement. Enforcement of idling limitations is realized through periodic site inspections conducted by County building officials, and/or in response to citizen complaints.

Construction worker trips for construction of the proposed Project would result in the estimated fuel consumption of 41,824 gallons of fuel. Additionally, fuel consumption from construction hauling trips will total approximately 1,145,562 gallons. Diesel fuel would be supplied by County and regional commercial vendors. Indirectly, construction energy efficiencies and energy conservation would be achieved through the use of bulk purchases, transport and use of construction materials. The 2018 IEPR released by the CEC has shown that fuel efficiencies are getting better within on and off-road vehicle engines due to more stringent government requirements (19). As supported by the preceding discussions, Project construction energy consumption would not be considered inefficient, wasteful, or otherwise unnecessary.

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5 CONCLUSION

Energy Impact-1: Result in potentially significant environmental impact due to wasteful, inefficient, or unnecessary consumption of energy resources, during project construction or operation.

As supported by the preceding analyses, Project construction would not result in the inefficient, wasteful or unnecessary consumption of energy. Further, the energy demands of the Project can be accommodated within the context of available resources and energy delivery systems. The Project would therefore not cause or result in the need for additional energy producing or transmission facilities. The Project would not engage in wasteful or inefficient uses of energy and aims to achieve energy conservations goals within the State of California.

Energy Impact-2: Conflict with or obstruct a state or local plan for renewable energy or energy efficiency.

The Project includes construction activity and associated improvements and would not result in the inefficient, wasteful, or unnecessary consumption of energy. In fact, the proposed Project involves the construction of wells, conveyance facilities and ancillary facilities, storage basins, recharge facilities, storage bands, desalters and water treatment facilities, and associated improvements which would result in a more efficient process and consequently reduce a wasteful use of energy. Further, the Project would not cause or result in the need for additional energy producing facilities or energy delivery systems.

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7 CERTIFICATIONS

The contents of this energy report represent an accurate depiction of the environmental impacts associated with the proposed 2020 Optimum Basin Management Program Update Project. The information contained in this energy report is based on the best available data at the time of preparation. If you have any questions, please contact me directly at (949) 336-5987.

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EDUCATION

Master of Science in Environmental Studies
California State University, Fullerton • May 2010

Bachelor of Arts in Environmental Analysis and Design
University of California, Irvine • June 2006

PROFESSIONAL AFFILIATIONS

AEP – Association of Environmental Planners
AWMA – Air and Waste Management Association
ASTM – American Society for Testing and Materials

PROFESSIONAL CERTIFICATIONS

Environmental Site Assessment – American Society for Testing and Materials • June 2013
Planned Communities and Urban Infill – Urban Land Institute • June 2011
Indoor Air Quality and Industrial Hygiene – EMSL Analytical • April 2008
Principles of Ambient Air Monitoring – California Air Resources Board • August 2007
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APPENDIX 4.1:

CALEEMOD PROJECT CATEGORY 1 ANNUAL CONSTRUCTION EMISSIONS MODEL OUTPUTS

OBMPU - Project Category 1 (Construction - Unmitigated)

San Bernardino-South Coast County, Annual

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Other Asphalt Surfaces	22.50	1000sqft	0.52	22,500.00	0
Other Non-Asphalt Surfaces	455.00	1000sqft	10.45	455,000.00	0

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	2.2	**Precipitation Freq (Days)**	32
Climate Zone	10			**Operational Year**	2022
Utility Company	Southern California Edison				
CO2 Intensity (lb/MWhr)	702.44	**CH4 Intensity (lb/MWhr)**	0.029	**N2O Intensity (lb/MWhr)**	0.006

1.3 User Entered Comments & Non-Default Data

Project Characteristics -

Land Use - Other Asphalt Surfaces = 20 Monitoring Wells and Production Wells; Other Non-Asphalt Surfaces = Conveyance

Construction Phase - Analysis assumes 20 Monitoring Wells, 10 Production Wells, and 65,000 LF of conveyance to be constructed in a single year.

Off-road Equipment - Equipment based on information provided in the Project Description

Trips and VMT - Based on information provided in the Project Description

Grading - Based on the Project Description, the average area of disturbance of each well site is anticipated to be half an acre or less.

Construction Off-road Equipment Mitigation - Rule 403

Table Name	Column Name	Default Value	New Value
tblConstructionPhase	NumDays	30.00	366.00
tblConstructionPhase	NumDaysWeek	5.00	7.00
tblGrading	AcresOfGrading	0.00	183.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	0.00
tblTripsAndVMT	VendorTripLength	6.90	50.00
tblTripsAndVMT	VendorTripNumber	0.00	30.00
tblTripsAndVMT	WorkerTripLength	14.70	30.00
tblTripsAndVMT	WorkerTripNumber	5.00	10.00

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	0.2250	3.0834	1.4999	0.0124	0.3871	0.0582	0.4453	0.0932	0.0538	0.1469	0.0000	1,148.6848	1,148.6848	0.1371	0.0000	1,152.1116
2022	5.5000e-004	7.0400e-003	3.8800e-003	3.0000e-005	0.0978	1.2000e-004	0.0980	0.0107	1.1000e-004	0.0108	0.0000	3.1271	3.1271	3.7000e-004	0.0000	3.1365
Maximum	**0.2250**	**3.0834**	**1.4999**	**0.0124**	**0.3871**	**0.0582**	**0.4453**	**0.0932**	**0.0538**	**0.1469**	**0.0000**	**1,148.6848**	**1,148.6848**	**0.1371**	**0.0000**	**1,152.1116**

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	0.2250	3.0834	1.4999	0.0124	0.3279	0.0582	0.3861	0.0868	0.0538	0.1405	0.0000	1,148.6844	1,148.6844	0.1371	0.0000	1,152.1112
2022	5.5000e-004	7.0400e-003	3.8800e-003	3.0000e-005	0.0386	1.2000e-004	0.0388	4.3100e-003	1.1000e-004	4.4300e-003	0.0000	3.1271	3.1271	3.7000e-004	0.0000	3.1365
Maximum	**0.2250**	**3.0834**	**1.4999**	**0.0124**	**0.3279**	**0.0582**	**0.3861**	**0.0868**	**0.0538**	**0.1405**	**0.0000**	**1,148.6844**	**1,148.6844**	**0.1371**	**0.0000**	**1,152.1112**

	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**	**24.41**	**0.00**	**21.79**	**12.31**	**0.00**	**8.10**	**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)
1	1-1-2021	3-31-2021	0.8098	0.8098
2	4-1-2021	6-30-2021	0.8084	0.8084
3	7-1-2021	9-30-2021	0.8173	0.8173
4	10-1-2021	12-31-2021	0.8278	0.8278
5	1-1-2022	3-31-2022	0.0075	0.0075
		Highest	0.8278	0.8278

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	0.0381	6.0000e-005	6.1000e-003	0.0000		2.0000e-005	2.0000e-005		2.0000e-005	2.0000e-005	0.0000	0.0119	0.0119	3.0000e-005	0.0000	0.0126
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	**0.0381**	**6.0000e-005**	**6.1000e-003**	**0.0000**	**0.0000**	**2.0000e-005**	**2.0000e-005**	**0.0000**	**2.0000e-005**	**2.0000e-005**	**0.0000**	**0.0119**	**0.0119**	**3.0000e-005**	**0.0000**	**0.0126**

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	0.0381	6.0000e-005	6.1000e-003	0.0000		2.0000e-005	2.0000e-005		2.0000e-005	2.0000e-005	0.0000	0.0119	0.0119	3.0000e-005	0.0000	0.0126
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	**0.0381**	**6.0000e-005**	**6.1000e-003**	**0.0000**	**0.0000**	**2.0000e-005**	**2.0000e-005**	**0.0000**	**2.0000e-005**	**2.0000e-005**	**0.0000**	**0.0119**	**0.0119**	**3.0000e-005**	**0.0000**	**0.0126**

	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	Grading	Grading	1/1/2021	1/1/2022	7	366	

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 183

Acres of Paving: 10.97

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
Grading	Bore/Drill Rigs	1	8.00	221	0.50
Grading	Excavators	0	8.00	158	0.38
Grading	Graders	0	8.00	187	0.41
Grading	Off-Highway Trucks	1	8.00	402	0.38
Grading	Rubber Tired Dozers	0	8.00	247	0.40
Grading	Scrapers	0	8.00	367	0.48
Grading	Tractors/Loaders/Backhoes	0	8.00	97	0.37

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
Grading	2	10.00	30.00	0.00	30.00	50.00	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

Water Exposed Area

3.2 Grading - 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					0.0970	0.0000	0.0970	0.0105	0.0000	0.0105	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.1577	1.5122	1.0363	4.1300e-003		0.0520	0.0520		0.0478	0.0478	0.0000	362.6760	362.6760	0.1173	0.0000	365.6084
Total	**0.1577**	**1.5122**	**1.0363**	**4.1300e-003**	**0.0970**	**0.0520**	**0.1490**	**0.0105**	**0.0478**	**0.0583**	**0.0000**	**362.6760**	**362.6760**	**0.1173**	**0.0000**	**365.6084**

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	0.0522	1.5589	0.3402	7.8700e-003	0.2492	6.0000e-003	0.2552	0.0718	5.7400e-003	0.0776	0.0000	752.4943	752.4943	0.0189	0.0000	752.9660
Worker	0.0151	0.0123	0.1234	3.7000e-004	0.0408	2.5000e-004	0.0411	0.0108	2.3000e-004	0.0111	0.0000	33.5146	33.5146	9.0000e-004	0.0000	33.5372
Total	**0.0673**	**1.5712**	**0.4636**	**8.2400e-003**	**0.2901**	**6.2500e-003**	**0.2963**	**0.0827**	**5.9700e-003**	**0.0886**	**0.0000**	**786.0088**	**786.0088**	**0.0198**	**0.0000**	**786.5032**

3.2 Grading - 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	tons/yr										MT/yr					
Fugitive Dust					0.0378	0.0000	0.0378	4.0900e-003	0.0000	4.0900e-003	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.1577	1.5122	1.0363	4.1300e-003		0.0520	0.0520		0.0478	0.0478	0.0000	362.6756	362.6756	0.1173	0.0000	365.6080
Total	**0.1577**	**1.5122**	**1.0363**	**4.1300e-003**	**0.0378**	**0.0520**	**0.0898**	**4.0900e-003**	**0.0478**	**0.0519**	**0.0000**	**362.6756**	**362.6756**	**0.1173**	**0.0000**	**365.6080**

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	0.0522	1.5589	0.3402	7.8700e-003	0.2492	6.0000e-003	0.2552	0.0718	5.7400e-003	0.0776	0.0000	752.4943	752.4943	0.0189	0.0000	752.9660
Worker	0.0151	0.0123	0.1234	3.7000e-004	0.0408	2.5000e-004	0.0411	0.0108	2.3000e-004	0.0111	0.0000	33.5146	33.5146	9.0000e-004	0.0000	33.5372
Total	**0.0673**	**1.5712**	**0.4636**	**8.2400e-003**	**0.2901**	**6.2500e-003**	**0.2963**	**0.0827**	**5.9700e-003**	**0.0886**	**0.0000**	**786.0088**	**786.0088**	**0.0198**	**0.0000**	**786.5032**

3.2 Grading - 2022

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					0.0970	0.0000	0.0970	0.0105	0.0000	0.0105	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	3.8000e-004	3.1400e-003	2.7000e-003	1.0000e-005		1.1000e-004	1.1000e-004		1.0000e-004	1.0000e-004	0.0000	0.9945	0.9945	3.2000e-004	0.0000	1.0026
Total	**3.8000e-004**	**3.1400e-003**	**2.7000e-003**	**1.0000e-005**	**0.0970**	**1.1000e-004**	**0.0972**	**0.0105**	**1.0000e-004**	**0.0106**	**0.0000**	**0.9945**	**0.9945**	**3.2000e-004**	**0.0000**	**1.0026**

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	1.3000e-004	3.8700e-003	8.7000e-004	2.0000e-005	6.8000e-004	1.0000e-005	7.0000e-004	2.0000e-004	1.0000e-005	2.1000e-004	0.0000	2.0441	2.0441	5.0000e-005	0.0000	2.0453
Worker	4.0000e-005	3.0000e-005	3.1000e-004	0.0000	1.1000e-004	0.0000	1.1000e-004	3.0000e-005	0.0000	3.0000e-005	0.0000	0.0885	0.0885	0.0000	0.0000	0.0886
Total	**1.7000e-004**	**3.9000e-003**	**1.1800e-003**	**2.0000e-005**	**7.9000e-004**	**1.0000e-005**	**8.1000e-004**	**2.3000e-004**	**1.0000e-005**	**2.4000e-004**	**0.0000**	**2.1326**	**2.1326**	**5.0000e-005**	**0.0000**	**2.1339**

3.2 Grading - 2022

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					0.0378	0.0000	0.0378	4.0900e-003	0.0000	4.0900e-003	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	3.8000e-004	3.1400e-003	2.7000e-003	1.0000e-005		1.1000e-004	1.1000e-004		1.0000e-004	1.0000e-004	0.0000	0.9945	0.9945	3.2000e-004	0.0000	1.0026
Total	**3.8000e-004**	**3.1400e-003**	**2.7000e-003**	**1.0000e-005**	**0.0378**	**1.1000e-004**	**0.0380**	**4.0900e-003**	**1.0000e-004**	**4.1900e-003**	**0.0000**	**0.9945**	**0.9945**	**3.2000e-004**	**0.0000**	**1.0026**

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	1.3000e-004	3.8700e-003	8.7000e-004	2.0000e-005	6.8000e-004	1.0000e-005	7.0000e-004	2.0000e-004	1.0000e-005	2.1000e-004	0.0000	2.0441	2.0441	5.0000e-005	0.0000	2.0453
Worker	4.0000e-005	3.0000e-005	3.1000e-004	0.0000	1.1000e-004	0.0000	1.1000e-004	3.0000e-005	0.0000	3.0000e-005	0.0000	0.0885	0.0885	0.0000	0.0000	0.0886
Total	**1.7000e-004**	**3.9000e-003**	**1.1800e-003**	**2.0000e-005**	**7.9000e-004**	**1.0000e-005**	**8.1000e-004**	**2.3000e-004**	**1.0000e-005**	**2.4000e-004**	**0.0000**	**2.1326**	**2.1326**	**5.0000e-005**	**0.0000**	**2.1339**

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 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 Asphalt Surfaces	16.60	8.40	6.90	0.00	0.00	0.00	0	0	0
Other Non-Asphalt Surfaces	16.60	8.40	6.90	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 Asphalt Surfaces	0.553113	0.036408	0.180286	0.116335	0.016165	0.005101	0.018218	0.063797	0.001357	0.001565	0.005903	0.000808	0.000944
Other Non-Asphalt Surfaces	0.553113	0.036408	0.180286	0.116335	0.016165	0.005101	0.018218	0.063797	0.001357	0.001565	0.005903	0.000808	0.000944

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 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
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 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
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 Asphalt Surfaces	0	0.0000	0.0000	0.0000	0.0000
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 Asphalt Surfaces	0	0.0000	0.0000	0.0000	0.0000
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	0.0381	6.0000e-005	6.1000e-003	0.0000		2.0000e-005	2.0000e-005		2.0000e-005	2.0000e-005	0.0000	0.0119	0.0119	3.0000e-005	0.0000	0.0126
Unmitigated	0.0381	6.0000e-005	6.1000e-003	0.0000		2.0000e-005	2.0000e-005		2.0000e-005	2.0000e-005	0.0000	0.0119	0.0119	3.0000e-005	0.0000	0.0126

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	6.6400e-003					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	0.0309					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Landscaping	5.7000e-004	6.0000e-005	6.1000e-003	0.0000		2.0000e-005	2.0000e-005		2.0000e-005	2.0000e-005	0.0000	0.0119	0.0119	3.0000e-005	0.0000	0.0126
Total	**0.0381**	**6.0000e-005**	**6.1000e-003**	**0.0000**		**2.0000e-005**	**2.0000e-005**		**2.0000e-005**	**2.0000e-005**	**0.0000**	**0.0119**	**0.0119**	**3.0000e-005**	**0.0000**	**0.0126**

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	6.6400e-003					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	0.0309					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Landscaping	5.7000e-004	6.0000e-005	6.1000e-003	0.0000		2.0000e-005	2.0000e-005		2.0000e-005	2.0000e-005	0.0000	0.0119	0.0119	3.0000e-005	0.0000	0.0126
Total	**0.0381**	**6.0000e-005**	**6.1000e-003**	**0.0000**		**2.0000e-005**	**2.0000e-005**		**2.0000e-005**	**2.0000e-005**	**0.0000**	**0.0119**	**0.0119**	**3.0000e-005**	**0.0000**	**0.0126**

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 Asphalt Surfaces	0 / 0	0.0000	0.0000	0.0000	0.0000
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 Asphalt Surfaces	0 / 0	0.0000	0.0000	0.0000	0.0000
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 Asphalt Surfaces	0	0.0000	0.0000	0.0000	0.0000
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 Asphalt Surfaces	0	0.0000	0.0000	0.0000	0.0000
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

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APPENDIX 4.2:

CALEEMOD PROJECT CATEGORY 2 ANNUAL CONSTRUCTION EMISSIONS MODEL OUTPUTS

OBMPU - Project Category 2 (Construction - Mitigated)

San Bernardino-South Coast County, Annual

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Other Non-Asphalt Surfaces	1,400.00	1000sqft	32.14	1,400,000.00	0

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	2.2	**Precipitation Freq (Days)**	32
Climate Zone	10			**Operational Year**	2022
Utility Company	Southern California Edison				
CO2 Intensity (lb/MWhr)	702.44	**CH4 Intensity (lb/MWhr)**	0.029	**N2O Intensity (lb/MWhr)**	0.006

1.3 User Entered Comments & Non-Default Data

Project Characteristics -

Land Use - Other Non-Asphalt Surfaces = Conveyance

Construction Phase - Analysis assumes 100,000 LF of Conveyance Pipelines (Recycled and Potable Water) and 100,000 LF of Conveyance Pipelines (Surplus and Supplemental Water Supply) constructed per year

Off-road Equipment - Equipment based on information provided in the Project Description

Trips and VMT - Based on information provided in the Project Description

Grading - Based on the Project Description, the average area of disturbance of each site is anticipated to be half an acre or less.

Construction Off-road Equipment Mitigation - All equipment operating at >150 hp are required to be equipped with Tier 4 or better engines. Increase watering to 4 times per day.

Table Name	Column Name	Default Value	New Value
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	2.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	22.00
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstructionPhase	NumDays	45.00	366.00
tblConstructionPhase	NumDaysWeek	5.00	7.00
tblConstructionPhase	PhaseEndDate	3/4/2021	1/1/2022
tblGrading	AcresOfGrading	0.00	183.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	0.00
tblTripsAndVMT	VendorTripLength	6.90	40.00
tblTripsAndVMT	VendorTripNumber	0.00	20.00
tblTripsAndVMT	WorkerTripLength	14.70	40.00
tblTripsAndVMT	WorkerTripNumber	75.00	28.00

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	2.8272	25.1858	18.8805	0.0644	0.3824	0.9469	1.3293	0.0893	0.8713	0.9605	0.0000	5,688.4592	5,688.4592	1.6823	0.0000	5,730.5165
2022	6.7700e-003	0.0537	0.0488	1.8000e-004	0.0978	1.9900e-003	0.0998	0.0107	1.8300e-003	0.0125	0.0000	15.5680	15.5680	4.6100e-003	0.0000	15.6832
Maximum	**2.8272**	**25.1858**	**18.8805**	**0.0644**	**0.3824**	**0.9469**	**1.3293**	**0.0893**	**0.8713**	**0.9605**	**0.0000**	**5,688.4592**	**5,688.4592**	**1.6823**	**0.0000**	**5,730.5165**

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	0.9831	6.1804	28.4430	0.0644	0.3106	0.2233	0.5338	0.0815	0.2127	0.2942	0.0000	5,688.4530	5,688.4530	1.6823	0.0000	5,730.5103
2022	2.5900e-003	0.0158	0.0777	1.8000e-004	0.0260	5.4000e-004	0.0266	2.9400e-003	5.2000e-004	3.4600e-003	0.0000	15.5680	15.5680	4.6100e-003	0.0000	15.6832
Maximum	**0.9831**	**6.1804**	**28.4430**	**0.0644**	**0.3106**	**0.2233**	**0.5338**	**0.0815**	**0.2127**	**0.2942**	**0.0000**	**5,688.4530**	**5,688.4530**	**1.6823**	**0.0000**	**5,730.5103**

	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	**65.22**	**75.45**	**-50.67**	**0.00**	**29.91**	**76.41**	**60.79**	**15.52**	**75.58**	**69.41**	**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)
1	1-1-2021	3-31-2021	6.9048	1.7638
2	4-1-2021	6-30-2021	6.9751	1.7770
3	7-1-2021	9-30-2021	7.0518	1.7966
4	10-1-2021	12-31-2021	7.0582	1.8030
5	1-1-2022	3-31-2022	0.0605	0.0184
		Highest	7.0582	1.8030

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	0.1116	1.6000e-004	0.0179	0.0000		6.0000e-005	6.0000e-005		6.0000e-005	6.0000e-005	0.0000	0.0347	0.0347	9.0000e-005	0.0000	0.0370
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	**0.1116**	**1.6000e-004**	**0.0179**	**0.0000**	**0.0000**	**6.0000e-005**	**6.0000e-005**	**0.0000**	**6.0000e-005**	**6.0000e-005**	**0.0000**	**0.0347**	**0.0347**	**9.0000e-005**	**0.0000**	**0.0370**

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	0.1116	1.6000e-004	0.0179	0.0000		6.0000e-005	6.0000e-005		6.0000e-005	6.0000e-005	0.0000	0.0347	0.0347	9.0000e-005	0.0000	0.0370
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	**0.1116**	**1.6000e-004**	**0.0179**	**0.0000**	**0.0000**	**6.0000e-005**	**6.0000e-005**	**0.0000**	**6.0000e-005**	**6.0000e-005**	**0.0000**	**0.0347**	**0.0347**	**9.0000e-005**	**0.0000**	**0.0370**

	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	Grading	Grading	1/1/2021	1/1/2022	7	366	

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 183

Acres of Paving: 32.14

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
Grading	Excavators	2	8.00	158	0.38
Grading	Graders	0	8.00	187	0.41
Grading	Off-Highway Trucks	22	8.00	402	0.38
Grading	Pavers	2	8.00	130	0.42
Grading	Rollers	2	8.00	80	0.38
Grading	Rubber Tired Dozers	0	8.00	247	0.40
Grading	Scrapers	0	8.00	367	0.48
Grading	Tractors/Loaders/Backhoes	2	8.00	97	0.37

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
Grading	30	28.00	20.00	0.00	40.00	40.00	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

Use Cleaner Engines for Construction Equipment

Water Exposed Area

3.2 Grading - 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					0.0970	0.0000	0.0970	0.0105	0.0000	0.0105	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	2.7437	24.2599	18.2373	0.0587		0.9428	0.9428		0.8673	0.8673	0.0000	5,156.8990	5,156.8990	1.6679	0.0000	5,198.5951
Total	**2.7437**	**24.2599**	**18.2373**	**0.0587**	**0.0970**	**0.9428**	**1.0398**	**0.0105**	**0.8673**	**0.8778**	**0.0000**	**5,156.8990**	**5,156.8990**	**1.6679**	**0.0000**	**5,198.5951**

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	0.0290	0.8805	0.1909	4.2500e-003	0.1329	3.2100e-003	0.1362	0.0383	3.0700e-003	0.0414	0.0000	406.7751	406.7751	0.0111	0.0000	407.0529
Worker	0.0545	0.0454	0.4523	1.3800e-003	0.1524	9.4000e-004	0.1533	0.0405	8.6000e-004	0.0413	0.0000	124.7851	124.7851	3.3400e-003	0.0000	124.8685
Total	**0.0835**	**0.9259**	**0.6432**	**5.6300e-003**	**0.2853**	**4.1500e-003**	**0.2895**	**0.0788**	**3.9300e-003**	**0.0827**	**0.0000**	**531.5602**	**531.5602**	**0.0145**	**0.0000**	**531.9213**

3.2 Grading - 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	tons/yr										MT/yr					
Fugitive Dust					0.0252	0.0000	0.0252	2.7200e-003	0.0000	2.7200e-003	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.8996	5.2545	27.7997	0.0587		0.2191	0.2191		0.2088	0.2088	0.0000	5,156.8929	5,156.8929	1.6678	0.0000	5,198.5889
Total	**0.8996**	**5.2545**	**27.7997**	**0.0587**	**0.0252**	**0.2191**	**0.2444**	**2.7200e-003**	**0.2088**	**0.2115**	**0.0000**	**5,156.8929**	**5,156.8929**	**1.6678**	**0.0000**	**5,198.5889**

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	0.0290	0.8805	0.1909	4.2500e-003	0.1329	3.2100e-003	0.1362	0.0383	3.0700e-003	0.0414	0.0000	406.7751	406.7751	0.0111	0.0000	407.0529
Worker	0.0545	0.0454	0.4523	1.3800e-003	0.1524	9.4000e-004	0.1533	0.0405	8.6000e-004	0.0413	0.0000	124.7851	124.7851	3.3400e-003	0.0000	124.8685
Total	**0.0835**	**0.9259**	**0.6432**	**5.6300e-003**	**0.2853**	**4.1500e-003**	**0.2895**	**0.0788**	**3.9300e-003**	**0.0827**	**0.0000**	**531.5602**	**531.5602**	**0.0145**	**0.0000**	**531.9213**

3.2 Grading - 2022

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					0.0970	0.0000	0.0970	0.0105	0.0000	0.0105	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	6.5500e-003	0.0514	0.0472	1.6000e-004		1.9800e-003	1.9800e-003		1.8200e-003	1.8200e-003	0.0000	14.1334	14.1334	4.5700e-003	0.0000	14.2477
Total	**6.5500e-003**	**0.0514**	**0.0472**	**1.6000e-004**	**0.0970**	**1.9800e-003**	**0.0990**	**0.0105**	**1.8200e-003**	**0.0123**	**0.0000**	**14.1334**	**14.1334**	**4.5700e-003**	**0.0000**	**14.2477**

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	7.0000e-005	2.1900e-003	4.9000e-004	1.0000e-005	3.6000e-004	1.0000e-005	3.7000e-004	1.0000e-004	1.0000e-005	1.1000e-004	0.0000	1.1050	1.1050	3.0000e-005	0.0000	1.1057
Worker	1.4000e-004	1.1000e-004	1.1400e-003	0.0000	4.2000e-004	0.0000	4.2000e-004	1.1000e-004	0.0000	1.1000e-004	0.0000	0.3295	0.3295	1.0000e-005	0.0000	0.3298
Total	**2.1000e-004**	**2.3000e-003**	**1.6300e-003**	**1.0000e-005**	**7.8000e-004**	**1.0000e-005**	**7.9000e-004**	**2.1000e-004**	**1.0000e-005**	**2.2000e-004**	**0.0000**	**1.4345**	**1.4345**	**4.0000e-005**	**0.0000**	**1.4355**

3.2 Grading - 2022

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					0.0252	0.0000	0.0252	2.7200e-003	0.0000	2.7200e-003	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	2.3800e-003	0.0135	0.0761	1.6000e-004		5.3000e-004	5.3000e-004		5.1000e-004	5.1000e-004	0.0000	14.1334	14.1334	4.5700e-003	0.0000	14.2477
Total	**2.3800e-003**	**0.0135**	**0.0761**	**1.6000e-004**	**0.0252**	**5.3000e-004**	**0.0258**	**2.7200e-003**	**5.1000e-004**	**3.2300e-003**	**0.0000**	**14.1334**	**14.1334**	**4.5700e-003**	**0.0000**	**14.2477**

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	7.0000e-005	2.1900e-003	4.9000e-004	1.0000e-005	3.6000e-004	1.0000e-005	3.7000e-004	1.0000e-004	1.0000e-005	1.1000e-004	0.0000	1.1050	1.1050	3.0000e-005	0.0000	1.1057
Worker	1.4000e-004	1.1000e-004	1.1400e-003	0.0000	4.2000e-004	0.0000	4.2000e-004	1.1000e-004	0.0000	1.1000e-004	0.0000	0.3295	0.3295	1.0000e-005	0.0000	0.3298
Total	**2.1000e-004**	**2.3000e-003**	**1.6300e-003**	**1.0000e-005**	**7.8000e-004**	**1.0000e-005**	**7.9000e-004**	**2.1000e-004**	**1.0000e-005**	**2.2000e-004**	**0.0000**	**1.4345**	**1.4345**	**4.0000e-005**	**0.0000**	**1.4355**

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		
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	16.60	8.40	6.90	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	0.553113	0.036408	0.180286	0.116335	0.016165	0.005101	0.018218	0.063797	0.001357	0.001565	0.005903	0.000808	0.000944

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	0.1116	1.6000e-004	0.0179	0.0000		6.0000e-005	6.0000e-005		6.0000e-005	6.0000e-005	0.0000	0.0347	0.0347	9.0000e-005	0.0000	0.0370
Unmitigated	0.1116	1.6000e-004	0.0179	0.0000		6.0000e-005	6.0000e-005		6.0000e-005	6.0000e-005	0.0000	0.0347	0.0347	9.0000e-005	0.0000	0.0370

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	0.0195					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	0.0905					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Landscaping	1.6600e-003	1.6000e-004	0.0179	0.0000		6.0000e-005	6.0000e-005		6.0000e-005	6.0000e-005	0.0000	0.0347	0.0347	9.0000e-005	0.0000	0.0370
Total	**0.1116**	**1.6000e-004**	**0.0179**	**0.0000**		**6.0000e-005**	**6.0000e-005**		**6.0000e-005**	**6.0000e-005**	**0.0000**	**0.0347**	**0.0347**	**9.0000e-005**	**0.0000**	**0.0370**

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	0.0195					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	0.0905					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Landscaping	1.6600e-003	1.6000e-004	0.0179	0.0000		6.0000e-005	6.0000e-005		6.0000e-005	6.0000e-005	0.0000	0.0347	0.0347	9.0000e-005	0.0000	0.0370
Total	**0.1116**	**1.6000e-004**	**0.0179**	**0.0000**		**6.0000e-005**	**6.0000e-005**		**6.0000e-005**	**6.0000e-005**	**0.0000**	**0.0347**	**0.0347**	**9.0000e-005**	**0.0000**	**0.0370**

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

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APPENDIX 4.3:

CALEEMOD PROJECT CATEGORY 3 ANNUAL CONSTRUCTION EMISSIONS MODEL OUTPUTS

OBMPU - Project Category 3 (Construction - Mitigated)

San Bernardino-South Coast County, Annual

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Other Asphalt Surfaces	100.00	Acre	100.00	4,356,000.00	0
Other Non-Asphalt Surfaces	420.00	1000sqft	9.64	420,000.00	0

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	2.2	**Precipitation Freq (Days)**	32
Climate Zone	10			**Operational Year**	2022
Utility Company	Southern California Edison				
CO2 Intensity (lb/MWhr)	702.44	**CH4 Intensity (lb/MWhr)**	0.029	**N2O Intensity (lb/MWhr)**	0.006

1.3 User Entered Comments & Non-Default Data

Project Characteristics -

Land Use - Other Non-Asphalt Surfaces = Conveyance; Other Asphalt Surfaces = Storage Basin

Construction Phase - As a conservative measure, analysis assumes the construction of one New Storage Basin (Chino Institute for Men + the associated pipeline)

Off-road Equipment - Equipment based on information provided in the Project Description

Trips and VMT - Based on information provided in the Project Description

Grading - Based on the Project Description, the average area of disturbance of each site is anticipated to be 2 acres on any given day.

Construction Off-road Equipment Mitigation - All equipment operating at >150 hp are required to be equipped with Tier 4 or better engines. Increase watering to 4 times per day.

Table Name	Column Name	Default Value	New Value
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	2.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	6.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	2.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	7.00
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstructionPhase	NumDays	310.00	550.00
tblConstructionPhase	NumDaysWeek	5.00	7.00
tblGrading	AcresOfGrading	3,850.00	1,100.00
tblGrading	MaterialExported	0.00	333,333.33
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	2.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	7.00
tblTripsAndVMT	HaulingTripLength	20.00	30.00
tblTripsAndVMT	HaulingTripNumber	41,667.00	370.00
tblTripsAndVMT	VendorTripLength	6.90	40.00
tblTripsAndVMT	VendorTripNumber	0.00	6.00
tblTripsAndVMT	WorkerTripLength	14.70	40.00
tblTripsAndVMT	WorkerTripNumber	48.00	6.00

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	2.4061	25.2290	16.5486	0.0417	2.8771	1.0179	3.8950	1.2954	0.9365	2.2319	0.0000	3,671.9919	3,671.9919	1.1400	0.0000	3,700.4920
2022	1.0567	10.4270	7.7467	0.0211	1.7570	0.4174	2.1744	0.6895	0.3840	1.0735	0.0000	1,861.6641	1,861.6641	0.5782	0.0000	1,876.1201
Maximum	**2.4061**	**25.2290**	**16.5486**	**0.0417**	**2.8771**	**1.0179**	**3.8950**	**1.2954**	**0.9365**	**2.2319**	**0.0000**	**3,671.9919**	**3,671.9919**	**1.1400**	**0.0000**	**3,700.4920**

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	0.5662	3.0672	19.0371	0.0417	0.8050	0.1056	0.9106	0.3526	0.1023	0.4549	0.0000	3,671.9878	3,671.9878	1.1400	0.0000	3,700.4878
2022	0.2821	1.4995	9.6389	0.0211	0.4870	0.0494	0.5364	0.1876	0.0481	0.2357	0.0000	1,861.6620	1,861.6620	0.5782	0.0000	1,876.1179
Maximum	**0.5662**	**3.0672**	**19.0371**	**0.0417**	**0.8050**	**0.1056**	**0.9106**	**0.3526**	**0.1023**	**0.4549**	**0.0000**	**3,671.9878**	**3,671.9878**	**1.1400**	**0.0000**	**3,700.4878**

	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	**75.50**	**87.19**	**-18.03**	**0.00**	**72.12**	**89.20**	**76.16**	**72.79**	**88.61**	**79.11**	**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)
1	1-1-2021	3-31-2021	6.8131	0.8949
2	4-1-2021	6-30-2021	6.8869	0.9029
3	7-1-2021	9-30-2021	6.9626	0.9128
4	10-1-2021	12-31-2021	6.9645	0.9148
5	1-1-2022	3-31-2022	5.5857	0.8658
6	4-1-2022	6-30-2022	5.6462	0.8738
7	7-1-2022	9-30-2022	0.2482	0.0384
		Highest	6.9645	0.9148

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	0.3758	6.0000e-005	6.6500e-003	0.0000		2.0000e-005	2.0000e-005		2.0000e-005	2.0000e-005	0.0000	0.0129	0.0129	3.0000e-005	0.0000	0.0138
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	**0.3758**	**6.0000e-005**	**6.6500e-003**	**0.0000**	**0.0000**	**2.0000e-005**	**2.0000e-005**	**0.0000**	**2.0000e-005**	**2.0000e-005**	**0.0000**	**0.0129**	**0.0129**	**3.0000e-005**	**0.0000**	**0.0138**

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	0.3758	6.0000e-005	6.6500e-003	0.0000		2.0000e-005	2.0000e-005		2.0000e-005	2.0000e-005	0.0000	0.0129	0.0129	3.0000e-005	0.0000	0.0138
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	**0.3758**	**6.0000e-005**	**6.6500e-003**	**0.0000**	**0.0000**	**2.0000e-005**	**2.0000e-005**	**0.0000**	**2.0000e-005**	**2.0000e-005**	**0.0000**	**0.0129**	**0.0129**	**3.0000e-005**	**0.0000**	**0.0138**

	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	Grading	Grading	1/1/2021	7/4/2022	7	550	

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 1100

Acres of Paving: 109.64

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
Grading	Excavators	2	8.00	158	0.38
Grading	Graders	0	8.00	187	0.41
Grading	Off-Highway Trucks	6	8.00	402	0.38
Grading	Rubber Tired Dozers	2	8.00	247	0.40
Grading	Scrapers	7	8.00	367	0.48
Grading	Tractors/Loaders/Backhoes	2	8.00	97	0.37

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
Grading	19	6.00	6.00	370.00	40.00	40.00	30.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

Use Cleaner Engines for Construction Equipment

Water Exposed Area

3.2 Grading - 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					2.8002	0.0000	2.8002	1.2741	0.0000	1.2741	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	2.3848	24.9187	16.3883	0.0400		1.0166	1.0166		0.9353	0.9353	0.0000	3,510.4618	3,510.4618	1.1354	0.0000	3,538.8457
Total	**2.3848**	**24.9187**	**16.3883**	**0.0400**	**2.8002**	**1.0166**	**3.8168**	**1.2741**	**0.9353**	**2.2093**	**0.0000**	**3,510.4618**	**3,510.4618**	**1.1354**	**0.0000**	**3,538.8457**

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	9.8000e-004	0.0364	6.1800e-003	1.3000e-004	4.3800e-003	1.2000e-004	4.4900e-003	1.1700e-003	1.1000e-004	1.2800e-003	0.0000	12.7579	12.7579	6.0000e-004	0.0000	12.7729
Vendor	8.6900e-003	0.2642	0.0573	1.2800e-003	0.0399	9.6000e-004	0.0409	0.0115	9.2000e-004	0.0124	0.0000	122.0325	122.0325	3.3300e-003	0.0000	122.1159
Worker	0.0117	9.7300e-003	0.0969	3.0000e-004	0.0327	2.0000e-004	0.0329	8.6700e-003	1.8000e-004	8.8500e-003	0.0000	26.7397	26.7397	7.1000e-004	0.0000	26.7575
Total	**0.0214**	**0.3103**	**0.1604**	**1.7100e-003**	**0.0769**	**1.2800e-003**	**0.0782**	**0.0213**	**1.2100e-003**	**0.0226**	**0.0000**	**161.5301**	**161.5301**	**4.6400e-003**	**0.0000**	**161.6463**

3.2 Grading - 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	tons/yr										MT/yr					
Fugitive Dust					0.7281	0.0000	0.7281	0.3313	0.0000	0.3313	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.5449	2.7568	18.8767	0.0400		0.1043	0.1043		0.1011	0.1011	0.0000	3,510.457 7	3,510.457 7	1.1354	0.0000	3,538.841 5
Total	**0.5449**	**2.7568**	**18.8767**	**0.0400**	**0.7281**	**0.1043**	**0.8324**	**0.3313**	**0.1011**	**0.4323**	**0.0000**	**3,510.457 7**	**3,510.457 7**	**1.1354**	**0.0000**	**3,538.841 5**

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	9.8000e-004	0.0364	6.1800e-003	1.3000e-004	4.3800e-003	1.2000e-004	4.4900e-003	1.1700e-003	1.1000e-004	1.2800e-003	0.0000	12.7579	12.7579	6.0000e-004	0.0000	12.7729
Vendor	8.6900e-003	0.2642	0.0573	1.2800e-003	0.0399	9.6000e-004	0.0409	0.0115	9.2000e-004	0.0124	0.0000	122.0325	122.0325	3.3300e-003	0.0000	122.1159
Worker	0.0117	9.7300e-003	0.0969	3.0000e-004	0.0327	2.0000e-004	0.0329	8.6700e-003	1.8000e-004	8.8500e-003	0.0000	26.7397	26.7397	7.1000e-004	0.0000	26.7575
Total	**0.0214**	**0.3103**	**0.1604**	**1.7100e-003**	**0.0769**	**1.2800e-003**	**0.0782**	**0.0213**	**1.2100e-003**	**0.0226**	**0.0000**	**161.5301**	**161.5301**	**4.6400e-003**	**0.0000**	**161.6463**

3.2 Grading - 2022

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					1.7162	0.0000	1.7162	0.6782	0.0000	0.6782	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	1.0465	10.2841	7.6713	0.0203		0.4168	0.4168		0.3835	0.3835	0.0000	1,780.8814	1,780.8814	0.5760	0.0000	1,795.2807
Total	**1.0465**	**10.2841**	**7.6713**	**0.0203**	**1.7162**	**0.4168**	**2.1331**	**0.6782**	**0.3835**	**1.0617**	**0.0000**	**1,780.8814**	**1,780.8814**	**0.5760**	**0.0000**	**1,795.2807**

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	4.7000e-004	0.0167	3.0400e-003	7.0000e-005	3.9900e-003	5.0000e-005	4.0400e-003	1.0300e-003	5.0000e-005	1.0700e-003	0.0000	6.3920	6.3920	3.0000e-004	0.0000	6.3995
Vendor	4.1300e-003	0.1217	0.0272	6.4000e-004	0.0202	4.2000e-004	0.0206	5.8300e-003	4.0000e-004	6.2200e-003	0.0000	61.3266	61.3266	1.6400e-003	0.0000	61.3677
Worker	5.5500e-003	4.4400e-003	0.0451	1.4000e-004	0.0166	1.0000e-004	0.0167	4.3900e-003	9.0000e-005	4.4900e-003	0.0000	13.0641	13.0641	3.3000e-004	0.0000	13.0722
Total	**0.0102**	**0.1429**	**0.0754**	**8.5000e-004**	**0.0408**	**5.7000e-004**	**0.0413**	**0.0113**	**5.4000e-004**	**0.0118**	**0.0000**	**80.7827**	**80.7827**	**2.2700e-003**	**0.0000**	**80.8393**

3.2 Grading - 2022

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					0.4462	0.0000	0.4462	0.1763	0.0000	0.1763	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.2720	1.3566	9.5635	0.0203		0.0489	0.0489		0.0475	0.0475	0.0000	1,780.879 3	1,780.879 3	0.5760	0.0000	1,795.278 6
Total	**0.2720**	**1.3566**	**9.5635**	**0.0203**	**0.4462**	**0.0489**	**0.4951**	**0.1763**	**0.0475**	**0.2239**	**0.0000**	**1,780.879 3**	**1,780.879 3**	**0.5760**	**0.0000**	**1,795.278 6**

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	4.7000e-004	0.0167	3.0400e-003	7.0000e-005	3.9900e-003	5.0000e-005	4.0400e-003	1.0300e-003	5.0000e-005	1.0700e-003	0.0000	6.3920	6.3920	3.0000e-004	0.0000	6.3995
Vendor	4.1300e-003	0.1217	0.0272	6.4000e-004	0.0202	4.2000e-004	0.0206	5.8300e-003	4.0000e-004	6.2200e-003	0.0000	61.3266	61.3266	1.6400e-003	0.0000	61.3677
Worker	5.5500e-003	4.4400e-003	0.0451	1.4000e-004	0.0166	1.0000e-004	0.0167	4.3900e-003	9.0000e-005	4.4900e-003	0.0000	13.0641	13.0641	3.3000e-004	0.0000	13.0722
Total	**0.0102**	**0.1429**	**0.0754**	**8.5000e-004**	**0.0408**	**5.7000e-004**	**0.0413**	**0.0113**	**5.4000e-004**	**0.0118**	**0.0000**	**80.7827**	**80.7827**	**2.2700e-003**	**0.0000**	**80.8393**

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 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 Asphalt Surfaces	16.60	8.40	6.90	0.00	0.00	0.00	0	0	0
Other Non-Asphalt Surfaces	16.60	8.40	6.90	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 Asphalt Surfaces	0.553113	0.036408	0.180286	0.116335	0.016165	0.005101	0.018218	0.063797	0.001357	0.001565	0.005903	0.000808	0.000944
Other Non-Asphalt Surfaces	0.553113	0.036408	0.180286	0.116335	0.016165	0.005101	0.018218	0.063797	0.001357	0.001565	0.005903	0.000808	0.000944

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 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
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 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
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 Asphalt Surfaces	0	0.0000	0.0000	0.0000	0.0000
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 Asphalt Surfaces	0	0.0000	0.0000	0.0000	0.0000
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	0.3758	6.0000e-005	6.6500e-003	0.0000		2.0000e-005	2.0000e-005		2.0000e-005	2.0000e-005	0.0000	0.0129	0.0129	3.0000e-005	0.0000	0.0138
Unmitigated	0.3758	6.0000e-005	6.6500e-003	0.0000		2.0000e-005	2.0000e-005		2.0000e-005	2.0000e-005	0.0000	0.0129	0.0129	3.0000e-005	0.0000	0.0138

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	0.0664					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	0.3087					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Landscaping	6.2000e-004	6.0000e-005	6.6500e-003	0.0000		2.0000e-005	2.0000e-005		2.0000e-005	2.0000e-005	0.0000	0.0129	0.0129	3.0000e-005	0.0000	0.0138
Total	**0.3758**	**6.0000e-005**	**6.6500e-003**	**0.0000**		**2.0000e-005**	**2.0000e-005**		**2.0000e-005**	**2.0000e-005**	**0.0000**	**0.0129**	**0.0129**	**3.0000e-005**	**0.0000**	**0.0138**

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	0.0664					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	0.3087					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Landscaping	6.2000e-004	6.0000e-005	6.6500e-003	0.0000		2.0000e-005	2.0000e-005		2.0000e-005	2.0000e-005	0.0000	0.0129	0.0129	3.0000e-005	0.0000	0.0138
Total	**0.3758**	**6.0000e-005**	**6.6500e-003**	**0.0000**		**2.0000e-005**	**2.0000e-005**		**2.0000e-005**	**2.0000e-005**	**0.0000**	**0.0129**	**0.0129**	**3.0000e-005**	**0.0000**	**0.0138**

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 Asphalt Surfaces	0 / 0	0.0000	0.0000	0.0000	0.0000
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 Asphalt Surfaces	0 / 0	0.0000	0.0000	0.0000	0.0000
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 Asphalt Surfaces	0	0.0000	0.0000	0.0000	0.0000
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 Asphalt Surfaces	0	0.0000	0.0000	0.0000	0.0000
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

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APPENDIX 4.4:

CALEEMOD PROJECT CATEGORY 4 ANNUAL CONSTRUCTION EMISSIONS MODEL OUTPUTS

OBMPU - Project Category 4 (Construction - Mitigated)

San Bernardino-South Coast County, Annual

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
General Light Industry	871.20	1000sqft	20.00	871,200.00	0
Other Non-Asphalt Surfaces	420.00	1000sqft	9.64	420,000.00	0

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	2.2	**Precipitation Freq (Days)**	32
Climate Zone	10			**Operational Year**	2022
Utility Company	Southern California Edison				
CO2 Intensity (lb/MWhr)	702.44	**CH4 Intensity (lb/MWhr)**	0.029	**N2O Intensity (lb/MWhr)**	0.006

1.3 User Entered Comments & Non-Default Data

Project Characteristics -

Land Use - General Light Industry = Water Treatment and Regional Water Treatment Facility; Other Non-Asphalt Surfaces = Conveyance

Construction Phase - Analysis assumes construction of a single Water Treatment and Regional Water Treatment Facility and Pipelines that would be constructed within an 18-month period

Off-road Equipment - Based on information provided in the Project Description

Trips and VMT - Based on information provided in the Project Description

Grading - Based on the Project Description, the average area of disturbance of each site is anticipated to be 2 acres on any given day.

Vehicle Trips - Construction Run Only.

Energy Use - Construction Run Only.

Water And Wastewater - Construction Run Only.

Solid Waste - Construction Run Only.

Construction Off-road Equipment Mitigation - All equipment operating at >150 hp are required to be equipped with Tier 3 or better engines. Increase watering to 4 times per day.

Table Name	Column Name	Default Value	New Value
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	3.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	15.00
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstructionPhase	NumDays	45.00	547.00
tblConstructionPhase	NumDaysWeek	5.00	7.00
tblConstructionPhase	PhaseEndDate	3/4/2021	7/1/2022
tblEnergyUse	LightingElect	2.93	0.00
tblEnergyUse	NT24E	5.02	0.00
tblEnergyUse	NT24NG	17.13	0.00
tblEnergyUse	T24E	2.20	0.00

tblEnergyUse	T24NG	15.36	0.00
tblGrading	AcresOfGrading	273.50	1,092.00
tblOffRoadEquipment	OffRoadEquipmentType		Off-Highway Trucks
tblOffRoadEquipment	OffRoadEquipmentType		Cranes
tblOffRoadEquipment	OffRoadEquipmentType		Plate Compactors
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	6.00
tblSolidWaste	SolidWasteGenerationRate	1,080.29	0.00
tblTripsAndVMT	VendorTripLength	6.90	40.00
tblTripsAndVMT	VendorTripNumber	0.00	15.00
tblTripsAndVMT	WorkerTripLength	14.70	40.00
tblTripsAndVMT	WorkerTripNumber	70.00	30.00
tblVehicleTrips	CC_TTP	28.00	0.00
tblVehicleTrips	CNW_TTP	13.00	0.00
tblVehicleTrips	CW_TTP	59.00	0.00
tblVehicleTrips	DV_TP	5.00	0.00
tblVehicleTrips	PB_TP	3.00	0.00
tblVehicleTrips	PR_TP	92.00	0.00
tblVehicleTrips	ST_TR	1.32	0.00
tblVehicleTrips	SU_TR	0.68	0.00
tblVehicleTrips	WD_TR	6.97	0.00
tblWater	IndoorWaterUseRate	201,465,000.00	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	2.2745	21.0672	14.4930	0.0489	0.8420	0.8017	1.6437	0.1346	0.7381	0.8727	0.0000	4,313.6710	4,313.6710	1.2614	0.0000	4,345.2051
2022	0.9992	8.4042	6.8262	0.0243	0.7102	0.3153	1.0254	0.0985	0.2903	0.3888	0.0000	2,147.9585	2,147.9585	0.6289	0.0000	2,163.6809
Maximum	**2.2745**	**21.0672**	**14.4930**	**0.0489**	**0.8420**	**0.8017**	**1.6437**	**0.1346**	**0.7381**	**0.8727**	**0.0000**	**4,313.6710**	**4,313.6710**	**1.2614**	**0.0000**	**4,345.2051**

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	0.8033	5.0725	21.4100	0.0489	0.4135	0.1973	0.6108	0.0883	0.1873	0.2757	0.0000	4,313.6664	4,313.6664	1.2614	0.0000	4,345.2005
2022	0.3857	2.3767	10.6393	0.0243	0.2817	0.0864	0.3680	0.0522	0.0824	0.1346	0.0000	2,147.9562	2,147.9562	0.6289	0.0000	2,163.6786
Maximum	**0.8033**	**5.0725**	**21.4100**	**0.0489**	**0.4135**	**0.1973**	**0.6108**	**0.0883**	**0.1873**	**0.2757**	**0.0000**	**4,313.6664**	**4,313.6664**	**1.2614**	**0.0000**	**4,345.2005**

	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	**63.68**	**74.72**	**-50.33**	**0.00**	**55.21**	**74.60**	**63.33**	**39.70**	**73.78**	**67.48**	**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)
1	**1-1-2021**	**3-31-2021**	5.7539	1.4472
2	**4-1-2021**	**6-30-2021**	5.8126	1.4581
3	**7-1-2021**	**9-30-2021**	5.8765	1.4741
4	**10-1-2021**	**12-31-2021**	5.8817	1.4794
5	**1-1-2022**	**3-31-2022**	4.6486	1.3647
6	**4-1-2022**	**6-30-2022**	4.6957	1.3753
7	**7-1-2022**	**9-30-2022**	0.0516	0.0151
		Highest	5.8817	1.4794

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	3.5864	1.5000e-004	0.0165	0.0000		6.0000e-005	6.0000e-005		6.0000e-005	6.0000e-005	0.0000	0.0320	0.0320	8.0000e-005	0.0000	0.0342
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	**3.5864**	**1.5000e-004**	**0.0165**	**0.0000**	**0.0000**	**6.0000e-005**	**6.0000e-005**	**0.0000**	**6.0000e-005**	**6.0000e-005**	**0.0000**	**0.0320**	**0.0320**	**8.0000e-005**	**0.0000**	**0.0342**

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	3.5864	1.5000e-004	0.0165	0.0000		6.0000e-005	6.0000e-005		6.0000e-005	6.0000e-005	0.0000	0.0320	0.0320	8.0000e-005	0.0000	0.0342
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	**3.5864**	**1.5000e-004**	**0.0165**	**0.0000**	**0.0000**	**6.0000e-005**	**6.0000e-005**	**0.0000**	**6.0000e-005**	**6.0000e-005**	**0.0000**	**0.0320**	**0.0320**	**8.0000e-005**	**0.0000**	**0.0342**

	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	Grading	Grading	1/1/2021	7/1/2022	7	547	

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 1092

Acres of Paving: 9.64

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
Grading	Off-Highway Trucks	15	8.00	402	0.38
Grading	Excavators	0	8.00	158	0.38
Grading	Graders	1	8.00	187	0.41
Grading	Cranes	3	8.00	231	0.29
Grading	Plate Compactors	3	8.00	8	0.43
Grading	Rubber Tired Dozers	0	8.00	247	0.40
Grading	Scrapers	0	8.00	367	0.48
Grading	Tractors/Loaders/Backhoes	6	8.00	97	0.37

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
Grading	28	30.00	15.00	0.00	40.00	40.00	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

Use Cleaner Engines for Construction Equipment

Water Exposed Area

3.2 Grading - 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					0.5790	0.0000	0.5790	0.0625	0.0000	0.0625	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	2.1944	20.3582	13.8652	0.0442		0.7983	0.7983		0.7349	0.7349	0.0000	3,874.8914	3,874.8914	1.2495	0.0000	3,906.1278
Total	**2.1944**	**20.3582**	**13.8652**	**0.0442**	**0.5790**	**0.7983**	**1.3773**	**0.0625**	**0.7349**	**0.7974**	**0.0000**	**3,874.8914**	**3,874.8914**	**1.2495**	**0.0000**	**3,906.1278**

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	0.0217	0.6604	0.1432	3.1900e-003	0.0997	2.4100e-003	0.1021	0.0287	2.3000e-003	0.0311	0.0000	305.0813	305.0813	8.3300e-003	0.0000	305.2896
Worker	0.0584	0.0486	0.4846	1.4800e-003	0.1633	1.0000e-003	0.1643	0.0434	9.2000e-004	0.0443	0.0000	133.6983	133.6983	3.5700e-003	0.0000	133.7877
Total	**0.0801**	**0.7090**	**0.6278**	**4.6700e-003**	**0.2630**	**3.4100e-003**	**0.2664**	**0.0721**	**3.2200e-003**	**0.0753**	**0.0000**	**438.7796**	**438.7796**	**0.0119**	**0.0000**	**439.0773**

3.2 Grading - 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	tons/yr										MT/yr					
Fugitive Dust					0.1506	0.0000	0.1506	0.0163	0.0000	0.0163	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.7232	4.3635	20.7822	0.0442		0.1939	0.1939		0.1841	0.1841	0.0000	3,874.886 8	3,874.886 8	1.2495	0.0000	3,906.123 2
Total	**0.7232**	**4.3635**	**20.7822**	**0.0442**	**0.1506**	**0.1939**	**0.3444**	**0.0163**	**0.1841**	**0.2004**	**0.0000**	**3,874.886 8**	**3,874.886 8**	**1.2495**	**0.0000**	**3,906.123 2**

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	0.0217	0.6604	0.1432	3.1900e-003	0.0997	2.4100e-003	0.1021	0.0287	2.3000e-003	0.0311	0.0000	305.0813	305.0813	8.3300e-003	0.0000	305.2896
Worker	0.0584	0.0486	0.4846	1.4800e-003	0.1633	1.0000e-003	0.1643	0.0434	9.2000e-004	0.0443	0.0000	133.6983	133.6983	3.5700e-003	0.0000	133.7877
Total	**0.0801**	**0.7090**	**0.6278**	**4.6700e-003**	**0.2630**	**3.4100e-003**	**0.2664**	**0.0721**	**3.2200e-003**	**0.0753**	**0.0000**	**438.7796**	**438.7796**	**0.0119**	**0.0000**	**439.0773**

3.2 Grading - 2022

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					0.5790	0.0000	0.5790	0.0625	0.0000	0.0625	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.9618	8.0830	6.5373	0.0221		0.3137	0.3137		0.2889	0.2889	0.0000	1,932.8672	1,932.8672	0.6233	0.0000	1,948.4485
Total	**0.9618**	**8.0830**	**6.5373**	**0.0221**	**0.5790**	**0.3137**	**0.8928**	**0.0625**	**0.2889**	**0.3514**	**0.0000**	**1,932.8672**	**1,932.8672**	**0.6233**	**0.0000**	**1,948.4485**

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	0.0102	0.2994	0.0669	1.5800e-003	0.0497	1.0200e-003	0.0507	0.0143	9.8000e-004	0.0153	0.0000	150.8303	150.8303	4.0400e-003	0.0000	150.9313
Worker	0.0273	0.0218	0.2220	7.1000e-004	0.0814	4.9000e-004	0.0819	0.0216	4.5000e-004	0.0221	0.0000	64.2611	64.2611	1.6000e-003	0.0000	64.3011
Total	**0.0375**	**0.3212**	**0.2888**	**2.2900e-003**	**0.1311**	**1.5100e-003**	**0.1326**	**0.0359**	**1.4300e-003**	**0.0374**	**0.0000**	**215.0914**	**215.0914**	**5.6400e-003**	**0.0000**	**215.2324**

3.2 Grading - 2022

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					0.1506	0.0000	0.1506	0.0163	0.0000	0.0163	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.3483	2.0555	10.3505	0.0221		0.0849	0.0849		0.0809	0.0809	0.0000	1,932.864 9	1,932.864 9	0.6233	0.0000	1,948.446 2
Total	**0.3483**	**2.0555**	**10.3505**	**0.0221**	**0.1506**	**0.0849**	**0.2354**	**0.0163**	**0.0809**	**0.0972**	**0.0000**	**1,932.864 9**	**1,932.864 9**	**0.6233**	**0.0000**	**1,948.446 2**

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	0.0102	0.2994	0.0669	1.5800e-003	0.0497	1.0200e-003	0.0507	0.0143	9.8000e-004	0.0153	0.0000	150.8303	150.8303	4.0400e-003	0.0000	150.9313
Worker	0.0273	0.0218	0.2220	7.1000e-004	0.0814	4.9000e-004	0.0819	0.0216	4.5000e-004	0.0221	0.0000	64.2611	64.2611	1.6000e-003	0.0000	64.3011
Total	**0.0375**	**0.3212**	**0.2888**	**2.2900e-003**	**0.1311**	**1.5100e-003**	**0.1326**	**0.0359**	**1.4300e-003**	**0.0374**	**0.0000**	**215.0914**	**215.0914**	**5.6400e-003**	**0.0000**	**215.2324**

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
General Light Industry	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
General Light Industry	16.60	8.40	6.90	0.00	0.00	0.00	0	0	0
Other Non-Asphalt Surfaces	16.60	8.40	6.90	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
General Light Industry	0.553113	0.036408	0.180286	0.116335	0.016165	0.005101	0.018218	0.063797	0.001357	0.001565	0.005903	0.000808	0.000944
Other Non-Asphalt Surfaces	0.553113	0.036408	0.180286	0.116335	0.016165	0.005101	0.018218	0.063797	0.001357	0.001565	0.005903	0.000808	0.000944

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					
General Light Industry	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
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					
General Light Industry	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
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			
General Light Industry	0	0.0000	0.0000	0.0000	0.0000
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			
General Light Industry	0	0.0000	0.0000	0.0000	0.0000
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	3.5864	1.5000e-004	0.0165	0.0000		6.0000e-005	6.0000e-005		6.0000e-005	6.0000e-005	0.0000	0.0320	0.0320	8.0000e-005	0.0000	0.0342
Unmitigated	3.5864	1.5000e-004	0.0165	0.0000		6.0000e-005	6.0000e-005		6.0000e-005	6.0000e-005	0.0000	0.0320	0.0320	8.0000e-005	0.0000	0.0342

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	0.4096					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	3.1752					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Landscaping	1.5400e-003	1.5000e-004	0.0165	0.0000		6.0000e-005	6.0000e-005		6.0000e-005	6.0000e-005	0.0000	0.0320	0.0320	8.0000e-005	0.0000	0.0342
Total	**3.5864**	**1.5000e-004**	**0.0165**	**0.0000**		**6.0000e-005**	**6.0000e-005**		**6.0000e-005**	**6.0000e-005**	**0.0000**	**0.0320**	**0.0320**	**8.0000e-005**	**0.0000**	**0.0342**

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	0.4096					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	3.1752					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Landscaping	1.5400e-003	1.5000e-004	0.0165	0.0000		6.0000e-005	6.0000e-005		6.0000e-005	6.0000e-005	0.0000	0.0320	0.0320	8.0000e-005	0.0000	0.0342
Total	**3.5864**	**1.5000e-004**	**0.0165**	**0.0000**		**6.0000e-005**	**6.0000e-005**		**6.0000e-005**	**6.0000e-005**	**0.0000**	**0.0320**	**0.0320**	**8.0000e-005**	**0.0000**	**0.0342**

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			
General Light Industry	0 / 0	0.0000	0.0000	0.0000	0.0000
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			
General Light Industry	0 / 0	0.0000	0.0000	0.0000	0.0000
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			
General Light Industry	0	0.0000	0.0000	0.0000	0.0000
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			
General Light Industry	0	0.0000	0.0000	0.0000	0.0000
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

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APPENDIX 4.5:

EMFAC2014 MODEL OUTPUTS

EMFAC2014 (v1.0.7) Emissions Inventory
Region Type: County
Region: San Bernardino
Calendar Year: 2021
Season: Annual
Vehicle Classification: EMFAC2007 Categories
Units: miles/day for VMT, trips/day for Trips, tons/day for Emissions, 1000 gallons/day for Fuel Consumption

Region	CalYr	VehClass	MdlYr	Speed	Fuel	Population	VMT	Fuel_Consumption	Fuel_Consumption	Total Fuel	VMT	Total VMT	Miles per Gallon	Vehicle Class
San Bernardino	2021	HHDT	Aggregated	Aggregated	GAS	125.9002107	16717.50413	3.423552402	3423.552402	667783.5564	16717.50413	4209421.238	6.30	HHDT
San Bernardino	2021	HHDT	Aggregated	Aggregated	DSL	24542.92266	4192703.734	664.360004	664360.004		4192703.734			
San Bernardino	2021	LDA	Aggregated	Aggregated	GAS	909207.5181	35199911.37	1171.881911	1171881.911	1181052.556	35199911.37	36939784.65	31.28	LDA
San Bernardino	2021	LDA	Aggregated	Aggregated	DSL	8792.69583	368580.8473	9.17064526	9170.64526		368580.8473			
San Bernardino	2021	LDA	Aggregated	Aggregated	ELEC	25849.69714	1371292.432	0	0		1371292.432			
San Bernardino	2021	LDT1	Aggregated	Aggregated	GAS	73635.44923	2489916.633	99.63468523	99634.68523	99718.79458	2489916.633	2493548.79	25.01	LDT1
San Bernardino	2021	LDT1	Aggregated	Aggregated	DSL	101.6427909	2418.284801	0.084109345	84.10934512		2418.284801			
San Bernardino	2021	LDT1	Aggregated	Aggregated	ELEC	34.48272391	1213.872315	0	0		1213.872315			
San Bernardino	2021	LDT2	Aggregated	Aggregated	GAS	309546.0379	12044583.12	535.7695589	535769.5589	536491.4517	12044583.12	12066830.72	22.49	LDT2
San Bernardino	2021	LDT2	Aggregated	Aggregated	DSL	510.5730144	22247.60261	0.721892821	721.8928209		22247.60261			
San Bernardino	2021	LHDT1	Aggregated	Aggregated	GAS	20120.25047	545735.4092	50.69078775	50690.78775	81054.43819	545735.4092	1157288.691	14.28	LHDT1
San Bernardino	2021	LHDT1	Aggregated	Aggregated	DSL	19532.32163	611553.2814	30.36365044	30363.65044		611553.2814			
San Bernardino	2021	LHDT2	Aggregated	Aggregated	GAS	3392.138812	112705.1992	11.01960873	11019.60873	23852.18706	112705.1992	353790.1324	14.83	LHDT2
San Bernardino	2021	LHDT2	Aggregated	Aggregated	DSL	6802.500203	241084.9332	12.83257832	12832.57832		241084.9332			
San Bernardino	2021	MCY	Aggregated	Aggregated	GAS	45247.5125	403007.7671	10.59030365	10590.30365	10590.30365	403007.7671	10590.30365	1.00	MCY
San Bernardino	2021	MDV	Aggregated	Aggregated	GAS	233176.3118	7886006.132	485.1973934	485197.3934	491039.0326	7886006.132	8023794.329	16.34	MDV
San Bernardino	2021	MDV	Aggregated	Aggregated	DSL	3243.875799	137788.1969	5.841639209	5841.639209		137788.1969			
San Bernardino	2021	MH	Aggregated	Aggregated	GAS	7006.601758	52861.43226	6.711216735	6711.216735	8137.886653	52861.43226	67822.77942	8.33	MH
San Bernardino	2021	MH	Aggregated	Aggregated	DSL	1887.003585	14961.34716	1.426669918	1426.669918		14961.34716			
San Bernardino	2021	MHDT	Aggregated	Aggregated	GAS	2091.977338	121940.1943	15.74990849	15749.90849	136107.7555	121940.1943	1200805.613	8.82	MHDT
San Bernardino	2021	MHDT	Aggregated	Aggregated	DSL	18704.77542	1078865.419	120.357847	120357.847		1078865.419			
San Bernardino	2021	OBUS	Aggregated	Aggregated	GAS	1010.911977	59331.66119	7.447531745	7447.531745	11603.10573	59331.66119	90555.25882	7.80	OBUS
San Bernardino	2021	OBUS	Aggregated	Aggregated	DSL	380.7199066	31223.59763	4.155573988	4155.573988		31223.59763			
San Bernardino	2021	SBUS	Aggregated	Aggregated	GAS	273.1903434	12901.3866	1.105241285	1105.241285	6860.647331	12901.3866	54527.98575	7.95	SBUS
San Bernardino	2021	SBUS	Aggregated	Aggregated	DSL	1096.414947	41626.59915	5.755406046	5755.406046		41626.59915			
San Bernardino	2021	UBUS	Aggregated	Aggregated	GAS	316.0138304	48311.18623	9.569447605	9569.447605	21525.10763	48311.18623	107911.4077	5.01	UBUS
San Bernardino	2021	UBUS	Aggregated	Aggregated	DSL	399.4700238	59600.22146	11.95566003	11955.66003		59600.22146			

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APPENDIX 5

Greenhouse Gas Analysis

2020 Optimum Basin Management Program Update

Greenhouse Gas Analysis

Chino Basin Watermaster

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MARCH 20, 2020

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APPENDICES

LIST OF EXHIBITS

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LIST OF ABBREVIATED TERMS

%	Percent
°C	Degrees Celsius
°F	Degrees Fahrenheit
(1)	Reference
AB	Assembly Bill
AB 32	Global Warming Solutions Act of 2006
AB 1493	Pavley Fuel Efficiency Standards
AB 1181	California Water Conservation Landscaping Act of 2006
ACE	Affordable Clean Energy
Annex I	Industrialized Nations
APA	Administrative Procedure Act
AQIA	Air Quality Impact Analysis
BAU	Business-As-Usual
C_2F_6	Hexafluoroethane
C_2H_6	Ethane
$C_2H_2F_4$	Tetrafluroethane
$C_2H_4F_2$	Ethylidene Fluoride
CAA	Federal Clean Air Act
CalEEMod	California Emissions Estimator Model
CalEPA	California Environmental Protection Agency
CALGAPS	California LBNL GHG Analysis of Policies Spreadsheet
CALGreen	California Green Building Standards Code
CAPCOA	California Air Pollution Control Officers Association
CARB	California Air Resource Board
CBSC	California Building Standards Commission
CEC	California Energy Commission
CCR	California Code of Regulations
CEQA	California Environmental Quality Act
CDFA	California Department of Food and Agriculture
CF_4	Tetrafluoromethane
CFC	Chlorofluorocarbons
CH_4	Methane
CHF_3	Fluoroform
CH_2FCF	1,1,1,2-tetrafluoroethane
CH_3CF_2	1,1-difluoroethane
CNRA	California Natural Resources Agency

CNRA 2009	2009 California Climate Adaptation Strategy
CO_2	Carbon Dioxide
CO_2e	Carbon Dioxide Equivalent
Convention	United Nation's Framework Convention on Climate Change
COP	Conference of the Parties
CPUC	California Public Utilities Commission
EPA	Environmental Protection Agency
GCC	Global Climate Change
Gg	Gigagram
GHGA	Greenhouse Gas Analysis
GWP	Global Warming Potential
H_2O	Water
HFC	Hydrofluorocarbons
IPCC	Intergovernmental Panel on Climate Change
ISO	Independent System Operator
ITE	Institute of Transportation Engineers
kWh	Kilowatt Hours
lbs	Pounds
LBNL	Lawrence Berkeley National Laboratory
LCA	Life-Cycle Analysis
LCD	Liquid Crystal Display
LCFS	Low Carbon Fuel Standard or Executive Order S-01-07
LEV III	Low-Emission Vehicle
LULUCF	Land-Use, Land-Use Change and Forestry
MMR	Mandatory Reporting Rule
$MMTCO_2e$	Million Metric Ton of Carbon Dioxide Equivalent
MPG	Miles Per Gallon
MPOs	Metropolitan Planning Organizations
MT/yr	Metric Tons Per Year
$MTCO_2e$	Metric Ton of Carbon Dioxide Equivalent
$MTCO_2e$/yr	Metric Ton of Carbon Dioxide Equivalent Per Year
MW	Megawatts
MWh	Megawatts Per Hour
MWELO	California Department of Water Resources' Model Water Efficient
N_20	Nitrous Oxide
NDC	Nationally Determined Contributions
NF_3	Nitrogen Trifluoride

NHTSA	National Highway Traffic Safety Administration
NIOSH	National Institute for Occupational Safety and Health
Non-Annex I	Developing Nations
OAL	Office of Administrative Law
OPR	Office of Planning and Research
PFC	Perfluorocarbons
ppb	Parts Per Billion
ppm	Parts Per Million
ppt	Parts Per Trillion
Project	2020 Optimum Basin Management Program Update
RPS	Renewable Portfolio Standards
RTP/SCS	Regional Transportation Plan/ Sustainable Communities Strategy
SAR	Second Assessment Report
SB	Senate Bill
SB 32	California Global Warming Solutions Act of 2006
SB 375	Regional GHG Emissions Reduction Targets/Sustainable Communities Strategies
SB 1078	Renewable Portfolio Standards
SB 1368	Statewide Retail Provider Emissions Performance Standards
SCAB	South Coast Air Basin
SCAG	Southern California Association of Governments
SCAQMD	South Coast Air Quality Management District
Scoping Plan	California Air Resources Board Climate Change Scoping Plan
SF_6	Sulfur Hexaflouride
SLPS	Short-Lived Climate Pollutant Strategy
SP	Service Population
Title 20	Appliance Energy Efficiency Standards
Title 24	California Building Code
U.N.	United Nations
U.S.	United States
UNFCCC	United Nations' Framework Convention on Climate Change
URBEMIS	Urban Emissions
WCI	Western Climate Initiative
WRI	World Resources Institute
ZE/NZE	Zero and Near-Zero Emissions
ZEV	Zero-Emissions Vehicles

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EXECUTIVE SUMMARY

ES.1 SUMMARY OF FINDINGS

The results of this *2020 Optimum Basin Management Program Update* (2020 OBMPU) *Greenhouse Gas Analysis* (GHGA) is summarized below based on the significance criteria in Section 3 of this report consistent with Appendix G of the California Environmental Quality Act (CEQA) Guidelines (1). Table ES-1 shows the findings of significance for potential greenhouse gas (GHG) impacts under CEQA.

TABLE ES-1: SUMMARY OF CEQA SIGNIFICANCE FINDINGS

Analysis	Report Section	Significance Findings	
		Unmitigated	Mitigated
GHG Impact #1: The Project would not generate direct or indirect GHG emission that would result in a significant impact on the environment.	3.8	*Potentially Significant*	*Significant and Unavoidable*
GHG Impact #2: The Project would not conflict with any applicable plan, policy or regulation of an agency adopted for the purpose of reducing the emissions of GHGs.	3.8	*Potentially Significant*	*Significant and Unavoidable*

ES.2 PROJECT REQUIREMENTS

The Project would be required to comply with regulations imposed by the State of California and the South Coast Air Quality Management District (SCAQMD) aimed at the reduction of air pollutant emissions. Those that are directly and indirectly applicable to the Project and that would assist in the reduction of GHG emissions include:

- Global Warming Solutions Act of 2006 (Assembly Bill (AB) 32) (2).
- Regional GHG Emissions Reduction Targets/Sustainable Communities Strategies (Senate Bill (SB) 375) (3).
- Pavley Fuel Efficiency Standards (AB 1493). Establishes fuel efficiency ratings for new vehicles (4).
- California Building Code (Title 24 California Code of Regulations (CCR)). Establishes energy efficiency requirements for new construction (5).
- Appliance Energy Efficiency Standards (Title 20 CCR). Establishes energy efficiency requirements for appliances (6).
- Low Carbon Fuel Standard (LCFS). Requires carbon content of fuel sold in California to be 10 percent (%) less by 2020 (7).
- California Water Conservation in Landscaping Act of 2006 (AB 1881). Requires local agencies to adopt the Department of Water Resources updated Water Efficient Landscape Ordinance or

equivalent by January 1, 2010 to ensure efficient landscapes in new development and reduced water waste in existing landscapes (8).

- Statewide Retail Provider Emissions Performance Standards (SB 1368). Requires energy generators to achieve performance standards for GHG emissions (9).
- Renewable Portfolio Standards (SB 1078 – also referred to as RPS). Requires electric corporations to increase the amount of energy obtained from eligible renewable energy resources to 20 % by 2010 and 33% by 2020 (10).
- California Global Warming Solutions Act of 2006 (SB 32). Requires the state to reduce statewide GHG emissions to 40% below 1990 levels by 2030, a reduction target that was first introduced in Executive Order B-30-15 (11).

Promulgated regulations that will affect the Project's emissions are accounted for in the Project's GHG calculations provided in this report. In particular, AB 1493, LCFS, and RPS, and therefore are accounted for in the Project's emission calculations.

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1 INTRODUCTION

This report presents the results of the GHGA prepared by Urban Crossroads, Inc., for the proposed 2020 OBMPU (Project). The purpose of this GHGA is to evaluate Project-related construction and operational emissions and determine the level of GHG impacts as a result of constructing and operating the proposed Project.

1.1 SITE LOCATION

The proposed 2020 OBMPU Project is generally located within the portions of the San Bernardino, Riverside, and Los Angeles counties, as shown on Exhibit 1-A.

1.2 PROJECT DESCRIPTION

The OBMPU consists of construction and operation of the various facilities which are separated into four project categories: 1) Project Category 1: Well Development and Monitoring Devices; 2) Project Category 2: Conveyance Facilities and Ancillary Facilities; 3) Project Category 3: Storage Basins, Recharge Facilities, and Storage Bands; and, 4) Project Category 4: Desalters and Water Treatment Facilities.

PROJECT CATEGORY 1: WELL DEVELOPMENT AND MONITORING DEVICES

This Project Category includes the development of aquifer storage and recovery (ASR), injection, pumping, groundwater level monitoring, and groundwater quality wells, associated well housing, as well as monitoring devices such as flow meters and extensometers. The proposed wells and monitoring devices will be installed throughout the Chino Basin.

Well development includes: 60 ASR wells, 10 wells relocated, 8 new wells to expand desalter capacity, modification of up to 5 wells, destruction and replacement of 5 wells for a total of 78 pumping wells. This category also includes the development of 100 monitoring wells, for a total of 178 wells, which serve the varying purposes listed above and outlined below. The monitoring devices proposed as part of the OBMPU include 300 flow meters and 3 extensometers.

PROJECT CATEGORY 2: CONVEYANCE FACILITIES AND ANCILLARY FACILITIES

This category includes the construction of 550,000 linear feet (LF) of new pipelines, booster pump stations, reservoirs and minor appurtenances whose number, locations and capacities are presently unknown. The proposed conveyance facilities and ancillary facilities would be implemented throughout the entire Chino Basin.

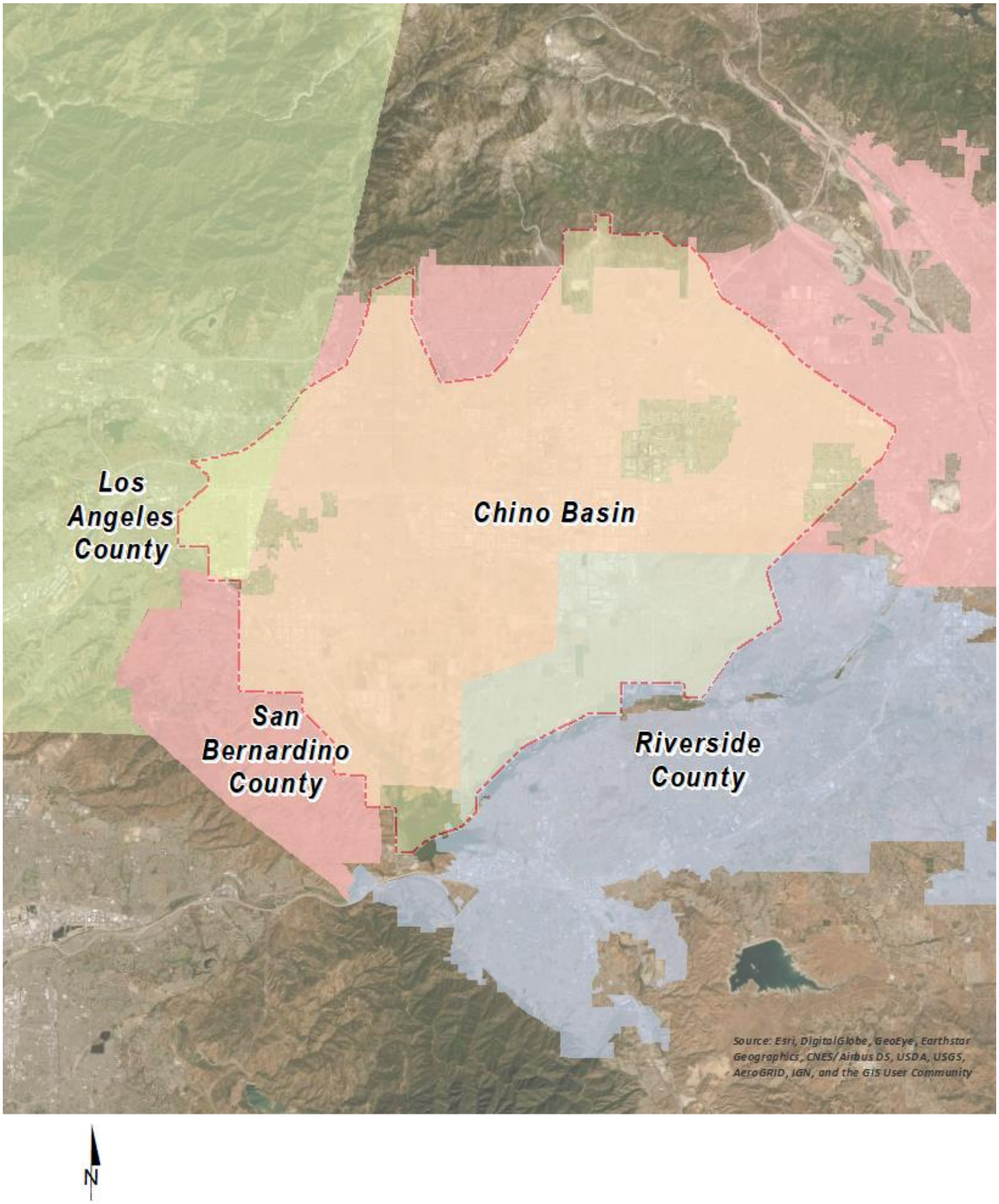
PROJECT CATEGORY 3: STORAGE BASINS, RECHARGE FACILITIES, AND STORAGE BANDS

This Project Category includes the construction of 310 acres of new storage basins—several locations for which are within existing facilities, improvements to existing storage basin(s), 200 acres of flood managed aquifer recharge (MAR) facilities, new municipal separate storm sewer system (MS4) compliance facilities, and expansion of the maximum storage space (safe storage capacity) to be used within the Chino Basin from 600,000 acre-feet (af) (through June 30, 2021) to between 700,000 af and 1,000,000 af going forward with various impacts that may result for each 100,000 af within this range of storage. The specific locations of the storage basins are described in the Project Description above; however, the locations of the flood MAR facilities and MS4 compliant projects are presently unknown.

PROJECT CATEGORY 4: DESALTERS AND WATER TREATMENT FACILITIES

The projects proposed under this category are: upgrades at Inland Empire Utilities Agency's (IEUA) existing Treatment Plants, a new advanced water treatment plant (discussed in IEUA's 2017 FMP PEIR), improvements to the Water Facilities Authority (WFA) Agua de Lejos Treatment Plant, upgrades to the Chino Desalters, new groundwater treatment facilities at or near well sites and at regionally located sites, and improvements to existing groundwater treatment facilities.

EXHIBIT 1-A: PROJECT LOCATION MAP



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2 CLIMATE CHANGE SETTING

2.1 INTRODUCTION TO GLOBAL CLIMATE CHANGE (GCC)

GCC is defined as the change in average meteorological conditions on the earth with respect to temperature, precipitation, and storms. The majority of scientists believe that the climate shift taking place since the Industrial Revolution is occurring at a quicker rate and magnitude than in the past. Scientific evidence suggests that GCC is the result of increased concentrations of GHGs in the earth's atmosphere, including carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O), and fluorinated gases. The majority of scientists believe that this increased rate of climate change is the result of GHGs resulting from human activity and industrialization over the past 200 years.

An individual project like the proposed Project evaluated in this GHGA cannot generate enough GHG emissions to affect a discernible change in global climate. However, the proposed Project may participate in the potential for GCC by its incremental contribution of GHGs combined with the cumulative increase of all other sources of GHGs, which when taken together constitute potential influences on GCC. Because these changes may have serious environmental consequences, Section 3.0 will evaluate the potential for the proposed Project to have a significant effect upon the environment as a result of its potential contribution to the greenhouse effect.

2.2 GLOBAL CLIMATE CHANGE DEFINED

GCC refers to the change in average meteorological conditions on the earth with respect to temperature, wind patterns, precipitation and storms. Global temperatures are regulated by naturally occurring atmospheric gases such as water vapor, CO_2, N_2O, CH_4, hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), and sulfur hexafluoride (SF_6). These particular gases are important due to their residence time (duration they stay) in the atmosphere, which ranges from 10 years to more than 100 years. These gases allow solar radiation into the earth's atmosphere, but prevent radioactive heat from escaping, thus warming the earth's atmosphere. GCC can occur naturally as it has in the past with the previous ice ages.

Gases that trap heat in the atmosphere are often referred to as GHGs. GHGs are released into the atmosphere by both natural and anthropogenic activity. Without the natural GHG effect, the earth's average temperature would be approximately 61 degrees Fahrenheit (°F) cooler than it is currently. The cumulative accumulation of these gases in the earth's atmosphere is considered to be the cause for the observed increase in the earth's temperature.

2.3 GREENHOUSE GASES

2.3.1 GHGS AND HEALTH EFFECTS

GHGs trap heat in the atmosphere, creating a GHG effect that results in global warming and climate change. Many gases demonstrate these properties and as discussed in Table 2-1. For the purposes of this analysis, emissions of CO_2, CH_4, and N_2O were evaluated (see Table 3-1 later in this report) because these gases are the primary contributors to GCC from development projects.

Although there are other substances such as fluorinated gases that also contribute to GCC, these fluorinated gases were not evaluated as their sources are not well-defined and do not contain accepted emissions factors or methodology to accurately calculate these gases.

TABLE 2-1: GREENHOUSE GASES

Greenhouse Gases	Description	Sources	Health Effects
Water	Water is the most abundant, important, and variable GHG in the atmosphere. Water vapor is not considered a pollutant; in the atmosphere it maintains a climate necessary for life. Changes in its concentration are primarily considered to be a result of climate feedbacks related to the warming of the atmosphere rather than a direct result of industrialization. A climate feedback is an indirect, or secondary, change, either positive or negative, that occurs within the climate system in response to a forcing mechanism. The feedback loop in which water is involved is critically important to projecting future climate change. As the temperature of the atmosphere rises, more water is evaporated from ground storage (rivers, oceans, reservoirs, soil). Because the air is warmer, the relative humidity can be higher (in essence, the air is able to 'hold' more water when it is warmer), leading to more water vapor in the atmosphere. As a GHG, the higher concentration of water vapor is then able to absorb more thermal indirect energy radiated from the Earth, thus further warming the atmosphere. The warmer atmosphere can then hold more water vapor and so on and so on. This is referred to as a "positive feedback loop." The extent to which this positive feedback loop will continue is	The main source of water vapor is evaporation from the oceans (approximately 85%). Other sources include evaporation from other water bodies, sublimation (change from solid to gas) from sea ice and snow, and transpiration from plant leaves.	There are no known direct health effects related to water vapor at this time. It should be noted however that when some pollutants react with water vapor, the reaction forms a transport mechanism for some of these pollutants to enter the human body through water vapor.

Greenhouse Gases	Description	Sources	Health Effects
	unknown as there are also dynamics that hold the positive feedback loop in check. As an example, when water vapor increases in the atmosphere, more of it will eventually condense into clouds, which are more able to reflect incoming solar radiation (thus allowing less energy to reach the earth's surface and heat it up) (12).		
CO_2	CO_2 is an odorless and colorless GHG. Since the industrial revolution began in the mid-1700s, the sort of human activity that increases GHG emissions has increased dramatically in scale and distribution. Data from the past 50 years suggests a corollary increase in levels and concentrations. As an example, prior to the industrial revolution, CO_2 concentrations were fairly stable at 280 parts per million (ppm). Today, they are around 370 ppm, an increase of more than 30%. Left unchecked, the concentration of CO_2 in the atmosphere is projected to increase to a minimum of 540 ppm by 2100 as a direct result of anthropogenic sources (13).	CO_2 is emitted from natural and manmade sources. Natural sources include: the decomposition of dead organic matter; respiration of bacteria, plants, animals and fungus; evaporation from oceans; and volcanic outgassing. Anthropogenic sources include: the burning of coal, oil, natural gas, and wood. CO_2 is naturally removed from the air by photosynthesis, dissolution into ocean water, transfer to soils and ice caps, and chemical weathering of carbonate rocks (14).	Outdoor levels of CO_2 are not high enough to result in negative health effects. According to the National Institute for Occupational Safety and Health (NIOSH) high concentrations of CO_2 can result in health effects such as: headaches, dizziness, restlessness, difficulty breathing, sweating, increased heart rate, increased cardiac output, increased blood pressure, coma, asphyxia, and/or convulsions. It should be noted that current concentrations of CO_2 in the earth's atmosphere are estimated to be approximately 370 ppm, the actual reference exposure level (level at which adverse health effects typically occur) is at exposure levels of 5,000 ppm averaged over 10 hours in a 40-hour workweek and short-term reference exposure levels of 30,000 ppm averaged over a 15 minute period (15).

Greenhouse Gases	Description	Sources	Health Effects
CH_4	CH_4 is an extremely effective absorber of radiation, although its atmospheric concentration is less than CO_2 and its lifetime in the atmosphere is brief (10-12 years), compared to other GHGs.	CH_4 has both natural and anthropogenic sources. It is released as part of the biological processes in low oxygen environments, such as in swamplands or in rice production (at the roots of the plants). Over the last 50 years, human activities such as growing rice, raising cattle, using natural gas, and mining coal have added to the atmospheric concentration of CH_4. Other anthropocentric sources include fossil-fuel combustion and biomass burning (16).	CH_4 is extremely reactive with oxidizers, halogens, and other halogen-containing compounds. Exposure to high levels of CH_4 can cause asphyxiation, loss of consciousness, headache and dizziness, nausea and vomiting, weakness, loss of coordination, and an increased breathing rate.
N_2O	N_2O, also known as laughing gas, is a colorless GHG. Concentrations of N_2O also began to rise at the beginning of the industrial revolution. In 1998, the global concentration was 314 parts per billion (ppb).	N_2O is produced by microbial processes in soil and water, including those reactions which occur in fertilizer containing nitrogen. In addition to agricultural sources, some industrial processes (fossil fuel-fired power plants, nylon production, nitric acid production, and vehicle emissions) also contribute to its atmospheric load. It is used as an aerosol spray propellant, i.e., in whipped cream bottles. It is also	N_2O can cause dizziness, euphoria, and sometimes slight hallucinations. In small doses, it is considered harmless. However, in some cases, heavy and extended use can cause Olney's Lesions (brain damage) (17).

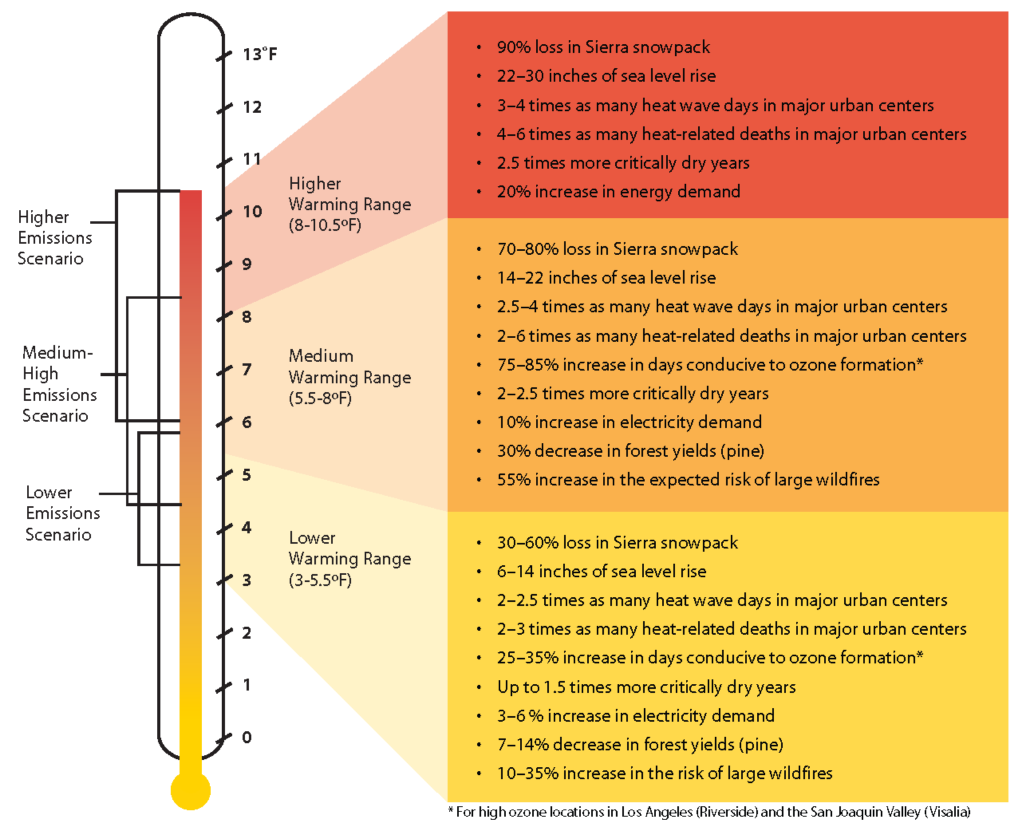
Greenhouse Gases	Description	Sources	Health Effects
		used in potato chip bags to keep chips fresh. It is used in rocket engines and in race cars. N_2O can be transported into the stratosphere, be deposited on the earth's surface, and be converted to other compounds by chemical reaction (17).	
Chlorofluorocarbons (CFCs)	CFCs are gases formed synthetically by replacing all hydrogen atoms in CH_4 or ethane (C_2H_6) with chlorine and/or fluorine atoms. CFCs are nontoxic, nonflammable, insoluble and chemically unreactive in the troposphere (the level of air at the earth's surface).	CFCs have no natural source but were first synthesized in 1928. They were used for refrigerants, aerosol propellants and cleaning solvents. Due to the discovery that they are able to destroy stratospheric ozone, a global effort to halt their production was undertaken and was extremely successful, so much so that levels of the major CFCs are now remaining steady or declining. However, their long atmospheric lifetimes mean that some of the CFCs will remain in the atmosphere for over 100 years (18).	In confined indoor locations, working with CFC-113 or other CFCs is thought to result in death by cardiac arrhythmia (heart frequency too high or too low) or asphyxiation.

Greenhouse Gases	Description	Sources	Health Effects
HFCs	HFCs are synthetic, man-made chemicals that are used as a substitute for CFCs. Out of all the GHGs, they are one of three groups with the highest global warming potential (GWP). The HFCs with the largest measured atmospheric abundances are (in order), fluoroform (CHF_3), 1,1,1,2-tetrafluoroethane (CH_2FCF), and 1,1-difluoroethane (CH_3CF_2). Prior to 1990, the only significant emissions were of CHF_3. CH_2FCF emissions are increasing due to its use as a refrigerant.	HFCs are manmade for applications such as automobile air conditioners and refrigerants.	No health effects are known to result from exposure to HFCs.
PFCs	PFCs have stable molecular structures and do not break down through chemical processes in the lower atmosphere. High-energy ultraviolet rays, which occur about 60 kilometers above earth's surface, are able to destroy the compounds. Because of this, PFCs have very long lifetimes, between 10,000 and 50,000 years. Two common PFCs are tetrafluoromethane (CF_4) and hexafluoroethane (C_2F_6). The EPA estimates that concentrations of CF_4 in the atmosphere are over 70 parts per trillion (ppt).	The two main sources of PFCs are primary aluminum production and semiconductor manufacture.	No health effects are known to result from exposure to PFCs.
SF_6	SF_6 is an inorganic, odorless, colorless, nontoxic, nonflammable gas. It also has the highest GWP of any gas evaluated (23,900) (19). The EPA indicates that concentrations in the 1990s were about 4 ppt.	SF_6 is used for insulation in electric power transmission and distribution equipment, in the magnesium industry, in semiconductor manufacturing, and as a tracer gas for leak detection.	In high concentrations in confined areas, the gas presents the hazard of suffocation because it displaces the oxygen needed for breathing.

Greenhouse Gases	Description	Sources	Health Effects
Nitrogen Trifluoride (NF_3)	NF_3 is a colorless gas with a distinctly moldy odor. The World Resources Institute (WRI) indicates that NF_3 has a 100-year GWP of 17,200 (20).	NF_3 is used in industrial processes and is produced in the manufacturing of semiconductors, Liquid Crystal Display (LCD) panels, types of solar panels, and chemical lasers.	Long-term or repeated exposure may affect the liver and kidneys and may cause fluorosis (21).

The potential health effects related directly to the emissions of CO_2, CH_4, and N_2O as they relate to development projects such as the proposed Project are still being debated in the scientific community. Their cumulative effects to GCC have the potential to cause adverse effects to human health. Increases in Earth's ambient temperatures would result in more intense heat waves, causing more heat-related deaths. Scientists also purport that higher ambient temperatures would increase disease survival rates and result in more widespread disease. Climate change will likely cause shifts in weather patterns, potentially resulting in devastating droughts and food shortages in some areas (22). Exhibit 2-A presents the potential impacts of global warming (23).

EXHIBIT 2-A: SUMMARY OF PROJECTED GLOBAL WARMING IMPACT, 2070-2099 (AS COMPARED WITH 1961-1990)



Source: Barbara H. Allen-Diaz. "Climate change affects us all." *University of California, Agriculture and Natural Resources*, 2009.

2.4 GLOBAL WARMING POTENTIAL

GHGs have varying GWP values. GWP of a GHG indicates the amount of warming a gas causes over a given period of time and represents the potential of a gas to trap heat in the atmosphere. CO_2 is utilized as the reference gas for GWP, and thus has a GWP of 1. CO_2 equivalent (CO_2e) is a term used for describing the difference GHGs in a common unit. CO_2e signifies the amount of CO_2 which would have the equivalent GWP.

The atmospheric lifetime and GWP of selected GHGs are summarized at Table 2-2. As shown in the table below, GWP for the Second Assessment Report, the Intergovernmental Panel on Climate Change (IPCC)'s scientific and socio-economic assessment on climate change, range from 1 for CO_2 to 23,900 for SF_6 and GWP for the IPCC's 5th Assessment Report range from 1 for CO_2 to 23,500 for SF_6 (24).

TABLE 2-2: GWP AND ATMOSPHERIC LIFETIME OF SELECT GHGS

Gas	Atmospheric Lifetime (years)	Global Warming Potential (100-year time horizon)	
		Second Assessment Report	5th Assessment Report
CO_2	See*	1	1
CH_4	12 .4	21	28
N_2O	121	310	265
HFC-23	222	11,700	12,400
HFC-134a	13.4	1,300	1,300
HFC-152a	1.5	140	138
SF_6	3,200	23,900	23,500

*As per Appendix 8.A. of IPCC's 5th Assessment Report, no single lifetime can be given.
Source: Table 2.14 of the IPCC Fourth Assessment Report, 2007

2.5 GREENHOUSE GAS EMISSIONS INVENTORIES

2.5.1 GLOBAL

Worldwide anthropogenic GHG emissions are tracked by the IPCC for industrialized nations (referred to as Annex I) and developing nations (referred to as Non-Annex I). Human GHG emissions data for Annex I nations are available through 2017. Based on the latest available data, the sum of these emissions totaled approximately 29,216,501 gigagram (Gg) CO_2e[1] (25) (26) as summarized on Table 2-3.

[1] The global emissions are the sum of Annex I and non-Annex I countries, without counting Land-Use, Land-Use Change and Forestry (LULUCF). For countries without 2017 data, the United Nations' Framework Convention on Climate Change (UNFCCC) data for the most recent year were used. United Nations Framework Convention on Climate Change, "Annex I Parties – GHG total without LULUCF," The most recent GHG emissions for China and India are from 2014.

2.5.2 UNITED STATES

As noted in Table 2-3, the United States, as a single country, was the number two producer of GHG emissions in 2017.

TABLE 2-3: TOP GHG PRODUCING COUNTRIES AND THE EUROPEAN UNION [2]

Emitting Countries	GHG Emissions (Gg CO_2e)
China	11,911,710
United States	6,456,718
European Union (28-member countries)	4,323,163
India	3,079,810
Russian Federation	2,155,470
Japan	1,289,630
Total	**29,216,501**

2.5.3 STATE OF CALIFORNIA

California has significantly slowed the rate of growth of GHG emissions due to the implementation of energy efficiency programs as well as adoption of strict emission controls, but is still a substantial contributor to the United States (U.S.) emissions inventory total (27). The California Air Resource Board (CARB) compiles GHG inventories for the State of California. Based upon the 2019 GHG inventory data (i.e., the latest year for which data are available) for the 2000-2017 GHG emissions period, California emitted an average 424.1 million metric tons of CO_2e per year ($MMTCO_2e$/yr) (28).

2.6 EFFECTS OF CLIMATE CHANGE IN CALIFORNIA

2.6.1 PUBLIC HEALTH

Higher temperatures may increase the frequency, duration, and intensity of conditions conducive to air pollution formation. For example, days with weather conducive to ozone formation could increase from 25 to 35% under the lower warming range to 75 to 85% under the medium warming range. In addition, if global background ozone levels increase as predicted in some scenarios, it may become impossible to meet local air quality standards. Air quality could be further compromised by increases in wildfires, which emit fine particulate matter that can travel long distances, depending on wind conditions. The Climate Scenarios report indicates that large wildfires could become up to 55% more frequent if GHG emissions are not significantly reduced.

In addition, under the higher warming range scenario, there could be up to 100 more days per year with temperatures above 90°F in Los Angeles and 95°F in Sacramento by 2100. This is a large increase over historical patterns and approximately twice the increase projected if temperatures

[2] Used http://unfccc.int data for Annex I countries. Consulted the CAIT Climate Data Explorer in https://www.climatewatchdata.org site to reference Non-Annex I countries of China and India.

remain within or below the lower warming range. Rising temperatures could increase the risk of death from dehydration, heat stroke/exhaustion, heart attack, stroke, and respiratory distress caused by extreme heat.

2.6.2 WATER RESOURCES

A vast network of man-made reservoirs and aqueducts captures and transports water throughout the state from northern California rivers and the Colorado River. The current distribution system relies on Sierra Nevada snowpack to supply water during the dry spring and summer months. Rising temperatures, potentially compounded by decreases in precipitation, could severely reduce spring snowpack, increasing the risk of summer water shortages.

If temperatures continue to increase, more precipitation could fall as rain instead of snow, and the snow that does fall could melt earlier, reducing the Sierra Nevada spring snowpack by as much as 70 to 90%. Under the lower warming range scenario, snowpack losses could be only half as large as those possible if temperatures were to rise to the higher warming range. How much snowpack could be lost depends in part on future precipitation patterns, the projections for which remain uncertain. However, even under the wetter climate projections, the loss of snowpack could pose challenges to water managers and hamper hydropower generation. It could also adversely affect winter tourism. Under the lower warming range, the ski season at lower elevations could be reduced by as much as a month. If temperatures reach the higher warming range and precipitation declines, there might be many years with insufficient snow for skiing and snowboarding.

The State's water supplies are also at risk from rising sea levels. An influx of saltwater could degrade California's estuaries, wetlands, and groundwater aquifers. Saltwater intrusion caused by rising sea levels is a major threat to the quality and reliability of water within the southern edge of the Sacramento/San Joaquin River Delta – a major fresh water supply.

2.6.3 AGRICULTURE

Increased temperatures could cause widespread changes to the agriculture industry reducing the quantity and quality of agricultural products statewide. First, California farmers could possibly lose as much as 25% of the water supply needed. Although higher CO_2 levels can stimulate plant production and increase plant water-use efficiency, California's farmers could face greater water demand for crops and a less reliable water supply as temperatures rise. Crop growth and development could change, as could the intensity and frequency of pest and disease outbreaks. Rising temperatures could aggravate ozone pollution, which makes plants more susceptible to disease and pests and interferes with plant growth.

Plant growth tends to be slow at low temperatures, increasing with rising temperatures up to a threshold. However, faster growth can result in less-than-optimal development for many crops, so rising temperatures could worsen the quantity and quality of yield for a number of California's agricultural products. Products likely to be most affected include wine grapes, fruits and nuts.

In addition, continued GCC could shift the ranges of existing invasive plants and weeds and alter competition patterns with native plants. Range expansion could occur in many species while range contractions may be less likely in rapidly evolving species with significant populations already established. Should range contractions occur, new or different weed species could fill the emerging gaps. Continued GCC could alter the abundance and types of many pests, lengthen pests' breeding season, and increase pathogen growth rates.

2.6.4 FORESTS AND LANDSCAPES

GCC has the potential to intensify the current threat to forests and landscapes by increasing the risk of wildfire and altering the distribution and character of natural vegetation. If temperatures rise into the medium warming range, the risk of large wildfires in California could increase by as much as 55%, which is almost twice the increase expected if temperatures stay in the lower warming range. However, since wildfire risk is determined by a combination of factors, including precipitation, winds, temperature, and landscape and vegetation conditions, future risks will not be uniform throughout the state. In contrast, wildfires in northern California could increase by up to 90% due to decreased precipitation.

Moreover, continued GCC has the potential to alter natural ecosystems and biological diversity within the state. For example, alpine and subalpine ecosystems could decline by as much as 60 to 80% by the end of the century as a result of increasing temperatures. The productivity of the state's forests has the potential to decrease as a result of GCC.

Rising Sea Levels

Rising sea levels, more intense coastal storms, and warmer water temperatures could increasingly threaten the state's coastal regions. Under the higher warming range scenario, sea level is anticipated to rise 22 to 35 inches by 2100. Elevations of this magnitude would inundate low-lying coastal areas with saltwater, accelerate coastal erosion, threaten vital levees and inland water systems, and disrupt wetlands and natural habitats. Under the lower warming range scenario, sea level could rise 12-14 inches.

2.7 REGULATORY SETTING

2.7.1 INTERNATIONAL

Climate change is a global issue involving GHG emissions from all around the world; therefore, countries such as the ones discussed below have made an effort to reduce GHGs.

IPCC

In 1988, the United Nations (U.N.) and the World Meteorological Organization established the IPCC to assess the scientific, technical and socioeconomic information relevant to understanding the scientific basis of risk of human-induced climate change, its potential impacts, and options for adaptation and mitigation.

UNITED NATION'S FRAMEWORK CONVENTION ON CLIMATE CHANGE (CONVENTION)

On March 21, 1994, the U.S. joined a number of countries around the world in signing the Convention. Under the Convention, governments gather and share information on GHG emissions, national policies, and best practices; launch national strategies for addressing GHG emissions and adapting to expected impacts, including the provision of financial and technological support to developing countries; and cooperate in preparing for adaptation to the impacts of climate change.

INTERNATIONAL CLIMATE CHANGE TREATIES

The Kyoto Protocol is an international agreement linked to the Convention. The major feature of the Kyoto Protocol is that it sets binding targets for 37 industrialized countries and the European community for reducing GHG emissions at an average of 5% against 1990 levels over the five-year period 2008–2012. The Convention (as discussed above) encouraged industrialized countries to stabilize emissions; however, the Protocol commits them to do so. Developed countries have contributed more emissions over the last 150 years; therefore, the Protocol places a heavier burden on developed nations under the principle of "common but differentiated responsibilities."

In 2001, President George W. Bush indicated that he would not submit the treaty to the U.S. Senate for ratification, which effectively ended American involvement in the Kyoto Protocol. In December 2009, international leaders met in Copenhagen to address the future of international climate change commitments post-Kyoto. No binding agreement was reached in Copenhagen; however, the Committee identified the long-term goal of limiting the maximum global average temperature increase to no more than 2 degrees Celsius (°C) above pre-industrial levels, subject to a review in 2015. The UN Climate Change Committee held additional meetings in Durban, South Africa in November 2011; Doha, Qatar in November 2012; and Warsaw, Poland in November 2013. The meetings are gradually gaining consensus among participants on individual climate change issues.

On September 23, 2014 more than 100 Heads of State and Government and leaders from the private sector and civil society met at the Climate Summit in New York hosted by the U.N. At the Summit, heads of government, business and civil society announced actions in areas that would have the greatest impact on reducing emissions, including climate finance, energy, transport, industry, agriculture, cities, forests, and building resilience.

Parties to the U.N. Framework Convention on Climate Change (UNFCCC) reached a landmark agreement on December 12, 2015 in Paris, charting a fundamentally new course in the two-decade-old global climate effort. Culminating a four-year negotiating round, the new treaty ends the strict differentiation between developed and developing countries that characterized earlier efforts, replacing it with a common framework that commits all countries to put forward their best efforts and to strengthen them in the years ahead. This includes, for the first time, requirements that all parties report regularly on their emissions and implementation efforts and undergo international review.

The agreement and a companion decision by parties were the key outcomes of the conference, known as the 21st session of the UNFCCC Conference of the Parties (COP) 21. Together, the Paris Agreement and the accompanying COP decision:

- Reaffirm the goal of limiting global temperature increase well below 2°C, while urging efforts to limit the increase to 1.5 degrees;

- Establish binding commitments by all parties to make "nationally determined contributions" (NDCs), and to pursue domestic measures aimed at achieving them;
- Commit all countries to report regularly on their emissions and "progress made in implementing and achieving" their NDCs, and to undergo international review;
- Commit all countries to submit new NDCs every five years, with the clear expectation that they will "represent a progression" beyond previous ones;
- Reaffirm the binding obligations of developed countries under the UNFCCC to support the efforts of developing countries, while for the first time encouraging voluntary contributions by developing countries too;
- Extend the current goal of mobilizing $100 billion a year in support by 2020 through 2025, with a new, higher goal to be set for the period after 2025;
- Extend a mechanism to address "loss and damage" resulting from climate change, which explicitly will not "involve or provide a basis for any liability or compensation;"
- Require parties engaging in international emissions trading to avoid "double counting;" and
- Call for a new mechanism, similar to the Clean Development Mechanism under the Kyoto Protocol, enabling emission reductions in one country to be counted toward another country's NDC (C2ES 2015a) (29).

On November 4, 2019, the Trump administration formally notified the U.N. that the United States would withdraw from the Paris Agreement. It should be noted that withdrawal would be effective one year after notification in 2020.

2.7.2 NATIONAL

Prior to the last decade, there have been no concrete federal regulations of GHGs or major planning for climate change adaptation. The following are actions regarding the federal government, GHGs, and fuel efficiency.

GHG ENDANGERMENT

In *Massachusetts v. Environmental Protection Agency* 549 U.S. 497 (2007), decided on April 2, 2007, the United States Supreme Court (U.S. Court) found that four GHGs, including CO_2, are air pollutants subject to regulation under Section 202(a)(1) of the Clean Air Act (CAA). The Court held that the EPA Administrator must determine whether emissions of GHGs from new motor vehicles cause or contribute to air pollution, which may reasonably be anticipated to endanger public health or welfare, or whether the science is too uncertain to make a reasoned decision. On December 7, 2009, the EPA Administrator signed two distinct findings regarding GHGs under section 202(a) of the CAA:

- Endangerment Finding: The Administrator finds that the current and projected concentrations of the six key well-mixed GHGs— CO_2, CH_4, N_2O, HFCs, PFCs, and SF_6—in the atmosphere threaten the public health and welfare of current and future generations.
- Cause or Contribute Finding: The Administrator finds that the combined emissions of these well-mixed GHGs from new motor vehicles and new motor vehicle engines contribute to the GHG pollution, which threatens public health and welfare.

These findings do not impose requirements on industry or other entities. However, this was a prerequisite for implementing GHG emissions standards for vehicles, as discussed in the section "Clean Vehicles" below. After a lengthy legal challenge, the U.S. Court declined to review an Appeals Court ruling that upheld the EPA Administrator's findings (30).

CLEAN VEHICLES

Congress first passed the Corporate Average Fuel Economy law in 1975 to increase the fuel economy of cars and light duty trucks. The law has become more stringent over time. On May 19, 2009, President Obama put in motion a new national policy to increase fuel economy for all new cars and trucks sold in the U.S. On April 1, 2010, the EPA and the Department of Transportation's National Highway Traffic Safety Administration (NHTSA) announced a joint final rule establishing a national program that would reduce GHG emissions and improve fuel economy for new cars and trucks sold in the U.S.

The first phase of the national program applies to passenger cars, light-duty trucks, and medium-duty (MD) passenger vehicles, covering model years 2012 through 2016. They require these vehicles to meet an estimated combined average emissions level of 250 grams of CO_2 per mile, equivalent to 35.5 miles per gallon (mpg) if the automobile industry were to meet this CO_2 level solely through fuel economy improvements. Together, these standards would cut CO_2 emissions by an estimated 960 million metric tons and 1.8 billion barrels of oil over the lifetime of the vehicles sold under the program (model years 2012–2016). The EPA and the NHTSA issued final rules on a second-phase joint rulemaking establishing national standards for light-duty vehicles for model years 2017 through 2025 in August 2012. The new standards for model years 2017 through 2025 apply to passenger cars, light-duty trucks, and MD passenger vehicles. The final standards are projected to result in an average industry fleetwide level of 163 grams/mile of CO_2 in model year 2025, which is equivalent to 54.5 mpg if achieved exclusively through fuel economy improvements.

The EPA and the U.S. Department of Transportation issued final rules for the first national standards to reduce GHG emissions and improve fuel efficiency of heavy-duty trucks (HDT) and buses on September 15, 2011, effective November 14, 2011. For combination tractors, the agencies are proposing engine and vehicle standards that begin in the 2014 model year and achieve up to a 20% reduction in CO_2 emissions and fuel consumption by the 2018 model year. For HDT and vans, the agencies are proposing separate gasoline and diesel truck standards, which phase in starting in the 2014 model year and achieve up to a 10% reduction for gasoline vehicles and a 15% reduction for diesel vehicles by the 2018 model year (12 and 17% respectively if accounting for air conditioning leakage). Lastly, for vocational vehicles, the engine and vehicle standards would achieve up to a 10% reduction in fuel consumption and CO_2 emissions from the 2014 to 2018 model years.

On April 2, 2018, the EPA signed the Mid-term Evaluation Final Determination, which finds that the model year 2022-2025 GHG standards are not appropriate and should be revised (31). This Final Determination serves to initiate a notice to further consider appropriate standards for model year 2022-2025 light-duty vehicles. On August 24, 2018, the EPA and NHTSA published a proposal to freeze the model year 2020 standards through model year 2026 and to revoke California's waiver under the CAA to establish more stringent standards (32).

MANDATORY REPORTING OF GHGS

The Consolidated Appropriations Act of 2008, passed in December 2007, requires the establishment of mandatory GHG reporting requirements. On September 22, 2009, the EPA issued the Final Mandatory Reporting of GHGs Rule, which became effective January 1, 2010. The rule requires reporting of GHG emissions from large sources and suppliers in the U.S. and is intended to collect accurate and timely emissions data to inform future policy decisions. Under the rule, suppliers of fossil fuels or industrial GHGs, manufacturers of vehicles and engines, and facilities that emit 25,000 metric tons per year (MT/yr) or more of GHG emissions are required to submit annual reports to the EPA.

NEW SOURCE REVIEW

The EPA issued a final rule on May 13, 2010, that establishes thresholds for GHGs that define when permits under the New Source Review Prevention of Significant Deterioration and Title V Operating Permit programs are required for new and existing industrial facilities. This final rule "tailors" the requirements of these CAA permitting programs to limit which facilities will be required to obtain Prevention of Significant Deterioration and Title V permits. In the preamble to the revisions to the Federal Code of Regulations, the EPA states:

> *"This rulemaking is necessary because without it the Prevention of Significant Deterioration and Title V requirements would apply, as of January 2, 2011, at the 100 or 250 tons per year levels provided under the CAA, greatly increasing the number of required permits, imposing undue costs on small sources, overwhelming the resources of permitting authorities, and severely impairing the functioning of the programs. EPA is relieving these resource burdens by phasing in the applicability of these programs to GHG sources, starting with the largest GHG emitters. This rule establishes two initial steps of the phase-in. The rule also commits the agency to take certain actions on future steps addressing smaller sources but excludes certain smaller sources from Prevention of Significant Deterioration and Title V permitting for GHG emissions until at least April 30, 2016."*

The EPA estimates that facilities responsible for nearly 70% of the national GHG emissions from stationary sources will be subject to permitting requirements under this rule. This includes the nation's largest GHG emitters—power plants, refineries, and cement production facilities.

STANDARDS OF PERFORMANCE FOR GHG EMISSIONS FOR NEW STATIONARY SOURCES: ELECTRIC UTILITY GENERATING UNITS

As required by a settlement agreement, the EPA proposed new performance standards for emissions of CO_2 for new, affected, fossil fuel-fired electric utility generating units on March 27, 2012. New sources greater than 25 megawatts (MW) would be required to meet an output-based standard of 1,000 pounds (lbs) of CO_2 per MW-hour (MWh), based on the performance of widely used natural gas combined cycle technology. It should be noted that on February 9, 2016 the U.S. Court issued a stay of this regulation pending litigation. Additionally, the current EPA Administrator has also signed a measure to repeal the Clean Power Plan, including the CO_2 standards. The Clean Power Plan was officially repealed on June 19, 2019, when the EPA issued the final Affordable Clean Energy rule (ACE). Under ACE, new state emission guidelines were established that provided existing coal-fired electric utility generating units with achievable standards.

CAP-AND-TRADE

Cap-and-trade refers to a policy tool where emissions are limited to a certain amount and can be traded or provides flexibility on how the emitter can comply. Successful examples in the U.S. include the Acid Rain Program and the N_2O Budget Trading Program and Clean Air Interstate Rule in the northeast. There is no federal GHG cap-and-trade program currently; however, some states have joined to create initiatives to provide a mechanism for cap-and-trade.

The Regional GHG Initiative is an effort to reduce GHGs among the states of Connecticut, Delaware, Maine, Maryland, Massachusetts, New Hampshire, New York, Rhode Island, and Vermont. Each state caps CO_2 emissions from power plants, auctions CO_2 emission allowances, and invests the proceeds in strategic energy programs that further reduce emissions, save consumers money, create jobs, and build a clean energy economy. The Initiative began in 2008 and in 2020 has retained all participating states.

The Western Climate Initiative (WCI) partner jurisdictions have developed a comprehensive initiative to reduce regional GHG emissions to 15% below 2005 levels by 2020. The partners were originally California, British Columbia, Manitoba, Ontario, and Quebec. However, Manitoba and Ontario are not currently participating. California linked with Quebec's cap-and-trade system January 1, 2014, and joint offset auctions took place in 2015. While the WCI has yet to publish whether it has successfully reached the 2020 emissions goal initiative set in 2007, SB 32, requires that California, a major partner in the WCI, adopt the goal of reducing statewide GHG emissions to 40% below the 1990 level by 2030.

SMARTWAY PROGRAM

The SmartWay Program is a public-private initiative between the EPA, large and small trucking companies, rail carriers, logistics companies, commercial manufacturers, retailers, and other federal and state agencies. Its purpose is to improve fuel efficiency and the environmental performance (reduction of both GHG emissions and air pollution) of the goods movement supply chains. SmartWay is comprised of four components (33):

1. SmartWay Transport Partnership: A partnership in which freight carriers and shippers commit to benchmark operations, track fuel consumption, and improve performance annually.
2. SmartWay Technology Program: A testing, verification, and designation program to help freight companies identify equipment, technologies, and strategies that save fuel and lower emissions.
3. SmartWay Vehicles: A program that ranks light-duty cars and small trucks and identifies superior environmental performers with the SmartWay logo.

4. SmartWay International Interests: Guidance and resources for countries seeking to develop freight sustainability programs modeled after SmartWay.

SmartWay effectively refers to requirements geared towards reducing fuel consumption. Most large trucking fleets driving newer vehicles are compliant with SmartWay design requirements. Moreover, over time, all HDTs will have to comply with the CARB GHG Regulation that is designed with the SmartWay Program in mind, to reduce GHG emissions by making them more fuel-efficient. For instance, in 2015, 53 foot or longer dry vans or refrigerated trailers equipped with a combination of SmartWay-verified low-rolling resistance tires and SmartWay-verified aerodynamic devices would obtain a total of 10% or more fuel savings over traditional trailers.

Through the SmartWay Technology Program, the EPA has evaluated the fuel saving benefits of various devices through grants, cooperative agreements, emissions and fuel economy testing, demonstration projects and technical literature review. As a result, the EPA has determined the following types of technologies provide fuel saving and/or emission reducing benefits when used properly in their designed applications, and has verified certain products:

- Idle reduction technologies – less idling of the engine when it is not needed would reduce fuel consumption.
- Aerodynamic technologies minimize drag and improve airflow over the entire tractor-trailer vehicle. Aerodynamic technologies include gap fairings that reduce turbulence between the tractor and trailer, side skirts that minimize wind under the trailer, and rear fairings that reduce turbulence and pressure drop at the rear of the trailer.
- Low rolling resistance tires can roll longer without slowing down, thereby reducing the amount of fuel used. Rolling resistance (or rolling friction or rolling drag) is the force resisting the motion when a tire rolls on a surface. The wheel will eventually slow down because of this resistance.
- Retrofit technologies include things such as diesel particulate filters, emissions upgrades (to a higher tier), etc., which would reduce emissions.
- Federal excise tax exemptions.

2.7.3 CALIFORNIA

LEGISLATIVE ACTIONS TO REDUCE GHGS

The State of California legislature has enacted a series of bills that constitute the most aggressive program to reduce GHGs of any state in the nation. Some legislation such as the landmark AB 32 was specifically enacted to address GHG emissions. Other legislation such as Title 24 and Title 20 energy standards were originally adopted for other purposes such as energy and water conservation, but also provide GHG reductions. This section describes the major provisions of the legislation.

AB 32

The California State Legislature enacted AB 32, which required that GHGs emitted in California be reduced to 1990 levels by the year 2020 (this goal has been met[3]). GHGs as defined under AB 32 include CO_2, CH_4, N_2O, HFCs, PFCs, and SF_6. Since AB 32 was enacted, a seventh chemical, nitrogen trifluoride, has also been added to the list of GHGs. The CARB is the state agency charged with monitoring and regulating sources of GHGs. AB 32 states the following:

> *"Global warming poses a serious threat to the economic well-being, 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."*

SB 32

On September 8, 2016, Governor Jerry Brown signed the SB 32 and its companion bill, AB 197. SB 32 requires the state to reduce statewide GHG emissions to 40% below 1990 levels by 2030, a reduction target that was first introduced in Executive Order B-30-15. The new legislation builds upon the AB 32 goal and provides an intermediate goal to achieving S-3-05, which sets a statewide GHG reduction target of 80% below 1990 levels by 2050. AB 197 creates a legislative committee to oversee regulators to ensure that CARB not only responds to the Governor, but also the Legislature (11).

CARB Scoping Plan Update

In November 2017, CARB released the *Final 2017 Scoping Plan Update*, which identifies the State's post-2020 reduction strategy. The *Final 2017 Scoping Plan Update* reflects the 2030 target of a 40% reduction below 1990 levels, set by Executive Order B-30-15 and codified by SB 32. Key programs that the proposed Second Update builds upon include the Cap-and-Trade Regulation, the LCFS, and much cleaner cars, trucks and freight movement, utilizing cleaner, renewable energy, and strategies to reduce CH_4 emissions from agricultural and other wastes.

The *Final 2017 Scoping Plan Update* establishes a new emissions limit of 260 $MMTCO_2e$ for the year 2030, which corresponds to a 40% decrease in 1990 levels by 2030 (34).

California's climate strategy will require contributions from all sectors of the economy, including the land base, and will include enhanced focus on zero- and near-zero-emission (ZE/NZE) vehicle technologies; continued investment in renewables, including solar roofs, wind, and other distributed generation; greater use of low carbon fuels; integrated land conservation and development strategies; coordinated efforts to reduce emissions of short-lived climate pollutants

[3] Based upon the 2019 GHG inventory data (i.e., the latest year for which data are available) for the 2000-2017 GHG emissions period, California emitted an average 424.1 $MMTCO_2e$ (30). This is less than the 2020 emissions target of 431 $MMTCO_2e$.

(CH_4, black carbon, and fluorinated gases); and an increased focus on integrated land use planning to support livable, transit-connected communities and conservation of agricultural and other lands. Requirements for direct GHG reductions at refineries will further support air quality co-benefits in neighborhoods, including in disadvantaged communities historically located adjacent to these large stationary sources, as well as efforts with California's local air pollution control and air quality management districts (air districts) to tighten emission limits on a broad spectrum of industrial sources. Major elements of the *Final 2017 Scoping Plan Update* framework include:

- Implementing and/or increasing the standards of the Mobile Source Strategy, which include increasing ZEV buses and trucks.
- LCFS, with an increased stringency (18% by 2030).
- Implementing SB 350, which expands the RPS to 50% RPS and doubles energy efficiency savings by 2030.
- California Sustainable Freight Action Plan, which improves freight system efficiency, utilizes near-zero emissions technology, and deployment of zero-emission vehicles (ZEV) trucks.
- Implementing the proposed Short-Lived Climate Pollutant Strategy (SLPS), which focuses on reducing CH_4 and hydroflurocarbon emissions by 40% and anthropogenic black carbon emissions by 50% by year 2030.
- Continued implementation of SB 375.
- Post-2020 Cap-and-Trade Program that includes declining caps.
- 20% reduction in GHG emissions from refineries by 2030.
- Development of a Natural and Working Lands Action Plan to secure California's land base as a net carbon sink.

Note, however, that the *Final 2017 Scoping Plan Update* acknowledges that:

> *"[a]chieving net zero increases in GHG emissions, resulting in no contribution to GHG impacts, may not be feasible or appropriate for every project, however, and the inability of a project to mitigate its GHG emissions to net zero does not imply the project results in a substantial contribution to the cumulatively significant environmental impact of climate change under CEQA."*

In addition to the statewide strategies listed above, the *Final 2017 Scoping Plan Update* also identifies local governments as essential partners in achieving the State's long-term GHG reduction goals and identifies local actions to reduce GHG emissions. As part of the recommended actions, CARB recommends that local governments achieve a community-wide goal to achieve emissions of no more than 6 metric tons of CO_2e ($MTCO_2e$) or less per capita by 2030 and 2 $MTCO_2e$ or less per capita by 2050. For CEQA projects, CARB states that lead agencies may develop evidenced-based bright-line numeric thresholds—consistent with the Scoping Plan and the State's long-term GHG goals—and projects with emissions over that amount may be required to incorporate on-site design features and mitigation measures that avoid or minimize project emissions to the degree feasible; or, a performance-based metric using a CAP or other plan to reduce GHG emissions is appropriate.

According to research conducted by the Lawrence Berkeley National Laboratory (LBNL) and supported by CARB, California, under its existing and proposed GHG reduction policies, could achieve the 2030 goals under SB 32. The research utilized a new, validated model known as the California LBNL GHG Analysis of Policies Spreadsheet (CALGAPS), which simulates GHG and criteria pollutant emissions in California from 2010 to 2050 in accordance to existing and future GHG-reducing policies. The CALGAPS model showed that by 2030, emissions could range from 211 to 428 $MTCO_2e$ per year ($MTCO_2e$/yr), indicating that "even if all modeled policies are not implemented, reductions could be sufficient to reduce emissions 40% below the 1990 level [of SB 32]." CALGAPS analyzed emissions through 2050 even though it did not generally account for policies that might be put in place after 2030. Although the research indicated that the emissions would not meet the State's 80% reduction goal by 2050, various combinations of policies could allow California's cumulative emissions to remain very low through 2050 (35) (36).

CAP-AND-TRADE PROGRAM

The Scoping Plan identifies a Cap-and-Trade Program as one of the key strategies for California to reduce GHG emissions. According to CARB, a cap-and-trade program will help put California on the path to meet its goal of achieving a 40% reduction in GHG emissions from 1990 levels by 2030. Under cap-and-trade, an overall limit on GHG emissions from capped sectors is established, and facilities subject to the cap will be able to trade permits to emit GHGs within the overall limit.

CARB adopted a California Cap-and-Trade Program pursuant to its authority under AB 32. The Cap-and-Trade Program is designed to reduce GHG emissions from regulated entities by more than 16% between 2013 and 2020, and by an additional 40% by 2030. The statewide cap for GHG emissions from the capped sectors (e.g., electricity generation, petroleum refining, and cement production) commenced in 2013 and will decline over time, achieving GHG emission reductions throughout the program's duration.

Covered entities that emit more than 25.000 $MTCO_2e$/yr must comply with the Cap-and-Trade Program. Triggering of the 25.000 $MTCO_2e$/yr "inclusion threshold" is measured against a subset of emissions reported and verified under the California Regulation for the Mandatory Reporting of GHG Emissions (Mandatory Reporting Rule or "MRR").

Under the Cap-and-Trade Program, CARB issues allowances equal to the total amount of allowable emissions over a given compliance period and distributes these to regulated entities. Covered entities are allocated free allowances in whole or part (if eligible), and may buy allowances at auction, purchase allowances from others, or purchase offset credits. Each covered entity with a compliance obligation is required to surrender "compliance instruments" for each $MTCO_2e$ of GHG they emit. There also are requirements to surrender compliance instruments covering 30% of the prior year's compliance obligation by November of each year (37).

The Cap-and-Trade Program provides a firm cap, which provides the highest certainty of achieving the 2030 target. An inherent feature of the Cap-and-Trade program is that it does not guarantee GHG emissions reductions in any discrete location or by any particular source. Rather, GHG emissions reductions are only guaranteed on an accumulative basis. As summarized by CARB in the *First Update to the Climate Change Scoping Plan*:

> *"The Cap-and-Trade Regulation gives companies the flexibility to trade allowances with others or take steps to cost-effectively reduce emissions at their own facilities. Companies that emit more have to turn in more allowances or other compliance instruments. Companies that can cut their GHG emissions have to turn in fewer allowances. But as the cap declines, aggregate emissions must be reduced. In other words, a covered entity theoretically could increase its GHG emissions every year and still comply with the Cap-and-Trade Program if there is a reduction in GHG emissions from other covered entities. Such a focus on aggregate GHG emissions is considered appropriate because climate change is a global phenomenon, and the effects of GHG emissions are considered cumulative."* (38)

The Cap-and-Trade Program covered approximately 80% of California's GHG emissions (34). The Cap-and-Trade Program covers the GHG emissions associated with electricity consumed in California, whether generated in-state or imported. Accordingly, GHG emissions associated with CEQA projects' electricity usage are covered by the Cap-and-Trade Program. The Cap-and-Trade Program also covers fuel suppliers (natural gas and propane fuel providers and transportation fuel providers) to address emissions from such fuels and from combustion of other fossil fuels not directly covered at large sources in the Program's first compliance period. The Cap-and-Trade Program covers the GHG emissions associated with the combustion of transportation fuels in California, whether refined in-state or imported.

THE SUSTAINABLE COMMUNITIES AND CLIMATE PROTECTION ACT OF 2008 (SB 375)

Passing the Senate on August 30, 2008, SB 375 was signed by the Governor on September 30, 2008. According to SB 375, the transportation sector is the largest contributor of GHG emissions, which emits over 40% of the total GHG emissions in California. SB 375 states, "Without improved land use and transportation policy, California will not be able to achieve the goals of AB 32." SB 375 does the following: it (1) requires metropolitan planning organizations (MPO) to include sustainable community strategies in their regional transportation plans for reducing GHG emissions, (2) aligns planning for transportation and housing, and (3) creates specified incentives for the implementation of the strategies.

Concerning CEQA, SB 375, as codified in Public Resources Code Section 21159.28, states that CEQA findings for certain projects are not required to reference, describe, or discuss (1) growth inducing impacts, or (2) any project-specific or cumulative impacts from cars and light-duty truck trips generated by the project on global warming or the regional transportation network, if the project:

1. Is in an area with an approved sustainable communities strategy or an alternative planning strategy that the CARB accepts as achieving the GHG emission reduction targets.
2. Is consistent with that strategy (in designation, density, building intensity, and applicable policies).
3. Incorporates the mitigation measures required by an applicable prior environmental document.

AB 1493

California AB 1493, enacted on July 22, 2002, required CARB to develop and adopt regulations that reduce GHGs emitted by passenger vehicles and light duty trucks. Implementation of the regulation was delayed by lawsuits filed by automakers and by the EPA's denial of an implementation waiver. The EPA subsequently granted the requested waiver in 2009, which was upheld by the U.S. District Court for the District of Columbia in 2011.

The standards phase in during the 2009 through 2016 model years. When fully phased in, the near-term (2009–2012) standards will result in about a 22% reduction compared with the 2002 fleet, and the mid-term (2013–2016) standards will result in about a 30% reduction. Several technologies stand out as providing significant reductions in emissions at favorable costs. These include discrete variable valve lift or camless valve actuation to optimize valve operation rather than relying on fixed valve timing and lift as has historically been done; turbocharging to boost power and allow for engine downsizing; improved multi-speed transmissions; and improved air conditioning systems that operate optimally, leak less, and/or use an alternative refrigerant.

The second phase of the implementation for the Pavley bill was incorporated into Amendments to the Low-Emission Vehicle Program (LEV III) or the Advanced Clean Cars program. The Advanced Clean Car program combines the control of smog-causing pollutants and GHG emissions into a single coordinated package of requirements for model years 2017 through 2025. The regulation will reduce GHGs from new cars by 34% from 2016 levels by 2025. The new rules will clean up gasoline and diesel-powered cars, and deliver increasing numbers of zero-emission technologies, such as full battery electric cars, newly emerging plug-in hybrid EVs (EV) and hydrogen fuel cell cars. The package will also ensure adequate fueling infrastructure is available for the increasing numbers of hydrogen fuel cell vehicles planned for deployment in California.

CLEAN ENERGY AND POLLUTION REDUCTION ACT OF 2015 (SB 350)

In October 2015, the legislature approved, and the Governor signed SB 350, which reaffirms California's commitment to reducing its GHG emissions and addressing climate change. Key provisions include an increase in the RPS, higher energy efficiency requirements for buildings, initial strategies towards a regional electricity grid, and improved infrastructure for EV charging stations. Provisions for a 50% reduction in the use of petroleum statewide were removed from the Bill because of opposition and concern that it would prevent the Bill's passage. Specifically, SB 350 requires the following to reduce statewide GHG emissions:

- Increase the amount of electricity procured from renewable energy sources from 33% to 50% by 2030, with interim targets of 40% by 2024, and 25% by 2027.
- Double the energy efficiency in existing buildings by 2030. This target will be achieved through the California Public Utility Commission (CPUC), the California Energy Commission (CEC), and local publicly owned utilities.
- Reorganize the Independent System Operator to develop more regional electrify transmission markets and to improve accessibility in these markets, which will facilitate the growth of renewable energy markets in the western United States.

2.7.3.1 Executive Orders Related to GHG Emissions

California's Executive Branch has taken several actions to reduce GHGs through the use of Executive Orders. Although not regulatory, they set the tone for the state and guide the actions of state agencies.

Executive Order B-55-18 and SB 100

Executive Order B-55-18 and SB 100. SB 100 and Executive Order B-55-18 were signed by Governor Brown on September 10, 2018. Under the existing RPS, 25% of retail sales are required to be from renewable sources by December 31, 2016, 33% by December 31, 2020, 40% by December 31, 2024, 45% by December 31, 2027, and 50% by December 31, 2030. SB 100 raises California's RPS requirement to 50% renewable resources target by December 31, 2026, and to achieve a 60% target by December 31, 2030. SB 100 also requires that retail sellers and local publicly owned electric utilities procure a minimum quantity of electricity products from eligible renewable energy resources so that the total kilowatt hours (kWh) of those products sold to their retail end-use customers achieve 44% of retail sales by December 31, 2024, 52% by December 31, 2027, and 60% by December 31, 2030. In addition to targets under AB 32 and SB 32, Executive Order B-55-18 establishes a carbon neutrality goal for the state of California by 2045; and sets a goal to maintain net negative emissions thereafter. The Executive Order directs the California Natural Resources Agency (CNRA), California Environmental Protection Agency (CalEPA), the Department of Food and Agriculture (CDFA), and CARB to include sequestration targets in the Natural and Working Lands Climate Change Implementation Plan consistent with the carbon neutrality goal.

Executive Order S-3-05

Former California Governor Arnold Schwarzenegger announced on June 1, 2005, through Executive Order S-3-05, the following reduction targets for GHG emissions:

- By 2010, reduce GHG emissions to 2000 levels.
- By 2020, reduce GHG emissions to 1990 levels.
- By 2050, reduce GHG emissions to 80% below 1990 levels.

The 2050 reduction goal represents what some scientists believe is necessary to reach levels that will stabilize the climate. The 2020 goal was established to be a mid-term target. Because this is an executive order, the goals are not legally enforceable for local governments or the private sector.

Executive Order S-01-07 (LCFS)

The Governor signed Executive Order S-01-07 on January 18, 2007. The order mandates that a statewide goal shall be established to reduce the carbon intensity of California's transportation fuels by at least 10% by 2020. The CARB adopted the LCFS on April 23, 2009.

The LCFS was challenged in the U.S. District Court in Fresno in 2011. The court's ruling issued on December 29, 2011, included a preliminary injunction against CARB's implementation of the rule. The Ninth Circuit Court of Appeals stayed the injunction on April 23, 2012, pending final ruling on appeal, allowing CARB to continue to implement and enforce the regulation. The Ninth Circuit Court's decision, filed September 18, 2013, vacated the preliminary injunction. In essence, the court held that LCFS adopted by CARB were not in conflict with federal law. On August 8, 2013, the Fifth District Court of Appeal (California) ruled CARB failed to comply with CEQA and the Administrative Procedure Act (APA) when adopting regulations for LCFS. In a partially published opinion, the Court of Appeal reversed the trial court's judgment and directed issuance of a writ of mandate setting aside Resolution 09-31 and two executive orders of CARB approving LCFS regulations promulgated to reduce GHG emissions. However, the court tailored its remedy to protect the public interest by allowing the LCFS regulations to remain operative while CARB complies with the procedural requirements it failed to satisfy.

To address the Court ruling, CARB was required to bring a new LCFS regulation to the Board for consideration in February 2015. The proposed LCFS regulation was required to contain revisions to the 2010 LCFS as well as new provisions designed to foster investments in the production of the low-carbon intensity fuels, offer additional flexibility to regulated parties, update critical technical information, simplify and streamline program operations, and enhance enforcement. On November 16, 2015 the Office of Administrative Law (OAL) approved the Final Rulemaking Package. The new LCFS regulation became effective on January 1, 2016.

In 2018, the CARB approved amendments to the regulation, which included strengthening the carbon intensity benchmarks through 2030 in compliance with the SB 32 GHG emissions reduction target for 2030. The amendments included crediting opportunities to promote zero emission vehicle adoption, alternative jet fuel, carbon capture and sequestration, and advanced technologies to achieve deep decarbonization in the transportation sector (39).

EXECUTIVE ORDER S-13-08

Executive Order S-13-08 states that "climate change in California during the next century is expected to shift precipitation patterns, accelerate sea level rise and increase temperatures, thereby posing a serious threat to California's economy, to the health and welfare of its population and to its natural resources." Pursuant to the requirements in the Order, the 2009 California Climate Adaptation Strategy (CNRA 2009) was adopted, which is the "…first statewide, multi-sector, region-specific, and information-based climate change adaptation strategy in the United States." Objectives include analyzing risks of climate change in California, identifying and exploring strategies to adapt to climate change, and specifying a direction for future research.

EXECUTIVE ORDER B-30-15

On April 29, 2015, Governor Edmund G. Brown Jr. issued an executive order to establish a California GHG reduction target of 40% below 1990 levels by 2030. The Governor's executive order aligns California's GHG reduction targets with those of leading international governments ahead of the U.N. Climate Change Conference in Paris late 2015. The Order sets a new interim statewide GHG emission reduction target to reduce GHG emissions to 40% below 1990 levels by 2030 in order to ensure California meets its target of reducing GHG emissions to 80% below 1990 levels by 2050 and directs CARB to update the Climate Change Scoping Plan to express the 2030 target in terms of $MMTCO_2e$. The Order also requires the state's climate adaptation plan to be updated every three years, and for the State to continue its climate change research program, among other provisions. As with Executive Order S-3-05, this Order is not legally enforceable for local governments and the private sector. Legislation that would update AB 32 to make post 2020 targets and requirements a mandate is in process in the State Legislature.

2.7.3.2 CALIFORNIA REGULATIONS AND BUILDING CODES

California has a long history of adopting regulations to improve energy efficiency in new and remodeled buildings. These regulations have kept California's energy consumption relatively flat even with rapid population growth.

TITLE 20 CCR

CCR, Title 20: Division 2, Chapter 4, Article 4, Sections 1601-1608: Appliance Efficiency Regulations regulates the sale of appliances in California. The Appliance Efficiency Regulations include standards for both federally regulated appliances and non-federally regulated appliances. 23 categories of appliances are included in the scope of these regulations. The standards within these regulations apply to appliances that are sold or offered for sale in California, except those sold wholesale in California for final retail sale outside the state and those designed and sold exclusively for use in recreational vehicles or other mobile equipment (CEC 2012).

TITLE 24 CCR

CCR Title 24 Part 6: California's Energy Efficiency Standards for Residential and Nonresidential Buildings, was first adopted in 1978 in response to a legislative mandate to reduce California's energy consumption. The standards are updated periodically to allow consideration and possible incorporation of new energy efficient technologies and methods. Energy efficient buildings require less electricity; therefore, increased energy efficiency reduces fossil fuel consumption and decreases GHG emissions. The 2019 version of Title 24 was adopted by the CEC and became effective on January 1, 2020.

The CEC indicates that the 2019 Title 24 standards will require solar photovoltaic systems for new homes, establish requirements for newly constructed healthcare facilities, encourage demand responsive technologies for residential buildings, update indoor and outdoor lighting for nonresidential buildings. The CEC anticipates that single-family homes built with the 2019 standards will use approximately 7% less energy compared to the residential homes built under the 2016 standards. Additionally, after implementation of solar photovoltaic systems, homes built under the 2019 standards will about 53% less energy than homes built under the 2016 standards. Nonresidential buildings will use approximately 30% less energy due to lighting upgrades (40).

CCR, Title 24, Part 11: California Green Building Standards Code (CALGreen) is a comprehensive and uniform regulatory code for all residential, commercial, and school buildings that went in effect on January 1, 2011, and is administered by the California Building Standards Commission (CBSC). CALGreen is updated on a regular basis, with the most recent approved update consisting of the 2019 California Green Building Code Standards that have become effective on January 1, 2020. Local jurisdictions are permitted to adopt more stringent requirements, as state law provides methods for local enhancements. CALGreen recognizes that many jurisdictions have developed existing construction and demolition ordinances and defers to them as the ruling guidance provided, they establish a minimum 65% diversion requirement. The code also provides exemptions for areas not served by construction and demolition recycling infrastructure. The State Building Code provides the minimum standard that buildings must meet in order to be certified for occupancy, which is generally enforced by the local building official. 2019 CALGreen standards are applicable to the Project and require (41):

- Short-term bicycle parking. If the new project or an additional alteration is anticipated to generate visitor traffic, provide permanently anchored bicycle racks within 200 feet of the visitors' entrance, readily visible to passers-by, for 5% of new visitor motorized vehicle parking spaces being added, with a minimum of one two-bike capacity rack (5.106.4.1.1).
- Long-term bicycle parking. For new buildings with tenant spaces that have 10 or more tenant-occupants, provide secure bicycle parking for 5% of the tenant-occupant vehicular parking spaces with a minimum of one bicycle parking facility (5.106.4.1.2).
- Designated parking. In new projects or additions to alterations that add 10 or more vehicular parking spaces, provide designated parking for any combination of low-emitting, fuel-efficient and carpool/van pool vehicles as shown in Table 5.106.5.2 (5.106.5.2).
- Construction waste management. Recycle and/or salvage for reuse a minimum of 65% of the nonhazardous construction and demolition waste in accordance with Section 5.408.1.1. 5.405.1.2, or 5.408.1.3; or meet a local construction and demolition waste management ordinance, whichever is more stringent (5.408.1).
- Excavated soil and land clearing debris. 100% of trees, stumps, rocks and associated vegetation and soils resulting primarily from land clearing shall be reused or recycled. For a phase project, such material may be stockpiled on site until the storage site is developed (5.408.3).
- Recycling by Occupants. Provide readily accessible areas that serve the entire building and are identified for the depositing, storage and collection of non-hazardous materials for recycling, including (at a minimum) paper, corrugated cardboard, glass, plastics, organic waste, and metals or meet a lawfully enacted local recycling ordinance, if more restrictive (5.410.1).
- Water conserving plumbing fixtures and fittings. Plumbing fixtures (water closets and urinals) and fittings (faucets and showerheads) shall comply with the following:
    - Water Closets. The effective flush volume of all water closets shall not exceed 1.28 gallons per flush (5.303.3.1)
    - Urinals. The effective flush volume of wall-mounted urinals shall not exceed 0.125 gallons per flush (5.303.3.2.1). The effective flush volume of floor-mounted or other urinals shall not exceed 0.5 gallons per flush (5.303.3.2.2).
    - Showerheads. Single showerheads shall have a minimum flow rate of not more than 1.8 gallons per minute and 80 psi (5.303.3.3.1). When a shower is served by more than one showerhead, the combine flow rate of all showerheads and/or other shower outlets controlled by a single valve shall not exceed 1.8 gallons per minute at 80 psi (5.303.3.3.2).
    - Faucets and fountains. Nonresidential lavatory faucets shall have a maximum flow rate of note more than 0.5 gallons per minute at 60 psi (5.303.3.4.1). Kitchen

faucets shall have a maximum flow rate of not more than 1.8 gallons per minute of 60 psi (5.303.3.4.2). Wash fountains shall have a maximum flow rate of not more than 1.8 gallons per minute (5.303.3.4.3). Metering faucets shall not deliver more than 0.20 gallons per cycle (5.303.3.4.4). Metering faucets for wash fountains shall have a maximum flow rate not more than 0.20 gallons per cycle (5.303.3.4.5).

- Outdoor portable water use in landscaped areas. Nonresidential developments shall comply with a local water efficient landscape ordinance or the current California Department of Water Resources' Model Water Efficient (MWELO), whichever is more stringent (5.304.1).
- Water meters. Separate submeters or metering devices shall be installed for new buildings or additions in excess of 50,000 sf or for excess consumption where any tenant within a new building or within an addition that is project to consume more than 1,000 gal/day (5.303.1.1 and 5.303.1.2).
- Outdoor water use in rehabilitated landscape projects equal or greater than 2,500 sf. Rehabilitated landscape projects with an aggregate landscape area equal to or greater than 2,500 sf requiring a building or landscape permit (5.304.3).
- Commissioning. For new buildings 10,000 sf and over, building commissioning shall be included in the design and construction processes of the building project to verify that the building systems and components meet the owner's or owner representative's project requirements (5.410.2).

MWELO

The MWELO was required by AB 1881, the Water Conservation Act. The bill required local agencies to adopt a local landscape ordinance at least as effective in conserving water as the Model Ordinance by January 1, 2010. Governor Brown's Drought Executive Order of April 1, 2015 (Executive Order B-29-15) directed Department of Water Resources (DWR) to update the Ordinance through expedited regulation. The California Water Commission approved the revised Ordinance on July 15, 2015 effective December 15, 2015. New development projects that include landscape areas of 500 sf or more are subject to the Ordinance. The update requires:

- More efficient irrigation systems;
- Incentives for graywater usage;
- Improvements in on-site stormwater capture;
- Limiting the portion of landscapes that can be planted with high water use plants; and
- Reporting requirements for local agencies.

CARB Refrigerant Management Program

CARB adopted a regulation in 2009 to reduce refrigerant GHG emissions from stationary sources through refrigerant leak detection and monitoring, leak repair, system retirement and retrofitting, reporting and recordkeeping, and proper refrigerant cylinder use, sale, and disposal. The regulation is set forth in sections 95380 to 95398 of Title 17, CCR. The rules implementing the regulation establish a limit on statewide GHG emissions from stationary facilities with refrigeration systems with more than 50 lbs of a high GWP refrigerant. The refrigerant management program is designed to (1) reduce emissions of high-GWP GHG refrigerants from leaky stationary, non-residential refrigeration equipment; (2) reduce emissions from the installation and servicing of refrigeration and air-conditioning appliances using high-GWP refrigerants; and (3) verify GHG emission reductions.

TRACTOR-TRAILER GHG REGULATION

The tractors and trailers subject to this regulation must either use EPA SmartWay certified tractors and trailers or retrofit their existing fleet with SmartWay verified technologies. The regulation applies primarily to owners of 53-foot or longer box-type trailers, including both dry-van and refrigerated-van trailers, and owners of the HD tractors that pull them on California highways. These owners are responsible for replacing or retrofitting their affected vehicles with compliant aerodynamic technologies and low rolling resistance tires. Sleeper cab tractors model year 2011 and later must be SmartWay certified. All other tractors must use SmartWay verified low rolling resistance tires. There are also requirements for trailers to have low rolling resistance tires and aerodynamic devices.

PHASE I AND 2 HEAVY-DUTY VEHICLE GHG STANDARDS

CARB has adopted a new regulation for GHG emissions from HDTs and engines sold in California. It establishes GHG emission limits on truck and engine manufacturers and harmonizes with the EPA rule for new trucks and engines nationally. Existing HD vehicle regulations in California include engine criteria emission standards, tractor-trailer GHG requirements to implement SmartWay strategies (i.e., the Heavy-Duty Tractor-Trailer Greenhouse Gas Regulation), and in-use fleet retrofit requirements such as the Truck and Bus Regulation. In September 2011, the EPA adopted their new rule for HDTs and engines. The EPA rule has compliance requirements for new compression and spark ignition engines, as well as trucks from Class 2b through Class 8. Compliance requirements begin with model year (MY) 2014 with stringency levels increasing through MY 2018. The rule organizes truck compliance into three groupings, which include a) HD pickups and vans; b) vocational vehicles; and c) combination tractors. The EPA rule does not regulate trailers.

CARB staff has worked jointly with the EPA and the NHTSA on the next phase of federal GHG emission standards for medium-duty trucks (MDT) and HDT vehicles, called federal Phase 2. The federal Phase 2 standards were built on the improvements in engine and vehicle efficiency required by the Phase 1 emission standards and represent a significant opportunity to achieve further GHG reductions for 2018 and later model year HDT vehicles, including trailers. But as discussed above, the EPA and NHTSA have proposed to roll back GHG and fuel economy standards for cars and light-duty trucks, which suggests a similar rollback of Phase 2 standards for MDT and HDT vehicles may be pursued.

SB 97 AND THE CEQA GUIDELINES UPDATE

Passed in August 2007, SB 97 added Section 21083.05 to the Public Resources Code. The code states “(a) On or before July 1, 2009, the OPR shall prepare, develop, and transmit to the Resources Agency guidelines for the mitigation of GHG emissions or the effects of GHG emissions as required by this division, including, but not limited to, effects associated with transportation or energy consumption. (b) On or before January 1, 2010, the Resources Agency shall certify and adopt guidelines prepared and developed by the OPR pursuant to subdivision (a)." Section 21097 was also added to the Public Resources Code. It provided CEQA protection until January 1, 2010 for transportation projects funded by the Highway Safety, Traffic Reduction, Air Quality, and Port Security Bond Act of 2006 or projects funded by the Disaster Preparedness and Flood Prevention Bond Act of 2006, in stating that the failure to analyze adequately the effects of GHGs would not violate CEQA.

On December 28, 2018, the Natural Resources Agency announced the OAL approved the amendments to the CEQA Guidelines for implementing the CEQA. The CEQA Amendments provide guidance to public agencies regarding the analysis and mitigation of the effects of GHG emissions in CEQA documents. The CEQA Amendments fit within the existing CEQA framework by amending existing CEQA Guidelines to reference climate change.

Section 15064.3 was added the CEQA Guidelines and states that in determining the significance of a project's GHG emissions, the lead agency should focus its analysis on the reasonably foreseeable incremental contribution of the project's emissions to the effects of climate change. A project's incremental contribution may be cumulatively considerable even if it appears relatively small compared to statewide, national or global emissions. The agency's analysis should consider a timeframe that is appropriate for the project. The agency's analysis also must reasonably reflect evolving scientific knowledge and state regulatory schemes. Additionally, a lead agency may use a model or methodology to estimate GHG emissions resulting from a project. The lead agency has discretion to select the model or methodology it considers most appropriate to enable decision makers to intelligently take into account the project's incremental contribution to climate change. The lead agency must support its selection of a model or methodology with substantial evidence. The lead agency should explain the limitations of the particular model or methodology selected for use (42).

2.7.4 REGIONAL

The project is within the South Coast Air Basin (SCAB), which is under the jurisdiction of the SCAQMD.

SCAQMD

SCAQMD is the agency responsible for air quality planning and regulation in the SCAB. The SCAQMD addresses the impacts to climate change of projects subject to SCAQMD permit as a lead agency if they are the only agency having discretionary approval for the project and acts as a responsible agency when a land use agency must also approve discretionary permits for the project. The SCAQMD acts as an expert commenting agency for impacts to air quality. This expertise carries over to GHG emissions, so the agency helps local land use agencies through the development of models and emission thresholds that can be used to address GHG emissions.

In 2008, SCAQMD formed a Working Group to identify GHG emissions thresholds for land use projects that could be used by local lead agencies in the SCAB. The Working Group developed several different options that are contained in the SCAQMD Draft Guidance Document – Interim CEQA GHG Significance Threshold, that could be applied by lead agencies. The working group has not provided additional guidance since release of the interim guidance in 2008. The SCAQMD

Board has not approved the thresholds; however, the Guidance Document provides substantial evidence supporting the approaches to significance of GHG emissions that can be considered by the lead agency in adopting its own threshold. The current interim thresholds consist of the following tiered approach:

- Tier 1 consists of evaluating whether or not the project qualifies for any applicable exemption under CEQA.
- Tier 2 consists of determining whether the project is consistent with a GHG reduction plan. If a project is consistent with a qualifying local GHG reduction plan, it does not have significant GHG emissions.
- Tier 3 consists of screening values, which the lead agency can choose, but must be consistent with all projects within its jurisdiction. A project's construction emissions are averaged over 30 years and are added to the project's operational emissions. If a project's emissions are below one of the following screening thresholds, then the project is less than significant:
    - Residential and Commercial land use: 3,000 $MTCO_2e$/yr
    - Industrial land use: 10,000 $MTCO_2e$/yr
    - Based on land use type: residential: 3,500 $MTCO_2e$/yr; commercial: 1,400 $MTCO_2e$/yr; or mixed use: 3,000 $MTCO_2e$/yr
- Tier 4 has the following options:
    - Option 1: Reduce Business-as-Usual (BAU) emissions by a certain percentage; this percentage is currently undefined.
    - Option 2: Early implementation of applicable AB 32 Scoping Plan measures
    - Option 3: 2020 target for service populations (SP), which includes residents and employees: 4.8 $MTCO_2e$ per SP per year for projects and 6.6 $MTCO_2e$ per SP per year for plans;
    - Option 3, 2035 target: 3.0 $MTCO_2e$ per SP per year for projects and 4.1 $MTCO_2e$ per SP per year for plans
- Tier 5 involves mitigation offsets to achieve target significance threshold.

The SCAQMD's interim thresholds used the Executive Order S-3-05-year 2050 goal as the basis for the Tier 3 screening level. Achieving the Executive Order's objective would contribute to worldwide efforts to cap CO_2 concentrations at 450 ppm, thus stabilizing global climate.

SCAQMD only has authority over GHG emissions from development projects that include air quality permits. At this time, it is unknown if the project would include stationary sources of emissions subject to SCAQMD permits. Notwithstanding, if the Project requires a stationary permit, it would be subject to the applicable SCAQMD regulations.

SCAQMD Regulation XXVII, adopted in 2009 includes the following rules:

- Rule 2700 defines terms and post global warming potentials.
- Rule 2701, SoCal Climate Solutions Exchange, establishes a voluntary program to encourage, quantify, and certify voluntary, high quality certified GHG emission reductions in the SCAQMD.

- Rule 2702, GHG Reduction Program created a program to produce GHG emission reductions within the SCAQMD. The SCAQMD will fund projects through contracts in response to requests for proposals or purchase reductions from other parties.

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3 PROJECT GREENHOUSE GAS IMPACT

3.1 INTRODUCTION

The Project has been evaluated to determine if it will result in a significant GHG impact. The significance of these potential impacts is described in the following section.

3.2 STANDARDS OF SIGNIFICANCE

The criteria used to determine the significance of potential Project-related GHG impacts are taken from the Initial Study Checklist in Appendix G of the State CEQA Guidelines (14 California Code of Regulations §§15000, et seq.). Based on these thresholds, a project would result in a significant impact related to GHG if it would (1):

- Generate GHG emissions, either directly or indirectly, that may have a significant impact on the environment?
- Conflict with an applicable plan, policy or regulation adopted for the purpose of reducing the emissions of GHGs?

3.3 CALIFORNIA EMISSIONS ESTIMATOR MODEL™ EMPLOYED TO ANALYZE GHG EMISSIONS

On October 17, 2017, the SCAQMD, in conjunction with the California Air Pollution Control Officers Association (CAPCOA) and other California air districts, released the latest version of the California Emissions Estimator Model (CalEEMod) Version 2016.3.2. The purpose of this model is to calculate construction-source and operational-source criteria pollutants and GHG emissions from direct and indirect sources; and quantify applicable air quality and GHG reductions achieved from mitigation measures (43). Accordingly, the latest version of CalEEMod has been used for this Project to determine GHG emissions. Output from the model runs for construction activity are provided in Appendices 3.1 through 3.4.

3.4 CONSTRUCTION LIFE-CYCLE ANALYSIS NOT REQUIRED

A full life-cycle analysis (LCA) for construction and operational activity is not included in this analysis due to the lack of consensus guidance on LCA methodology at this time (44). Life-cycle analysis (i.e., assessing economy-wide GHG emissions from the processes in manufacturing and transporting all raw materials used in the project development, infrastructure and on-going operations) depends on emission factors or econometric factors that are not well established for all processes. At this time, a LCA would be extremely speculative and thus has not been prepared.

Additionally, the SCAQMD recommends analyzing direct and indirect project GHG emissions generated within California and not life-cycle emissions because the life-cycle effects from a project could occur outside of California, might not be very well understood or documented, and would be challenging to mitigate (45). Additionally, the science to calculate life cycle emissions is not yet established or well defined; therefore, SCAQMD has not recommended, and is not requiring, life-cycle emissions analysis.

3.5 CONSTRUCTION EMISSIONS

Construction activities associated with the Project would result in emissions of CO_2 and CH_4 from construction activities. The report *2020 Optimum Basin Management Program Update Air Quality Impact Analysis Report* (AQIA) (Urban Crossroads, Inc.) contains detailed information regarding construction activity (46).

3.6 OPERATIONAL EMISSIONS

In terms of operational GHG emissions, the proposed Project involves the construction of wells, conveyance facilities and ancillary facilities, storage basins, recharge facilities, storage bands, desalters and water treatment facilities, and associated improvements. The proposed Project does not include any substantive new stationary or mobile sources of emissions, and therefore, by its very nature, will not generate quantifiable GHG emissions from Project operations. The Project does not propose a trip-generating land use or facilities that would generate any substantive amount of on-going GHG emissions. While it is anticipated that the Project would require intermittent maintenance to be, such maintenance would be minimal requiring a negligible amount of traffic trips on an annual basis. Therefore, there is no significant operational impact.

3.7 EMISSIONS SUMMARY

As shown in Table 3-1, the Project will result in approximately 18,986.93 $MTCO_2e$/yr from construction activities.

TABLE 3-1: PROJECT GHG EMISSIONS

Construction-related Emission Source	Emissions (MT/yr)			
	CO_2	CH_4	N_2O	Total CO_2e
Project Category 1	1,151.81	0.14	0.00	1,155.25
Project Category 2	5,704.02	1.69	0.00	5,746.19
Project Category 3	5,533.65	1.72	0.00	5,576.61
Project Category 4	6,461.62	1.89	0.00	6,508.88
Total CO_2e (All Sources)	**18,986.93**			

Source: Refer to Appendices 3.1 through 3.4 for detailed CalEEMod outputs.

3.8 GREENHOUSE GAS EMISSIONS FINDINGS AND RECOMMENDATIONS

GHG Impact #1: The Project would generate direct or indirect GHG emission that would result in a significant impact on the environment.

The Chino Basin Watermaster has not adopted its own numeric threshold of significance for determining impacts with respect to GHG emissions. A screening threshold of 3,000 $MTCO_2e$/yr or 10,000 $MTCO_2e$/yr to determine if additional analysis is required is an acceptable approach. This approach is a widely accepted screening threshold used by numerous cities and counties in the SCAB and is based on the SCAQMD staff's proposed GHG screening threshold for stationary source emissions for non-industrial projects, as described in the SCAQMD's *Interim CEQA GHG Significance Threshold for Stationary Sources, Rules and Plans* (SCAQMD Interim GHG Threshold). The SCAQMD Interim GHG Threshold identifies a screening threshold to determine whether additional analysis is required (47).

The Project will result in approximately 18,986.93 $MTCO_2e$/yr from construction activities. As such, the Project would exceed the SCAQMD's recommended numeric threshold of 3,000 $MTCO_2e$ or 10,000 $MTCO_2e$/yr if it were applied. Thus, the Project has the potential to result in a cumulatively considerable impact with respect to GHG emissions.

GHG Impact #2: The Project would not conflict with any applicable plan, policy or regulation of an agency adopted for the purpose of reducing the emissions of GHG.

As discussed above, the Project involves construction activity and does not propose a trip-generating land use or facilities that would generate any substantive amount of on-going GHG emissions. However, as presented in Table 3-1, the project's amortized GHG emissions are above the 3,000 $MTCO_2e$/yr and 10,000 $MTCO_2e$/yr thresholds. As concluded in Impact Statement GHG-1 the proposed project would have the potential to generate a significant amount of GHGs emissions. As such, proposed Project may otherwise conflict with an applicable plan, policy, or regulation adopted for the purpose of reducing the emissions of GHGs. Impacts are considered potentially significant in this regard.

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5 CERTIFICATIONS

The contents of this GHG study report represent an accurate depiction of the GHG impacts associated with the proposed 2020 Optimum Basin Management Program Update Project. The information contained in this GHG report is based on the best available data at the time of preparation. If you have any questions, please contact me directly at (949) 336-5987.

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AEP – Association of Environmental Planners
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PROFESSIONAL CERTIFICATIONS

Environmental Site Assessment – American Society for Testing and Materials • June 2013
Planned Communities and Urban Infill – Urban Land Institute • June 2011
Indoor Air Quality and Industrial Hygiene – EMSL Analytical • April 2008
Principles of Ambient Air Monitoring – California Air Resources Board • August 2007
AB2588 Regulatory Standards – Trinity Consultants • November 2006
Air Dispersion Modeling – Lakes Environmental • June 2006

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APPENDIX 3.1:

CALEEMOD PROJECT CATEGORY 1 ANNUAL CONSTRUCTION EMISSIONS MODEL OUTPUTS

OBMPU - Project Category 1 (Construction - Mitigated)

San Bernardino-South Coast County, Annual

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Other Asphalt Surfaces	22.50	1000sqft	0.52	22,500.00	0
Other Non-Asphalt Surfaces	455.00	1000sqft	10.45	455,000.00	0

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	2.2	**Precipitation Freq (Days)**	32
Climate Zone	10			**Operational Year**	2022
Utility Company	Southern California Edison				
CO2 Intensity (lb/MWhr)	702.44	**CH4 Intensity (lb/MWhr)**	0.029	**N2O Intensity (lb/MWhr)**	0.006

1.3 User Entered Comments & Non-Default Data

Project Characteristics -

Land Use - Other Asphalt Surfaces = 20 Monitoring Wells and Production Wells; Other Non-Asphalt Surfaces = Conveyance

Construction Phase - Analysis assumes 20 Monitoring Wells, 10 Production Wells, and 65,000 LF of conveyance to be constructed in a single year.

Off-road Equipment - Equipment based on information provided in the Project Description

Trips and VMT - Based on information provided in the Project Description

Grading - Based on the Project Description, the average area of disturbance of each site is anticipated to be half an acre or less.

Construction Off-road Equipment Mitigation - All equipment operating at >150 hp are required to be equipped with Tier 4 or better engines. Increase watering to 4 times per day.

Table Name	Column Name	Default Value	New Value
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstructionPhase	NumDays	30.00	366.00
tblConstructionPhase	NumDaysWeek	5.00	7.00
tblGrading	AcresOfGrading	0.00	183.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	0.00
tblTripsAndVMT	VendorTripLength	6.90	50.00
tblTripsAndVMT	VendorTripNumber	0.00	30.00
tblTripsAndVMT	WorkerTripLength	14.70	30.00
tblTripsAndVMT	WorkerTripNumber	5.00	10.00

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	0.2250	3.0834	1.4999	0.0124	0.3871	0.0582	0.4453	0.0932	0.0538	0.1469	0.0000	1,148.6848	1,148.6848	0.1371	0.0000	1,152.1116
2022	5.5000e-004	7.0400e-003	3.8800e-003	3.0000e-005	0.0978	1.2000e-004	0.0980	0.0107	1.1000e-004	0.0108	0.0000	3.1271	3.1271	3.7000e-004	0.0000	3.1365
Maximum	**0.2250**	**3.0834**	**1.4999**	**0.0124**	**0.3871**	**0.0582**	**0.4453**	**0.0932**	**0.0538**	**0.1469**	**0.0000**	**1,148.6848**	**1,148.6848**	**0.1371**	**0.0000**	**1,152.1116**

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	0.1181	1.7915	2.3278	0.0124	0.3153	0.0130	0.3283	0.0854	0.0128	0.0982	0.0000	1,148.6844	1,148.6844	0.1371	0.0000	1,152.1112
2022	3.1000e-004	4.5000e-003	6.2900e-003	3.0000e-005	0.0260	3.0000e-005	0.0261	2.9500e-003	3.0000e-005	2.9800e-003	0.0000	3.1271	3.1271	3.7000e-004	0.0000	3.1365
Maximum	**0.1181**	**1.7915**	**2.3278**	**0.0124**	**0.3153**	**0.0130**	**0.3283**	**0.0854**	**0.0128**	**0.0982**	**0.0000**	**1,148.6844**	**1,148.6844**	**0.1371**	**0.0000**	**1,152.1112**

	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	**47.49**	**41.89**	**-55.22**	**0.00**	**29.62**	**77.61**	**34.77**	**14.93**	**76.28**	**35.89**	**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)
1	1-1-2021	3-31-2021	0.8098	0.4649
2	4-1-2021	6-30-2021	0.8084	0.4597
3	7-1-2021	9-30-2021	0.8173	0.4647
4	10-1-2021	12-31-2021	0.8278	0.4753
5	1-1-2022	3-31-2022	0.0075	0.0048
		Highest	0.8278	0.4753

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	0.0381	6.0000e-005	6.1000e-003	0.0000		2.0000e-005	2.0000e-005		2.0000e-005	2.0000e-005	0.0000	0.0119	0.0119	3.0000e-005	0.0000	0.0126
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	**0.0381**	**6.0000e-005**	**6.1000e-003**	**0.0000**	**0.0000**	**2.0000e-005**	**2.0000e-005**	**0.0000**	**2.0000e-005**	**2.0000e-005**	**0.0000**	**0.0119**	**0.0119**	**3.0000e-005**	**0.0000**	**0.0126**

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	0.0381	6.0000e-005	6.1000e-003	0.0000		2.0000e-005	2.0000e-005		2.0000e-005	2.0000e-005	0.0000	0.0119	0.0119	3.0000e-005	0.0000	0.0126
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	**0.0381**	**6.0000e-005**	**6.1000e-003**	**0.0000**	**0.0000**	**2.0000e-005**	**2.0000e-005**	**0.0000**	**2.0000e-005**	**2.0000e-005**	**0.0000**	**0.0119**	**0.0119**	**3.0000e-005**	**0.0000**	**0.0126**

	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	Grading	Grading	1/1/2021	1/1/2022	7	366	

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 183

Acres of Paving: 10.97

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
Grading	Bore/Drill Rigs	1	8.00	221	0.50
Grading	Excavators	0	8.00	158	0.38
Grading	Graders	0	8.00	187	0.41
Grading	Off-Highway Trucks	1	8.00	402	0.38
Grading	Rubber Tired Dozers	0	8.00	247	0.40
Grading	Scrapers	0	8.00	367	0.48
Grading	Tractors/Loaders/Backhoes	0	8.00	97	0.37

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
Grading	2	10.00	30.00	0.00	30.00	50.00	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

Use Cleaner Engines for Construction Equipment

Water Exposed Area

3.2 Grading - 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					0.0970	0.0000	0.0970	0.0105	0.0000	0.0105	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.1577	1.5122	1.0363	4.1300e-003		0.0520	0.0520		0.0478	0.0478	0.0000	362.6760	362.6760	0.1173	0.0000	365.6084
Total	**0.1577**	**1.5122**	**1.0363**	**4.1300e-003**	**0.0970**	**0.0520**	**0.1490**	**0.0105**	**0.0478**	**0.0583**	**0.0000**	**362.6760**	**362.6760**	**0.1173**	**0.0000**	**365.6084**

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	0.0522	1.5589	0.3402	7.8700e-003	0.2492	6.0000e-003	0.2552	0.0718	5.7400e-003	0.0776	0.0000	752.4943	752.4943	0.0189	0.0000	752.9660
Worker	0.0151	0.0123	0.1234	3.7000e-004	0.0408	2.5000e-004	0.0411	0.0108	2.3000e-004	0.0111	0.0000	33.5146	33.5146	9.0000e-004	0.0000	33.5372
Total	**0.0673**	**1.5712**	**0.4636**	**8.2400e-003**	**0.2901**	**6.2500e-003**	**0.2963**	**0.0827**	**5.9700e-003**	**0.0886**	**0.0000**	**786.0088**	**786.0088**	**0.0198**	**0.0000**	**786.5032**

3.2 Grading - 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	tons/yr										MT/yr					
Fugitive Dust					0.0252	0.0000	0.0252	2.7200e-003	0.0000	2.7200e-003	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0508	0.2203	1.8642	4.1300e-003		6.7800e-003	6.7800e-003		6.7800e-003	6.7800e-003	0.0000	362.6756	362.6756	0.1173	0.0000	365.6080
Total	**0.0508**	**0.2203**	**1.8642**	**4.1300e-003**	**0.0252**	**6.7800e-003**	**0.0320**	**2.7200e-003**	**6.7800e-003**	**9.5000e-003**	**0.0000**	**362.6756**	**362.6756**	**0.1173**	**0.0000**	**365.6080**

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	0.0522	1.5589	0.3402	7.8700e-003	0.2492	6.0000e-003	0.2552	0.0718	5.7400e-003	0.0776	0.0000	752.4943	752.4943	0.0189	0.0000	752.9660
Worker	0.0151	0.0123	0.1234	3.7000e-004	0.0408	2.5000e-004	0.0411	0.0108	2.3000e-004	0.0111	0.0000	33.5146	33.5146	9.0000e-004	0.0000	33.5372
Total	**0.0673**	**1.5712**	**0.4636**	**8.2400e-003**	**0.2901**	**6.2500e-003**	**0.2963**	**0.0827**	**5.9700e-003**	**0.0886**	**0.0000**	**786.0088**	**786.0088**	**0.0198**	**0.0000**	**786.5032**

3.2 Grading - 2022

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					0.0970	0.0000	0.0970	0.0105	0.0000	0.0105	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	3.8000e-004	3.1400e-003	2.7000e-003	1.0000e-005		1.1000e-004	1.1000e-004		1.0000e-004	1.0000e-004	0.0000	0.9945	0.9945	3.2000e-004	0.0000	1.0026
Total	**3.8000e-004**	**3.1400e-003**	**2.7000e-003**	**1.0000e-005**	**0.0970**	**1.1000e-004**	**0.0972**	**0.0105**	**1.0000e-004**	**0.0106**	**0.0000**	**0.9945**	**0.9945**	**3.2000e-004**	**0.0000**	**1.0026**

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	1.3000e-004	3.8700e-003	8.7000e-004	2.0000e-005	6.8000e-004	1.0000e-005	7.0000e-004	2.0000e-004	1.0000e-005	2.1000e-004	0.0000	2.0441	2.0441	5.0000e-005	0.0000	2.0453
Worker	4.0000e-005	3.0000e-005	3.1000e-004	0.0000	1.1000e-004	0.0000	1.1000e-004	3.0000e-005	0.0000	3.0000e-005	0.0000	0.0885	0.0885	0.0000	0.0000	0.0886
Total	**1.7000e-004**	**3.9000e-003**	**1.1800e-003**	**2.0000e-005**	**7.9000e-004**	**1.0000e-005**	**8.1000e-004**	**2.3000e-004**	**1.0000e-005**	**2.4000e-004**	**0.0000**	**2.1326**	**2.1326**	**5.0000e-005**	**0.0000**	**2.1339**

3.2 Grading - 2022

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					0.0252	0.0000	0.0252	2.7200e-003	0.0000	2.7200e-003	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	1.4000e-004	6.0000e-004	5.1100e-003	1.0000e-005		2.0000e-005	2.0000e-005		2.0000e-005	2.0000e-005	0.0000	0.9945	0.9945	3.2000e-004	0.0000	1.0026
Total	**1.4000e-004**	**6.0000e-004**	**5.1100e-003**	**1.0000e-005**	**0.0252**	**2.0000e-005**	**0.0253**	**2.7200e-003**	**2.0000e-005**	**2.7400e-003**	**0.0000**	**0.9945**	**0.9945**	**3.2000e-004**	**0.0000**	**1.0026**

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	1.3000e-004	3.8700e-003	8.7000e-004	2.0000e-005	6.8000e-004	1.0000e-005	7.0000e-004	2.0000e-004	1.0000e-005	2.1000e-004	0.0000	2.0441	2.0441	5.0000e-005	0.0000	2.0453
Worker	4.0000e-005	3.0000e-005	3.1000e-004	0.0000	1.1000e-004	0.0000	1.1000e-004	3.0000e-005	0.0000	3.0000e-005	0.0000	0.0885	0.0885	0.0000	0.0000	0.0886
Total	**1.7000e-004**	**3.9000e-003**	**1.1800e-003**	**2.0000e-005**	**7.9000e-004**	**1.0000e-005**	**8.1000e-004**	**2.3000e-004**	**1.0000e-005**	**2.4000e-004**	**0.0000**	**2.1326**	**2.1326**	**5.0000e-005**	**0.0000**	**2.1339**

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 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 Asphalt Surfaces	16.60	8.40	6.90	0.00	0.00	0.00	0	0	0
Other Non-Asphalt Surfaces	16.60	8.40	6.90	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 Asphalt Surfaces	0.553113	0.036408	0.180286	0.116335	0.016165	0.005101	0.018218	0.063797	0.001357	0.001565	0.005903	0.000808	0.000944
Other Non-Asphalt Surfaces	0.553113	0.036408	0.180286	0.116335	0.016165	0.005101	0.018218	0.063797	0.001357	0.001565	0.005903	0.000808	0.000944

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 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
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 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
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 Asphalt Surfaces	0	0.0000	0.0000	0.0000	0.0000
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 Asphalt Surfaces	0	0.0000	0.0000	0.0000	0.0000
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	0.0381	6.0000e-005	6.1000e-003	0.0000		2.0000e-005	2.0000e-005		2.0000e-005	2.0000e-005	0.0000	0.0119	0.0119	3.0000e-005	0.0000	0.0126
Unmitigated	0.0381	6.0000e-005	6.1000e-003	0.0000		2.0000e-005	2.0000e-005		2.0000e-005	2.0000e-005	0.0000	0.0119	0.0119	3.0000e-005	0.0000	0.0126

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	6.6400e-003					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	0.0309					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Landscaping	5.7000e-004	6.0000e-005	6.1000e-003	0.0000		2.0000e-005	2.0000e-005		2.0000e-005	2.0000e-005	0.0000	0.0119	0.0119	3.0000e-005	0.0000	0.0126
Total	**0.0381**	**6.0000e-005**	**6.1000e-003**	**0.0000**		**2.0000e-005**	**2.0000e-005**		**2.0000e-005**	**2.0000e-005**	**0.0000**	**0.0119**	**0.0119**	**3.0000e-005**	**0.0000**	**0.0126**

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	6.6400e-003					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	0.0309					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Landscaping	5.7000e-004	6.0000e-005	6.1000e-003	0.0000		2.0000e-005	2.0000e-005		2.0000e-005	2.0000e-005	0.0000	0.0119	0.0119	3.0000e-005	0.0000	0.0126
Total	**0.0381**	**6.0000e-005**	**6.1000e-003**	**0.0000**		**2.0000e-005**	**2.0000e-005**		**2.0000e-005**	**2.0000e-005**	**0.0000**	**0.0119**	**0.0119**	**3.0000e-005**	**0.0000**	**0.0126**

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 Asphalt Surfaces	0 / 0	0.0000	0.0000	0.0000	0.0000
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 Asphalt Surfaces	0 / 0	0.0000	0.0000	0.0000	0.0000
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 Asphalt Surfaces	0	0.0000	0.0000	0.0000	0.0000
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 Asphalt Surfaces	0	0.0000	0.0000	0.0000	0.0000
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

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APPENDIX 3.2:

CALEEMOD PROJECT CATEGORY 2 ANNUAL CONSTRUCTION EMISSIONS MODEL OUTPUTS

OBMPU - Project Category 2 (Construction - Mitigated)

San Bernardino-South Coast County, Annual

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Other Non-Asphalt Surfaces	1,400.00	1000sqft	32.14	1,400,000.00	0

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	2.2	**Precipitation Freq (Days)**	32
Climate Zone	10			**Operational Year**	2022
Utility Company	Southern California Edison				
CO2 Intensity (lb/MWhr)	702.44	**CH4 Intensity (lb/MWhr)**	0.029	**N2O Intensity (lb/MWhr)**	0.006

1.3 User Entered Comments & Non-Default Data

Project Characteristics -

Land Use - Other Non-Asphalt Surfaces = Conveyance

Construction Phase - Analysis assumes 100,000 LF of Conveyance Pipelines (Recycled and Potable Water) and 100,000 LF of Conveyance Pipelines (Surplus and Supplemental Water Supply) constructed per year

Off-road Equipment - Equipment based on information provided in the Project Description

Trips and VMT - Based on information provided in the Project Description

Grading - Based on the Project Description, the average area of disturbance of each site is anticipated to be half an acre or less.

Construction Off-road Equipment Mitigation - All equipment operating at >150 hp are required to be equipped with Tier 4 or better engines. Increase watering to 4 times per day.

OBMPU - Project Category 2 (Construction - Mitigated) - San Bernardino-South Coast County, Annual

Table Name	Column Name	Default Value	New Value
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	2.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	22.00
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstructionPhase	NumDays	45.00	366.00
tblConstructionPhase	NumDaysWeek	5.00	7.00
tblConstructionPhase	PhaseEndDate	3/4/2021	1/1/2022
tblGrading	AcresOfGrading	0.00	183.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	0.00
tblTripsAndVMT	VendorTripLength	6.90	40.00
tblTripsAndVMT	VendorTripNumber	0.00	20.00
tblTripsAndVMT	WorkerTripLength	14.70	40.00
tblTripsAndVMT	WorkerTripNumber	75.00	28.00

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	2.8272	25.1858	18.8805	0.0644	0.3824	0.9469	1.3293	0.0893	0.8713	0.9605	0.0000	5,688.4592	5,688.4592	1.6823	0.0000	5,730.5165
2022	6.7700e-003	0.0537	0.0488	1.8000e-004	0.0978	1.9900e-003	0.0998	0.0107	1.8300e-003	0.0125	0.0000	15.5680	15.5680	4.6100e-003	0.0000	15.6832
Maximum	**2.8272**	**25.1858**	**18.8805**	**0.0644**	**0.3824**	**0.9469**	**1.3293**	**0.0893**	**0.8713**	**0.9605**	**0.0000**	**5,688.4592**	**5,688.4592**	**1.6823**	**0.0000**	**5,730.5165**

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	0.9831	6.1804	28.4430	0.0644	0.3106	0.2233	0.5338	0.0815	0.2127	0.2942	0.0000	5,688.4530	5,688.4530	1.6823	0.0000	5,730.5103
2022	2.5900e-003	0.0158	0.0777	1.8000e-004	0.0260	5.4000e-004	0.0266	2.9400e-003	5.2000e-004	3.4600e-003	0.0000	15.5680	15.5680	4.6100e-003	0.0000	15.6832
Maximum	**0.9831**	**6.1804**	**28.4430**	**0.0644**	**0.3106**	**0.2233**	**0.5338**	**0.0815**	**0.2127**	**0.2942**	**0.0000**	**5,688.4530**	**5,688.4530**	**1.6823**	**0.0000**	**5,730.5103**

	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	**65.22**	**75.45**	**-50.67**	**0.00**	**29.91**	**76.41**	**60.79**	**15.52**	**75.58**	**69.41**	**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)
1	**1-1-2021**	**3-31-2021**	6.9048	1.7638
2	**4-1-2021**	**6-30-2021**	6.9751	1.7770
3	**7-1-2021**	**9-30-2021**	7.0518	1.7966
4	**10-1-2021**	**12-31-2021**	7.0582	1.8030
5	**1-1-2022**	**3-31-2022**	0.0605	0.0184
		Highest	7.0582	1.8030

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	0.1116	1.6000e-004	0.0179	0.0000		6.0000e-005	6.0000e-005		6.0000e-005	6.0000e-005	0.0000	0.0347	0.0347	9.0000e-005	0.0000	0.0370
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	**0.1116**	**1.6000e-004**	**0.0179**	**0.0000**	**0.0000**	**6.0000e-005**	**6.0000e-005**	**0.0000**	**6.0000e-005**	**6.0000e-005**	**0.0000**	**0.0347**	**0.0347**	**9.0000e-005**	**0.0000**	**0.0370**

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	0.1116	1.6000e-004	0.0179	0.0000		6.0000e-005	6.0000e-005		6.0000e-005	6.0000e-005	0.0000	0.0347	0.0347	9.0000e-005	0.0000	0.0370
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	**0.1116**	**1.6000e-004**	**0.0179**	**0.0000**	**0.0000**	**6.0000e-005**	**6.0000e-005**	**0.0000**	**6.0000e-005**	**6.0000e-005**	**0.0000**	**0.0347**	**0.0347**	**9.0000e-005**	**0.0000**	**0.0370**

	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	Grading	Grading	1/1/2021	1/1/2022	7	366	

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 183

Acres of Paving: 32.14

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

<u>OffRoad Equipment</u>

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Grading	Excavators	2	8.00	158	0.38
Grading	Graders	0	8.00	187	0.41
Grading	Off-Highway Trucks	22	8.00	402	0.38
Grading	Pavers	2	8.00	130	0.42
Grading	Rollers	2	8.00	80	0.38
Grading	Rubber Tired Dozers	0	8.00	247	0.40
Grading	Scrapers	0	8.00	367	0.48
Grading	Tractors/Loaders/Backhoes	2	8.00	97	0.37

<u>Trips and VMT</u>

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
Grading	30	28.00	20.00	0.00	40.00	40.00	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

Use Cleaner Engines for Construction Equipment

Water Exposed Area

3.2 Grading - 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					0.0970	0.0000	0.0970	0.0105	0.0000	0.0105	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	2.7437	24.2599	18.2373	0.0587		0.9428	0.9428		0.8673	0.8673	0.0000	5,156.8990	5,156.8990	1.6679	0.0000	5,198.5951
Total	**2.7437**	**24.2599**	**18.2373**	**0.0587**	**0.0970**	**0.9428**	**1.0398**	**0.0105**	**0.8673**	**0.8778**	**0.0000**	**5,156.8990**	**5,156.8990**	**1.6679**	**0.0000**	**5,198.5951**

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	0.0290	0.8805	0.1909	4.2500e-003	0.1329	3.2100e-003	0.1362	0.0383	3.0700e-003	0.0414	0.0000	406.7751	406.7751	0.0111	0.0000	407.0529
Worker	0.0545	0.0454	0.4523	1.3800e-003	0.1524	9.4000e-004	0.1533	0.0405	8.6000e-004	0.0413	0.0000	124.7851	124.7851	3.3400e-003	0.0000	124.8685
Total	**0.0835**	**0.9259**	**0.6432**	**5.6300e-003**	**0.2853**	**4.1500e-003**	**0.2895**	**0.0788**	**3.9300e-003**	**0.0827**	**0.0000**	**531.5602**	**531.5602**	**0.0145**	**0.0000**	**531.9213**

3.2 Grading - 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	tons/yr										MT/yr					
Fugitive Dust					0.0252	0.0000	0.0252	2.7200e-003	0.0000	2.7200e-003	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.8996	5.2545	27.7997	0.0587		0.2191	0.2191		0.2088	0.2088	0.0000	5,156.8929	5,156.8929	1.6678	0.0000	5,198.5889
Total	**0.8996**	**5.2545**	**27.7997**	**0.0587**	**0.0252**	**0.2191**	**0.2444**	**2.7200e-003**	**0.2088**	**0.2115**	**0.0000**	**5,156.8929**	**5,156.8929**	**1.6678**	**0.0000**	**5,198.5889**

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	0.0290	0.8805	0.1909	4.2500e-003	0.1329	3.2100e-003	0.1362	0.0383	3.0700e-003	0.0414	0.0000	406.7751	406.7751	0.0111	0.0000	407.0529
Worker	0.0545	0.0454	0.4523	1.3800e-003	0.1524	9.4000e-004	0.1533	0.0405	8.6000e-004	0.0413	0.0000	124.7851	124.7851	3.3400e-003	0.0000	124.8685
Total	**0.0835**	**0.9259**	**0.6432**	**5.6300e-003**	**0.2853**	**4.1500e-003**	**0.2895**	**0.0788**	**3.9300e-003**	**0.0827**	**0.0000**	**531.5602**	**531.5602**	**0.0145**	**0.0000**	**531.9213**

3.2 Grading - 2022

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					0.0970	0.0000	0.0970	0.0105	0.0000	0.0105	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	6.5500e-003	0.0514	0.0472	1.6000e-004		1.9800e-003	1.9800e-003		1.8200e-003	1.8200e-003	0.0000	14.1334	14.1334	4.5700e-003	0.0000	14.2477
Total	**6.5500e-003**	**0.0514**	**0.0472**	**1.6000e-004**	**0.0970**	**1.9800e-003**	**0.0990**	**0.0105**	**1.8200e-003**	**0.0123**	**0.0000**	**14.1334**	**14.1334**	**4.5700e-003**	**0.0000**	**14.2477**

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	7.0000e-005	2.1900e-003	4.9000e-004	1.0000e-005	3.6000e-004	1.0000e-005	3.7000e-004	1.0000e-004	1.0000e-005	1.1000e-004	0.0000	1.1050	1.1050	3.0000e-005	0.0000	1.1057
Worker	1.4000e-004	1.1000e-004	1.1400e-003	0.0000	4.2000e-004	0.0000	4.2000e-004	1.1000e-004	0.0000	1.1000e-004	0.0000	0.3295	0.3295	1.0000e-005	0.0000	0.3298
Total	**2.1000e-004**	**2.3000e-003**	**1.6300e-003**	**1.0000e-005**	**7.8000e-004**	**1.0000e-005**	**7.9000e-004**	**2.1000e-004**	**1.0000e-005**	**2.2000e-004**	**0.0000**	**1.4345**	**1.4345**	**4.0000e-005**	**0.0000**	**1.4355**

3.2 Grading - 2022

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					0.0252	0.0000	0.0252	2.7200e-003	0.0000	2.7200e-003	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	2.3800e-003	0.0135	0.0761	1.6000e-004		5.3000e-004	5.3000e-004		5.1000e-004	5.1000e-004	0.0000	14.1334	14.1334	4.5700e-003	0.0000	14.2477
Total	**2.3800e-003**	**0.0135**	**0.0761**	**1.6000e-004**	**0.0252**	**5.3000e-004**	**0.0258**	**2.7200e-003**	**5.1000e-004**	**3.2300e-003**	**0.0000**	**14.1334**	**14.1334**	**4.5700e-003**	**0.0000**	**14.2477**

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	7.0000e-005	2.1900e-003	4.9000e-004	1.0000e-005	3.6000e-004	1.0000e-005	3.7000e-004	1.0000e-004	1.0000e-005	1.1000e-004	0.0000	1.1050	1.1050	3.0000e-005	0.0000	1.1057
Worker	1.4000e-004	1.1000e-004	1.1400e-003	0.0000	4.2000e-004	0.0000	4.2000e-004	1.1000e-004	0.0000	1.1000e-004	0.0000	0.3295	0.3295	1.0000e-005	0.0000	0.3298
Total	**2.1000e-004**	**2.3000e-003**	**1.6300e-003**	**1.0000e-005**	**7.8000e-004**	**1.0000e-005**	**7.9000e-004**	**2.1000e-004**	**1.0000e-005**	**2.2000e-004**	**0.0000**	**1.4345**	**1.4345**	**4.0000e-005**	**0.0000**	**1.4355**

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		
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	16.60	8.40	6.90	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	0.553113	0.036408	0.180286	0.116335	0.016165	0.005101	0.018218	0.063797	0.001357	0.001565	0.005903	0.000808	0.000944

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	0.1116	1.6000e-004	0.0179	0.0000		6.0000e-005	6.0000e-005		6.0000e-005	6.0000e-005	0.0000	0.0347	0.0347	9.0000e-005	0.0000	0.0370
Unmitigated	0.1116	1.6000e-004	0.0179	0.0000		6.0000e-005	6.0000e-005		6.0000e-005	6.0000e-005	0.0000	0.0347	0.0347	9.0000e-005	0.0000	0.0370

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	0.0195					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	0.0905					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Landscaping	1.6600e-003	1.6000e-004	0.0179	0.0000		6.0000e-005	6.0000e-005		6.0000e-005	6.0000e-005	0.0000	0.0347	0.0347	9.0000e-005	0.0000	0.0370
Total	**0.1116**	**1.6000e-004**	**0.0179**	**0.0000**		**6.0000e-005**	**6.0000e-005**		**6.0000e-005**	**6.0000e-005**	**0.0000**	**0.0347**	**0.0347**	**9.0000e-005**	**0.0000**	**0.0370**

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	0.0195					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	0.0905					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Landscaping	1.6600e-003	1.6000e-004	0.0179	0.0000		6.0000e-005	6.0000e-005		6.0000e-005	6.0000e-005	0.0000	0.0347	0.0347	9.0000e-005	0.0000	0.0370
Total	**0.1116**	**1.6000e-004**	**0.0179**	**0.0000**		**6.0000e-005**	**6.0000e-005**		**6.0000e-005**	**6.0000e-005**	**0.0000**	**0.0347**	**0.0347**	**9.0000e-005**	**0.0000**	**0.0370**

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

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APPENDIX 3.3:

CALEEMOD PROJECT CATEGORY 3 ANNUAL CONSTRUCTION EMISSIONS MODEL OUTPUTS

OBMPU - Project Category 3 (Construction - Mitigated)

San Bernardino-South Coast County, Annual

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Other Asphalt Surfaces	100.00	Acre	100.00	4,356,000.00	0
Other Non-Asphalt Surfaces	420.00	1000sqft	9.64	420,000.00	0

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	2.2	**Precipitation Freq (Days)**	32
Climate Zone	10			**Operational Year**	2022
Utility Company	Southern California Edison				
CO2 Intensity (lb/MWhr)	702.44	**CH4 Intensity (lb/MWhr)**	0.029	**N2O Intensity (lb/MWhr)**	0.006

1.3 User Entered Comments & Non-Default Data

Project Characteristics -

Land Use - Other Non-Asphalt Surfaces = Conveyance; Other Asphalt Surfaces = Storage Basin

Construction Phase - As a conservative measure, analysis assumes the construction of one New Storage Basin (Chino Institute for Men + the associated pipeline)

Off-road Equipment - Equipment based on information provided in the Project Description

Trips and VMT - Based on information provided in the Project Description

Grading - Based on the Project Description, the average area of disturbance of each site is anticipated to be 2 acres on any given day.

Construction Off-road Equipment Mitigation - All equipment operating at >150 hp are required to be equipped with Tier 4 or better engines. Increase watering to 4 times per day.

Table Name	Column Name	Default Value	New Value
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	2.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	6.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	2.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	7.00
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstructionPhase	NumDays	310.00	550.00
tblConstructionPhase	NumDaysWeek	5.00	7.00
tblGrading	AcresOfGrading	3,850.00	1,100.00
tblGrading	MaterialExported	0.00	333,333.33
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	2.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	7.00
tblTripsAndVMT	HaulingTripLength	20.00	30.00
tblTripsAndVMT	HaulingTripNumber	41,667.00	370.00
tblTripsAndVMT	VendorTripLength	6.90	40.00
tblTripsAndVMT	VendorTripNumber	0.00	6.00
tblTripsAndVMT	WorkerTripLength	14.70	40.00
tblTripsAndVMT	WorkerTripNumber	48.00	6.00

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	2.4061	25.2290	16.5486	0.0417	2.8771	1.0179	3.8950	1.2954	0.9365	2.2319	0.0000	3,671.9919	3,671.9919	1.1400	0.0000	3,700.4920
2022	1.0567	10.4270	7.7467	0.0211	1.7570	0.4174	2.1744	0.6895	0.3840	1.0735	0.0000	1,861.6641	1,861.6641	0.5782	0.0000	1,876.1201
Maximum	**2.4061**	**25.2290**	**16.5486**	**0.0417**	**2.8771**	**1.0179**	**3.8950**	**1.2954**	**0.9365**	**2.2319**	**0.0000**	**3,671.9919**	**3,671.9919**	**1.1400**	**0.0000**	**3,700.4920**

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	0.5662	3.0672	19.0371	0.0417	0.8050	0.1056	0.9106	0.3526	0.1023	0.4549	0.0000	3,671.9878	3,671.9878	1.1400	0.0000	3,700.4878
2022	0.2821	1.4995	9.6389	0.0211	0.4870	0.0494	0.5364	0.1876	0.0481	0.2357	0.0000	1,861.6620	1,861.6620	0.5782	0.0000	1,876.1179
Maximum	**0.5662**	**3.0672**	**19.0371**	**0.0417**	**0.8050**	**0.1056**	**0.9106**	**0.3526**	**0.1023**	**0.4549**	**0.0000**	**3,671.9878**	**3,671.9878**	**1.1400**	**0.0000**	**3,700.4878**

	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	**75.50**	**87.19**	**-18.03**	**0.00**	**72.12**	**89.20**	**76.16**	**72.79**	**88.61**	**79.11**	**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)
1	1-1-2021	3-31-2021	6.8131	0.8949
2	4-1-2021	6-30-2021	6.8869	0.9029
3	7-1-2021	9-30-2021	6.9626	0.9128
4	10-1-2021	12-31-2021	6.9645	0.9148
5	1-1-2022	3-31-2022	5.5857	0.8658
6	4-1-2022	6-30-2022	5.6462	0.8738
7	7-1-2022	9-30-2022	0.2482	0.0384
		Highest	6.9645	0.9148

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	0.3758	6.0000e-005	6.6500e-003	0.0000		2.0000e-005	2.0000e-005		2.0000e-005	2.0000e-005	0.0000	0.0129	0.0129	3.0000e-005	0.0000	0.0138
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	**0.3758**	**6.0000e-005**	**6.6500e-003**	**0.0000**	**0.0000**	**2.0000e-005**	**2.0000e-005**	**0.0000**	**2.0000e-005**	**2.0000e-005**	**0.0000**	**0.0129**	**0.0129**	**3.0000e-005**	**0.0000**	**0.0138**

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	0.3758	6.0000e-005	6.6500e-003	0.0000		2.0000e-005	2.0000e-005		2.0000e-005	2.0000e-005	0.0000	0.0129	0.0129	3.0000e-005	0.0000	0.0138
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	**0.3758**	**6.0000e-005**	**6.6500e-003**	**0.0000**	**0.0000**	**2.0000e-005**	**2.0000e-005**	**0.0000**	**2.0000e-005**	**2.0000e-005**	**0.0000**	**0.0129**	**0.0129**	**3.0000e-005**	**0.0000**	**0.0138**

	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	Grading	Grading	1/1/2021	7/4/2022	7	550	

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 1100

Acres of Paving: 109.64

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
Grading	Excavators	2	8.00	158	0.38
Grading	Graders	0	8.00	187	0.41
Grading	Off-Highway Trucks	6	8.00	402	0.38
Grading	Rubber Tired Dozers	2	8.00	247	0.40
Grading	Scrapers	7	8.00	367	0.48
Grading	Tractors/Loaders/Backhoes	2	8.00	97	0.37

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
Grading	19	6.00	6.00	370.00	40.00	40.00	30.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

Use Cleaner Engines for Construction Equipment

Water Exposed Area

3.2 Grading - 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					2.8002	0.0000	2.8002	1.2741	0.0000	1.2741	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	2.3848	24.9187	16.3883	0.0400		1.0166	1.0166		0.9353	0.9353	0.0000	3,510.4618	3,510.4618	1.1354	0.0000	3,538.8457
Total	**2.3848**	**24.9187**	**16.3883**	**0.0400**	**2.8002**	**1.0166**	**3.8168**	**1.2741**	**0.9353**	**2.2093**	**0.0000**	**3,510.4618**	**3,510.4618**	**1.1354**	**0.0000**	**3,538.8457**

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	9.8000e-004	0.0364	6.1800e-003	1.3000e-004	4.3800e-003	1.2000e-004	4.4900e-003	1.1700e-003	1.1000e-004	1.2800e-003	0.0000	12.7579	12.7579	6.0000e-004	0.0000	12.7729
Vendor	8.6900e-003	0.2642	0.0573	1.2800e-003	0.0399	9.6000e-004	0.0409	0.0115	9.2000e-004	0.0124	0.0000	122.0325	122.0325	3.3300e-003	0.0000	122.1159
Worker	0.0117	9.7300e-003	0.0969	3.0000e-004	0.0327	2.0000e-004	0.0329	8.6700e-003	1.8000e-004	8.8500e-003	0.0000	26.7397	26.7397	7.1000e-004	0.0000	26.7575
Total	**0.0214**	**0.3103**	**0.1604**	**1.7100e-003**	**0.0769**	**1.2800e-003**	**0.0782**	**0.0213**	**1.2100e-003**	**0.0226**	**0.0000**	**161.5301**	**161.5301**	**4.6400e-003**	**0.0000**	**161.6463**

3.2 Grading - 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	tons/yr										MT/yr					
Fugitive Dust					0.7281	0.0000	0.7281	0.3313	0.0000	0.3313	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.5449	2.7568	18.8767	0.0400		0.1043	0.1043		0.1011	0.1011	0.0000	3,510.4577	3,510.4577	1.1354	0.0000	3,538.8415
Total	**0.5449**	**2.7568**	**18.8767**	**0.0400**	**0.7281**	**0.1043**	**0.8324**	**0.3313**	**0.1011**	**0.4323**	**0.0000**	**3,510.4577**	**3,510.4577**	**1.1354**	**0.0000**	**3,538.8415**

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	9.8000e-004	0.0364	6.1800e-003	1.3000e-004	4.3800e-003	1.2000e-004	4.4900e-003	1.1700e-003	1.1000e-004	1.2800e-003	0.0000	12.7579	12.7579	6.0000e-004	0.0000	12.7729
Vendor	8.6900e-003	0.2642	0.0573	1.2800e-003	0.0399	9.6000e-004	0.0409	0.0115	9.2000e-004	0.0124	0.0000	122.0325	122.0325	3.3300e-003	0.0000	122.1159
Worker	0.0117	9.7300e-003	0.0969	3.0000e-004	0.0327	2.0000e-004	0.0329	8.6700e-003	1.8000e-004	8.8500e-003	0.0000	26.7397	26.7397	7.1000e-004	0.0000	26.7575
Total	**0.0214**	**0.3103**	**0.1604**	**1.7100e-003**	**0.0769**	**1.2800e-003**	**0.0782**	**0.0213**	**1.2100e-003**	**0.0226**	**0.0000**	**161.5301**	**161.5301**	**4.6400e-003**	**0.0000**	**161.6463**

3.2 Grading - 2022

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					1.7162	0.0000	1.7162	0.6782	0.0000	0.6782	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	1.0465	10.2841	7.6713	0.0203		0.4168	0.4168		0.3835	0.3835	0.0000	1,780.881 4	1,780.881 4	0.5760	0.0000	1,795.280 7
Total	**1.0465**	**10.2841**	**7.6713**	**0.0203**	**1.7162**	**0.4168**	**2.1331**	**0.6782**	**0.3835**	**1.0617**	**0.0000**	**1,780.881 4**	**1,780.881 4**	**0.5760**	**0.0000**	**1,795.280 7**

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	4.7000e-004	0.0167	3.0400e-003	7.0000e-005	3.9900e-003	5.0000e-005	4.0400e-003	1.0300e-003	5.0000e-005	1.0700e-003	0.0000	6.3920	6.3920	3.0000e-004	0.0000	6.3995
Vendor	4.1300e-003	0.1217	0.0272	6.4000e-004	0.0202	4.2000e-004	0.0206	5.8300e-003	4.0000e-004	6.2200e-003	0.0000	61.3266	61.3266	1.6400e-003	0.0000	61.3677
Worker	5.5500e-003	4.4400e-003	0.0451	1.4000e-004	0.0166	1.0000e-004	0.0167	4.3900e-003	9.0000e-005	4.4900e-003	0.0000	13.0641	13.0641	3.3000e-004	0.0000	13.0722
Total	**0.0102**	**0.1429**	**0.0754**	**8.5000e-004**	**0.0408**	**5.7000e-004**	**0.0413**	**0.0113**	**5.4000e-004**	**0.0118**	**0.0000**	**80.7827**	**80.7827**	**2.2700e-003**	**0.0000**	**80.8393**

3.2 Grading - 2022

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					0.4462	0.0000	0.4462	0.1763	0.0000	0.1763	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.2720	1.3566	9.5635	0.0203		0.0489	0.0489		0.0475	0.0475	0.0000	1,780.8793	1,780.8793	0.5760	0.0000	1,795.2786
Total	**0.2720**	**1.3566**	**9.5635**	**0.0203**	**0.4462**	**0.0489**	**0.4951**	**0.1763**	**0.0475**	**0.2239**	**0.0000**	**1,780.8793**	**1,780.8793**	**0.5760**	**0.0000**	**1,795.2786**

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	4.7000e-004	0.0167	3.0400e-003	7.0000e-005	3.9900e-003	5.0000e-005	4.0400e-003	1.0300e-003	5.0000e-005	1.0700e-003	0.0000	6.3920	6.3920	3.0000e-004	0.0000	6.3995
Vendor	4.1300e-003	0.1217	0.0272	6.4000e-004	0.0202	4.2000e-004	0.0206	5.8300e-003	4.0000e-004	6.2200e-003	0.0000	61.3266	61.3266	1.6400e-003	0.0000	61.3677
Worker	5.5500e-003	4.4400e-003	0.0451	1.4000e-004	0.0166	1.0000e-004	0.0167	4.3900e-003	9.0000e-005	4.4900e-003	0.0000	13.0641	13.0641	3.3000e-004	0.0000	13.0722
Total	**0.0102**	**0.1429**	**0.0754**	**8.5000e-004**	**0.0408**	**5.7000e-004**	**0.0413**	**0.0113**	**5.4000e-004**	**0.0118**	**0.0000**	**80.7827**	**80.7827**	**2.2700e-003**	**0.0000**	**80.8393**

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 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 Asphalt Surfaces	16.60	8.40	6.90	0.00	0.00	0.00	0	0	0
Other Non-Asphalt Surfaces	16.60	8.40	6.90	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 Asphalt Surfaces	0.553113	0.036408	0.180286	0.116335	0.016165	0.005101	0.018218	0.063797	0.001357	0.001565	0.005903	0.000808	0.000944
Other Non-Asphalt Surfaces	0.553113	0.036408	0.180286	0.116335	0.016165	0.005101	0.018218	0.063797	0.001357	0.001565	0.005903	0.000808	0.000944

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 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
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 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
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 Asphalt Surfaces	0	0.0000	0.0000	0.0000	0.0000
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 Asphalt Surfaces	0	0.0000	0.0000	0.0000	0.0000
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	0.3758	6.0000e-005	6.6500e-003	0.0000		2.0000e-005	2.0000e-005		2.0000e-005	2.0000e-005	0.0000	0.0129	0.0129	3.0000e-005	0.0000	0.0138
Unmitigated	0.3758	6.0000e-005	6.6500e-003	0.0000		2.0000e-005	2.0000e-005		2.0000e-005	2.0000e-005	0.0000	0.0129	0.0129	3.0000e-005	0.0000	0.0138

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	0.0664					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	0.3087					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Landscaping	6.2000e-004	6.0000e-005	6.6500e-003	0.0000		2.0000e-005	2.0000e-005		2.0000e-005	2.0000e-005	0.0000	0.0129	0.0129	3.0000e-005	0.0000	0.0138
Total	**0.3758**	**6.0000e-005**	**6.6500e-003**	**0.0000**		**2.0000e-005**	**2.0000e-005**		**2.0000e-005**	**2.0000e-005**	**0.0000**	**0.0129**	**0.0129**	**3.0000e-005**	**0.0000**	**0.0138**

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	0.0664					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	0.3087					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Landscaping	6.2000e-004	6.0000e-005	6.6500e-003	0.0000		2.0000e-005	2.0000e-005		2.0000e-005	2.0000e-005	0.0000	0.0129	0.0129	3.0000e-005	0.0000	0.0138
Total	**0.3758**	**6.0000e-005**	**6.6500e-003**	**0.0000**		**2.0000e-005**	**2.0000e-005**		**2.0000e-005**	**2.0000e-005**	**0.0000**	**0.0129**	**0.0129**	**3.0000e-005**	**0.0000**	**0.0138**

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 Asphalt Surfaces	0 / 0	0.0000	0.0000	0.0000	0.0000
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 Asphalt Surfaces	0 / 0	0.0000	0.0000	0.0000	0.0000
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 Asphalt Surfaces	0	0.0000	0.0000	0.0000	0.0000
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 Asphalt Surfaces	0	0.0000	0.0000	0.0000	0.0000
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

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APPENDIX 3.4:

CALEEMOD PROJECT CATEGORY 4 ANNUAL CONSTRUCTION EMISSIONS MODEL OUTPUTS

OBMPU - Project Category 4 (Construction - Mitigated)

San Bernardino-South Coast County, Annual

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
General Light Industry	871.20	1000sqft	20.00	871,200.00	0
Other Non-Asphalt Surfaces	420.00	1000sqft	9.64	420,000.00	0

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	2.2	**Precipitation Freq (Days)**	32
Climate Zone	10			**Operational Year**	2022
Utility Company	Southern California Edison				
CO2 Intensity (lb/MWhr)	702.44	**CH4 Intensity (lb/MWhr)**	0.029	**N2O Intensity (lb/MWhr)**	0.006

1.3 User Entered Comments & Non-Default Data

Project Characteristics -

Land Use - General Light Industry = Water Treatment and Regional Water Treatment Facility; Other Non-Asphalt Surfaces = Conveyance

Construction Phase - Analysis assumes construction of a single Water Treatment and Regional Water Treatment Facility and Pipelines that would be constructed within an 18-month period

Off-road Equipment - Based on information provided in the Project Description

Trips and VMT - Based on information provided in the Project Description

Grading - Based on the Project Description, the average area of disturbance of each site is anticipated to be 2 acres on any given day.

Vehicle Trips - Construction Run Only.

Energy Use - Construction Run Only.

Water And Wastewater - Construction Run Only.

Solid Waste - Construction Run Only.

Construction Off-road Equipment Mitigation - All equipment operating at >150 hp are required to be equipped with Tier 3 or better engines. Increase watering to 4 times per day.

Table Name	Column Name	Default Value	New Value
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	3.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	15.00
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstEquipMitigation	Tier	No Change	Tier 4 Final
tblConstructionPhase	NumDays	45.00	547.00
tblConstructionPhase	NumDaysWeek	5.00	7.00
tblConstructionPhase	PhaseEndDate	3/4/2021	7/1/2022
tblEnergyUse	LightingElect	2.93	0.00
tblEnergyUse	NT24E	5.02	0.00
tblEnergyUse	NT24NG	17.13	0.00
tblEnergyUse	T24E	2.20	0.00

tblEnergyUse	T24NG	15.36	0.00
tblGrading	AcresOfGrading	273.50	1,092.00
tblOffRoadEquipment	OffRoadEquipmentType		Off-Highway Trucks
tblOffRoadEquipment	OffRoadEquipmentType		Cranes
tblOffRoadEquipment	OffRoadEquipmentType		Plate Compactors
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	6.00
tblSolidWaste	SolidWasteGenerationRate	1,080.29	0.00
tblTripsAndVMT	VendorTripLength	6.90	40.00
tblTripsAndVMT	VendorTripNumber	0.00	15.00
tblTripsAndVMT	WorkerTripLength	14.70	40.00
tblTripsAndVMT	WorkerTripNumber	70.00	30.00
tblVehicleTrips	CC_TTP	28.00	0.00
tblVehicleTrips	CNW_TTP	13.00	0.00
tblVehicleTrips	CW_TTP	59.00	0.00
tblVehicleTrips	DV_TP	5.00	0.00
tblVehicleTrips	PB_TP	3.00	0.00
tblVehicleTrips	PR_TP	92.00	0.00
tblVehicleTrips	ST_TR	1.32	0.00
tblVehicleTrips	SU_TR	0.68	0.00
tblVehicleTrips	WD_TR	6.97	0.00
tblWater	IndoorWaterUseRate	201,465,000.00	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	2.2745	21.0672	14.4930	0.0489	0.8420	0.8017	1.6437	0.1346	0.7381	0.8727	0.0000	4,313.6710	4,313.6710	1.2614	0.0000	4,345.2051
2022	0.9992	8.4042	6.8262	0.0243	0.7102	0.3153	1.0254	0.0985	0.2903	0.3888	0.0000	2,147.9585	2,147.9585	0.6289	0.0000	2,163.6809
Maximum	**2.2745**	**21.0672**	**14.4930**	**0.0489**	**0.8420**	**0.8017**	**1.6437**	**0.1346**	**0.7381**	**0.8727**	**0.0000**	**4,313.6710**	**4,313.6710**	**1.2614**	**0.0000**	**4,345.2051**

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	0.8033	5.0725	21.4100	0.0489	0.4135	0.1973	0.6108	0.0883	0.1873	0.2757	0.0000	4,313.6664	4,313.6664	1.2614	0.0000	4,345.2005
2022	0.3857	2.3767	10.6393	0.0243	0.2817	0.0864	0.3680	0.0522	0.0824	0.1346	0.0000	2,147.9562	2,147.9562	0.6289	0.0000	2,163.6786
Maximum	**0.8033**	**5.0725**	**21.4100**	**0.0489**	**0.4135**	**0.1973**	**0.6108**	**0.0883**	**0.1873**	**0.2757**	**0.0000**	**4,313.6664**	**4,313.6664**	**1.2614**	**0.0000**	**4,345.2005**

	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	**63.68**	**74.72**	**-50.33**	**0.00**	**55.21**	**74.60**	**63.33**	**39.70**	**73.78**	**67.48**	**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)
1	**1-1-2021**	**3-31-2021**	5.7539	1.4472
2	**4-1-2021**	**6-30-2021**	5.8126	1.4581
3	**7-1-2021**	**9-30-2021**	5.8765	1.4741
4	**10-1-2021**	**12-31-2021**	5.8817	1.4794
5	**1-1-2022**	**3-31-2022**	4.6486	1.3647
6	**4-1-2022**	**6-30-2022**	4.6957	1.3753
7	**7-1-2022**	**9-30-2022**	0.0516	0.0151
		Highest	5.8817	1.4794

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	3.5864	1.5000e-004	0.0165	0.0000		6.0000e-005	6.0000e-005		6.0000e-005	6.0000e-005	0.0000	0.0320	0.0320	8.0000e-005	0.0000	0.0342
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	**3.5864**	**1.5000e-004**	**0.0165**	**0.0000**	**0.0000**	**6.0000e-005**	**6.0000e-005**	**0.0000**	**6.0000e-005**	**6.0000e-005**	**0.0000**	**0.0320**	**0.0320**	**8.0000e-005**	**0.0000**	**0.0342**

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	3.5864	1.5000e-004	0.0165	0.0000		6.0000e-005	6.0000e-005		6.0000e-005	6.0000e-005	0.0000	0.0320	0.0320	8.0000e-005	0.0000	0.0342
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	**3.5864**	**1.5000e-004**	**0.0165**	**0.0000**	**0.0000**	**6.0000e-005**	**6.0000e-005**	**0.0000**	**6.0000e-005**	**6.0000e-005**	**0.0000**	**0.0320**	**0.0320**	**8.0000e-005**	**0.0000**	**0.0342**

	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	Grading	Grading	1/1/2021	7/1/2022	7	547	

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 1092

Acres of Paving: 9.64

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
Grading	Off-Highway Trucks	15	8.00	402	0.38
Grading	Excavators	0	8.00	158	0.38
Grading	Graders	1	8.00	187	0.41
Grading	Cranes	3	8.00	231	0.29
Grading	Plate Compactors	3	8.00	8	0.43
Grading	Rubber Tired Dozers	0	8.00	247	0.40
Grading	Scrapers	0	8.00	367	0.48
Grading	Tractors/Loaders/Backhoes	6	8.00	97	0.37

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
Grading	28	30.00	15.00	0.00	40.00	40.00	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

Use Cleaner Engines for Construction Equipment

Water Exposed Area

3.2 Grading - 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					0.5790	0.0000	0.5790	0.0625	0.0000	0.0625	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	2.1944	20.3582	13.8652	0.0442		0.7983	0.7983		0.7349	0.7349	0.0000	3,874.8914	3,874.8914	1.2495	0.0000	3,906.1278
Total	**2.1944**	**20.3582**	**13.8652**	**0.0442**	**0.5790**	**0.7983**	**1.3773**	**0.0625**	**0.7349**	**0.7974**	**0.0000**	**3,874.8914**	**3,874.8914**	**1.2495**	**0.0000**	**3,906.1278**

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	0.0217	0.6604	0.1432	3.1900e-003	0.0997	2.4100e-003	0.1021	0.0287	2.3000e-003	0.0311	0.0000	305.0813	305.0813	8.3300e-003	0.0000	305.2896
Worker	0.0584	0.0486	0.4846	1.4800e-003	0.1633	1.0000e-003	0.1643	0.0434	9.2000e-004	0.0443	0.0000	133.6983	133.6983	3.5700e-003	0.0000	133.7877
Total	**0.0801**	**0.7090**	**0.6278**	**4.6700e-003**	**0.2630**	**3.4100e-003**	**0.2664**	**0.0721**	**3.2200e-003**	**0.0753**	**0.0000**	**438.7796**	**438.7796**	**0.0119**	**0.0000**	**439.0773**

3.2 Grading - 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	tons/yr										MT/yr					
Fugitive Dust					0.1506	0.0000	0.1506	0.0163	0.0000	0.0163	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.7232	4.3635	20.7822	0.0442		0.1939	0.1939		0.1841	0.1841	0.0000	3,874.886 8	3,874.886 8	1.2495	0.0000	3,906.123 2
Total	**0.7232**	**4.3635**	**20.7822**	**0.0442**	**0.1506**	**0.1939**	**0.3444**	**0.0163**	**0.1841**	**0.2004**	**0.0000**	**3,874.886 8**	**3,874.886 8**	**1.2495**	**0.0000**	**3,906.123 2**

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	0.0217	0.6604	0.1432	3.1900e-003	0.0997	2.4100e-003	0.1021	0.0287	2.3000e-003	0.0311	0.0000	305.0813	305.0813	8.3300e-003	0.0000	305.2896
Worker	0.0584	0.0486	0.4846	1.4800e-003	0.1633	1.0000e-003	0.1643	0.0434	9.2000e-004	0.0443	0.0000	133.6983	133.6983	3.5700e-003	0.0000	133.7877
Total	**0.0801**	**0.7090**	**0.6278**	**4.6700e-003**	**0.2630**	**3.4100e-003**	**0.2664**	**0.0721**	**3.2200e-003**	**0.0753**	**0.0000**	**438.7796**	**438.7796**	**0.0119**	**0.0000**	**439.0773**

3.2 Grading - 2022

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					0.5790	0.0000	0.5790	0.0625	0.0000	0.0625	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.9618	8.0830	6.5373	0.0221		0.3137	0.3137		0.2889	0.2889	0.0000	1,932.867 2	1,932.867 2	0.6233	0.0000	1,948.448 5
Total	**0.9618**	**8.0830**	**6.5373**	**0.0221**	**0.5790**	**0.3137**	**0.8928**	**0.0625**	**0.2889**	**0.3514**	**0.0000**	**1,932.867 2**	**1,932.867 2**	**0.6233**	**0.0000**	**1,948.448 5**

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	0.0102	0.2994	0.0669	1.5800e-003	0.0497	1.0200e-003	0.0507	0.0143	9.8000e-004	0.0153	0.0000	150.8303	150.8303	4.0400e-003	0.0000	150.9313
Worker	0.0273	0.0218	0.2220	7.1000e-004	0.0814	4.9000e-004	0.0819	0.0216	4.5000e-004	0.0221	0.0000	64.2611	64.2611	1.6000e-003	0.0000	64.3011
Total	**0.0375**	**0.3212**	**0.2888**	**2.2900e-003**	**0.1311**	**1.5100e-003**	**0.1326**	**0.0359**	**1.4300e-003**	**0.0374**	**0.0000**	**215.0914**	**215.0914**	**5.6400e-003**	**0.0000**	**215.2324**

3.2 Grading - 2022

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					0.1506	0.0000	0.1506	0.0163	0.0000	0.0163	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.3483	2.0555	10.3505	0.0221		0.0849	0.0849		0.0809	0.0809	0.0000	1,932.8649	1,932.8649	0.6233	0.0000	1,948.4462
Total	**0.3483**	**2.0555**	**10.3505**	**0.0221**	**0.1506**	**0.0849**	**0.2354**	**0.0163**	**0.0809**	**0.0972**	**0.0000**	**1,932.8649**	**1,932.8649**	**0.6233**	**0.0000**	**1,948.4462**

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	0.0102	0.2994	0.0669	1.5800e-003	0.0497	1.0200e-003	0.0507	0.0143	9.8000e-004	0.0153	0.0000	150.8303	150.8303	4.0400e-003	0.0000	150.9313
Worker	0.0273	0.0218	0.2220	7.1000e-004	0.0814	4.9000e-004	0.0819	0.0216	4.5000e-004	0.0221	0.0000	64.2611	64.2611	1.6000e-003	0.0000	64.3011
Total	**0.0375**	**0.3212**	**0.2888**	**2.2900e-003**	**0.1311**	**1.5100e-003**	**0.1326**	**0.0359**	**1.4300e-003**	**0.0374**	**0.0000**	**215.0914**	**215.0914**	**5.6400e-003**	**0.0000**	**215.2324**

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
General Light Industry	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
General Light Industry	16.60	8.40	6.90	0.00	0.00	0.00	0	0	0
Other Non-Asphalt Surfaces	16.60	8.40	6.90	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
General Light Industry	0.553113	0.036408	0.180286	0.116335	0.016165	0.005101	0.018218	0.063797	0.001357	0.001565	0.005903	0.000808	0.000944
Other Non-Asphalt Surfaces	0.553113	0.036408	0.180286	0.116335	0.016165	0.005101	0.018218	0.063797	0.001357	0.001565	0.005903	0.000808	0.000944

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					
General Light Industry	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
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					
General Light Industry	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
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			
General Light Industry	0	0.0000	0.0000	0.0000	0.0000
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			
General Light Industry	0	0.0000	0.0000	0.0000	0.0000
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	3.5864	1.5000e-004	0.0165	0.0000		6.0000e-005	6.0000e-005		6.0000e-005	6.0000e-005	0.0000	0.0320	0.0320	8.0000e-005	0.0000	0.0342
Unmitigated	3.5864	1.5000e-004	0.0165	0.0000		6.0000e-005	6.0000e-005		6.0000e-005	6.0000e-005	0.0000	0.0320	0.0320	8.0000e-005	0.0000	0.0342

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	0.4096					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	3.1752					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Landscaping	1.5400e-003	1.5000e-004	0.0165	0.0000		6.0000e-005	6.0000e-005		6.0000e-005	6.0000e-005	0.0000	0.0320	0.0320	8.0000e-005	0.0000	0.0342
Total	**3.5864**	**1.5000e-004**	**0.0165**	**0.0000**		**6.0000e-005**	**6.0000e-005**		**6.0000e-005**	**6.0000e-005**	**0.0000**	**0.0320**	**0.0320**	**8.0000e-005**	**0.0000**	**0.0342**

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	0.4096					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	3.1752					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Landscaping	1.5400e-003	1.5000e-004	0.0165	0.0000		6.0000e-005	6.0000e-005		6.0000e-005	6.0000e-005	0.0000	0.0320	0.0320	8.0000e-005	0.0000	0.0342
Total	**3.5864**	**1.5000e-004**	**0.0165**	**0.0000**		**6.0000e-005**	**6.0000e-005**		**6.0000e-005**	**6.0000e-005**	**0.0000**	**0.0320**	**0.0320**	**8.0000e-005**	**0.0000**	**0.0342**

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			
General Light Industry	0 / 0	0.0000	0.0000	0.0000	0.0000
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			
General Light Industry	0 / 0	0.0000	0.0000	0.0000	0.0000
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			
General Light Industry	0	0.0000	0.0000	0.0000	0.0000
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			
General Light Industry	0	0.0000	0.0000	0.0000	0.0000
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

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APPENDIX 6

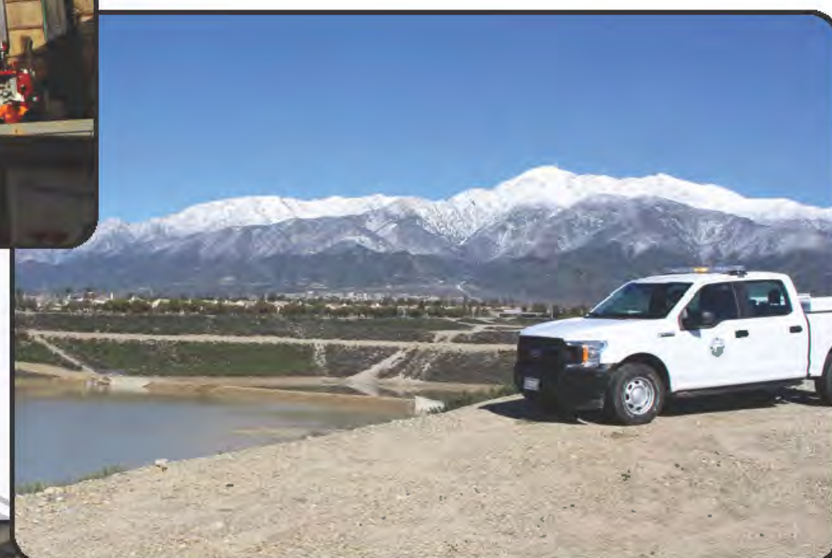
2020 OBMPU Report

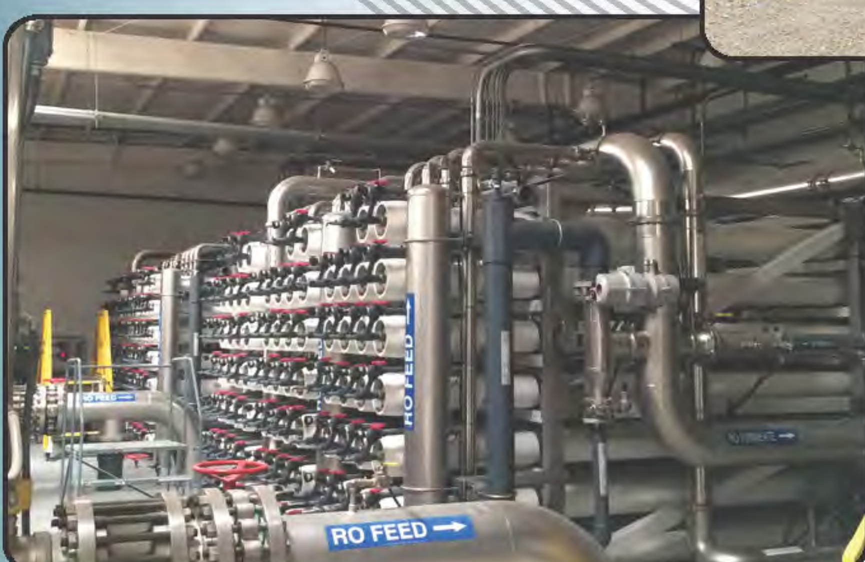
2020

Optimum Basin Management Program Update Report

Prepared for:

Chino Basin Watermaster
Partners in Basin Management





January 2020

WEI
Wildermuth Environmental Inc.

To: Chino Basin Watermaster Stakeholders

From: Watermaster 2020 OBMP Update Team

Subject: 2020 Optimum Basin Management Program Update Report

Date: Draft November 22, 2019; Final January 24, 2020

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List of Inset Tables

List of Attached Exhibits

1.0 Introduction and Background

In September 2018, the Chino Basin Watermaster (Watermaster) initiated the process to update its Optimum Basin Management Program (OBMP) and the associated Implementation Plan. A detailed description of the development of the 2000 OBMP and the rationale for and process to prepare the 2020 OBMP Update was described in a white paper prepared for the stakeholders: *White Paper – 2020 Update to Chino Basin Optimum Basin Management Program* (OBMP White Paper). The OBMP White Paper is included herein as Appendix A.

The purpose of this *2020 Optimum Basin Management Program Update Report* (2020 OBMP Update Report) is to document the stakeholder process to update the OBMP and describe the recommended 2020 OBMP management plan. The management plan will form the foundation for Watermaster and the Chino Basin Judgment Parties (hereafter, Parties[1]) to develop a final implementation plan (the 2020 OBMP Implementation Plan) and the agreements necessary to implement it. The draft 2020 OBMP Update Report was released for stakeholder review and comment on November 22, 2019. This version reflects changes made in response to comments received. A record of the comments received and the responses provided by Watermaster are included herein as Appendix B.

1.1 History of the OBMP and its Implementation

The Chino Basin Judgment invested Watermaster with the discretionary authority to develop an OBMP for the Chino Basin, including both water quantity and quality considerations. Paragraph 41 (within the Physical Solution), states:

> 41. Watermaster Control. Watermaster, with the advice of the Advisory and Pool Committees, is granted discretionary powers in order to develop an optimum basin management program for Chino Basin, including both water quantity and quality considerations. Withdrawals and supplemental water replenishment of Basin Water, and the full utilization of the water resources of Chino Basin, must be subject to procedures established by and administered through Watermaster with the advice and assistance of the Advisory and Pool Committees composed of the affected producers. Both the quantity and quality of said water resources may thereby be preserved and the beneficial utilization of the Basin maximized.[2]

1.1.1 The OBMP and the Peace Agreement

Watermaster, at the direction of the Court, began developing the OBMP in 1998 and completed it in July 2000. The OBMP was developed in a collaborative public process that identified the needs and wants of all stakeholders, described the physical state of the groundwater basin, defined a set of management goals, characterized impediments to those goals, and developed a series of actions that could be taken to remove the impediments and achieve the management goals. This work was documented in the *Optimum Basin Management Program – Phase I Report* (OBMP Phase 1 Report).[3]

---

[1] Defined terms in the Court Approved Management Agreements will appear with the first letter of each word capitalized.

[2] See Restated Judgment, ¶ 41

[3] WEI. (1999). *Optimum Basin Management Program – Phase I Report*. Prepared for the Chino Basin Watermaster. August 19, 1999. http://www.cbwm.org/docs/engdocs/OBMP%20-%20Phase%20I%20(Revised%20DigDoc).pdf

The four goals of the 2000 OBMP included:

Goal 1 – Enhance Basin Water Supplies

Goal 2 – Protect and Enhance Water Quality

Goal 3 – Enhance Management of the Basin

Goal 4 – Equitably Finance the OBMP

The actions defined by the stakeholders to remove impediments to the OBMP goals were logically grouped into sets of coordinated activities called Program Elements (PEs), each of which included a list of implementation actions and an implementation schedule. The nine PEs defined in the 2000 OBMP included:

PE 1 – Develop and Implement Comprehensive Monitoring Program. The objectives of the comprehensive monitoring program are to collect the data necessary to support the implementation of the other eight PEs and periodic updates to the *State of the Basin Report*.[4]

PE 2 – Develop and Implement Comprehensive Recharge Program. The objectives of the comprehensive recharge program include increasing stormwater recharge to offset the recharge lost due to channel lining, to increase Safe Yield, and to ensure that there will be enough supplemental water recharge capacity available to Watermaster to meet its Replenishment Obligations.

PE 3 – Develop and Implement a Water Supply Plan for Impaired Areas. The objective of this program is to maintain and enhance Safe Yield with a groundwater desalting program that is designed to replace declining agricultural groundwater pumping in the southern part of the basin with new pumping to meet increasing municipal water demands in the same area, to minimize groundwater outflow to the Santa Ana River, and to increase Santa Ana River recharge into the basin.

PE 4 – Develop and Implement Comprehensive Groundwater Management Plan for Management Zone 1. The objectives of this land subsidence management program are to characterize the spatial and temporal occurrence of land subsidence, to identify its causes, and, where appropriate, to develop and implement a program to minimize or stop land subsidence.

PE 5 – Develop and Implement Regional Supplemental Water Program. The objective of this program is to improve the regional conveyance and availability of imported and recycled waters throughout the basin.

PE 6 – Develop and Implement Cooperative Programs with the Regional Board and Other Agencies to Improve Basin Management. The objectives of this water quality management program are to identify water quality trends in the basin and the impact of the OBMP implementation on them, to determine whether point and non-point contamination sources are being addressed by water quality regulators, and to collaborate with water-quality regulators to identify and facilitate the cleanup of soil and groundwater contamination.

[4] See for example: WEI (2019). *Optimum Basin Management Program 2018 State of the Basin Report*. Prepared for the Chino Basin Watermaster. June 2018.

PE 7 – Develop and Implement Salt Management Plan. The objectives of this salinity management program are to characterize current and future salt and nutrient conditions in the basin and to develop and implement a plan to manage them.

PE 8 – Develop and Implement Groundwater Storage Management Program. The objectives of this storage program are to implement and periodically update a storage management plan that prevents overdraft, protects water quality, and ensures equity among the Parties, and to periodically recalculate Safe Yield. This PE explicitly defined the storage management plan, including a "Safe Storage Capacity" for the managed storage of 500,000 acre-feet (af)–inclusive of Local and Supplemental Storage and Storage and Recovery Programs.

PE 9 – Develop and Implement Storage and Recovery Programs. The objectives of this conjunctive use program are to develop Storage and Recovery Programs that will provide broad mutual benefit to the Parties and ensure that Basin Water and storage capacity are put to maximum beneficial use while causing no Material Physical Injury (MPI).

The PEs and their associated implementation actions were incorporated into a recommended management plan. The Parties used the management plan as the basis for developing the OBMP Implementation Plan and an agreement (the Peace Agreement) to implement it. The OBMP Implementation Plan is Exhibit B to the Peace Agreement. The Peace Agreement was reviewed in a programmatic environmental impact report (PEIR) that was certified by the Inland Empire Utilities Agency (IEUA) in July 2000.

The Parties entered into the Peace Agreement in June 2000. Under Resolution 2000-05,[5] Watermaster adopted the goals and plans of the OBMP Phase 1 Report and agreed to proceed in accordance with the Peace Agreement and the OBMP Implementation Plan. Following a July 2000 hearing, the Court directed Watermaster to proceed in a manner consistent with the Peace Agreement in order to implement the OBMP and received and filed the PEIR.

For the purposes of the discussions in this report, the term "OBMP" refers to the collective programs implemented by Watermaster and others (e.g. IEUA, Chino Basin Desalter Authority [CDA], etc.) pursuant to the Peace Agreements, the OBMP Implementation Plan, the PEIR, and any amendments to these documents.

1.1.2 2007 Supplement to the OBMP Implementation Plan and the Peace II Agreement

The work to develop the OBMP determined that the groundwater production of the Chino Basin Desalters would ultimately need to be 40,000 acre-feet per year (afy) to accomplish the goals of the OBMP. The Chino I Desalter production capacity prior to the Peace Agreement was 8 million gallons per day (mgd; 9,000 afy). The Peace Agreement provided for the expansion of the Chino I Desalter to up to 14 mgd (15,700 afy) and the construction of the Chino II Desalter, with a production capacity of 10 mgd. The Peace Agreement required a minimum combined Desalter production capacity of 20 mgd (22,400 afy) and it committed the Parties to developing expansion and funding plans for the remaining capacity within five years of approval of the Peace Agreement. The Parties developed the Peace II Agreement, which included provisions to expand the desalting capacity such that groundwater production reaches

[5] Chino Basin Watermaster. (2002). *Twenty Fourth Annual Report Fiscal Year 2000-2001*; Appendix O
http://www.cbwm.org/docs/annualrep/24th%20Annual%20Report%20-%20Approved.pdf

40,000 afy. The Peace II Agreement introduced Re-operation[6] to achieve Hydraulic Control[7] of the Chino Basin and maintain Safe Yield. Hydraulic Control is both a goal of the OBMP and a requirement of the maximum-benefit salt-and-nutrient management plan (maximum benefit SNMP) that was developed by Watermaster and the IEUA under PE 7 to enable the expansion of recycled water recharge and reuse throughout the basin under PEs 2 and 5.

The Parties executed the Peace II Agreement in 2007, which included a supplement to the OBMP Implementation Plan to expand the Chino Basin Desalters to 40,000 afy of groundwater pumping, to incorporate Re-operation and Hydraulic Control, and to resolve other issues. There were no changes to the storage management plan in the OBMP Implementation Plan.

The IEUA Board certified a supplemental environmental impact report (SEIR) for the Peace II Agreement in 2010.

1.1.3 2017 Addendum to the 2010 Peace II SEIR

In 2016, Watermaster identified the need to update the storage management plan in the OBMP Implementation Plan because the total amount of water in managed storage accounts was projected to exceed the Safe Storage Capacity (SSC) limit of 500,000 af defined in the 2000 OBMP. In 2017, the IEUA adopted an addendum to the SEIR to provide a "temporary increase in the Safe Storage Capacity from 500,000 af to 600,000 af for the period of July 1, 2017 through June 30, 2021 […] until a comprehensive re-evaluation of the Safe Storage Capacity value/concept can be completed before June 30, 2021."[8] The addendum was supported with engineering work that demonstrated that this temporary increase in SSC would not cause MPI or loss of Hydraulic Control.

1.1.4 Grant Funding for OBMP Implementation

The OBMP provided the certainty necessary for Watermaster, the IEUA, the Parties, and regulators to mobilize for rapid implementation of the OBMP PEs as well as to attract significant outside funding for the design and construction of facilities. The following are a few examples:

- Under PE 2, having recharge master plans (RMPs) that clearly defined the financial and water-supply benefits of the projects enabled the IEUA to obtain about $40 million in grant funding and $16 million in low-interest loans to construct the recharge improvements recommended in the 2001 RMP and 2013 RMP Update, covering about 70 percent of the total capital costs.
- In support of PE 3, Watermaster, the IEUA and Western Municipal Water District successfully obtained about $148 million in grants for the design and construction of the Chino Basin Desalters, including Desalter I expansion, Desalter II, the Chino Creek wellfield, and the current

[6] Re-operation is the controlled overdraft of the basin by the managed withdrawal of groundwater pumping for the Chino Basin Desalters and the potential increase in the cumulative un-replenished pumping from the 200,000 acre-feet authorized by paragraph 3 of the Engineering Appendix Exhibit I to the Restated Judgment, to 600,000 acre-feet for the express purpose of securing and maintaining Hydraulic Control as a component of the Physical Solution.

[7] Hydraulic Control is the elimination of groundwater discharge from the Chino-North Groundwater Management Zone to the Santa Ana River or its reduction to less than 1,000 afy.

[8] Tom Dodson & Associates. (2017). *Addendum No. 1 to the Optimum Basin Management Program Project*. Page 2.

Desalter II expansion to incorporate treatment of point-source contamination associated with the South Archibald trichloroethene (TCE) plume. This funding has covered about 45 percent of the total capital costs of these facilities.

- In support of PEs 2 and 5, the IEUA successfully obtained about $64 million in grants and $115 million in low-interest loans for the construction of the recycled water distribution system, covering about 70 percent of the total capital costs.

In total, Watermaster and the IEUA have obtained over $230 million in grant funding and over $130 million in low-interest loans to implement the OBMP.

1.2 Need for the 2020 OBMP Update

The current OBMP contains a set of management programs that improve the reliability and long-term sustainability of the Chino Basin and the water supply reliability of the Judgment Parties. The framework for developing the OBMP—including the goals of the Parties, the hydrologic understanding of the basin, the institutional and regulatory environment, an assessment of the impediments to achieving the Parties' goals, and the actions required to remove the impediments and achieve the goals—were all based on 1998-1999 conditions.

As of 2019, many of the projects and management programs envisioned in the 2000 OBMP have been implemented; though some have not. The understanding of the hydrology and hydrogeology of the Chino Basin has improved since 2000, and new water-management issues have been identified. The strategic drivers and trends that shaped the goals and activities of the OBMP in the late 1990s have since changed. And, there are several drivers and trends in today's water management space that may challenge the ability of the Parties to protect their collective interests in the Chino Basin and their water supply reliability.

Exhibit 1 characterizes the drivers and trends shaping water management and their basin management implications for the Parties. "Drivers" are external forces that cause changes in the Chino Basin water space, such as climate change, regulations, and funding. Grouped under each driver are expected trends that emanate from that driver. For example, trends associated with climate change include reduced groundwater recharge, increased evaporation, and reduced imported water supply. The relationship of the drivers/trends to the management implications are shown by arcs that connect trends to implications. For example, a management implication of reduced groundwater recharge is the reduction of the Chino Basin Safe Yield.

The drivers, trends, and implications were first identified in the OBMP White Paper and served as the initial rationale for recommending an update to the OBMP. Exhibit 1 represents the final characterization of the drivers, trends, and implications, based on stakeholder input during the process to update the OBMP. The basin management implications that form the stakeholders' rationale for the 2020 OBMP Update are:

- Reductions in Chino Basin Safe Yield
- Reduced imported water availability and increased cost
- Imported water quality degradation
- Chino Basin water quality degradation
- Inability to pump groundwater with existing infrastructure
- Increased cost of groundwater use
- Recycled water quality degradation
- Reduced recycled water availability and increased cost

- Increased cost of Basin Plan compliance

Additionally, the PEIR and SEIR for the OBMP are nineteen and nine years old, respectively. Knowledge of the basin's characteristics has improved since these documents were adopted, water management challenges have intensified, and environmental considerations have changed. An updated PEIR will better support decision-making, investment, and grant applications for ongoing and new management actions under the OBMP.

Finally, it is anticipated that it will become increasingly difficult to secure grants and low-interest loans due to increased competition in the future. Most grant and low-interest loan programs require, or heavily favor, projects that are within watersheds and groundwater basins with adopted integrated regional management plans, groundwater sustainability plans, or their equivalents. The 2020 OBMP Update is equivalent to a regional water resources and groundwater management plan that, in addition to allowing the implementation of the Physical Solution, will enable the stakeholders to be competitive in applying for grants and low-interest loans.

For these reasons, Watermaster and the Parties need to update the OBMP and its Implementation Plan, and perform the CEQA process, to set the framework for the next 20 years of basin-management activities.

1.3 Stakeholder Process for the 2020 OBMP Update

The 2020 OBMP Update was facilitated using a collaborative stakeholder process like that employed for the development of the 2000 OBMP. Throughout 2019, Watermaster held a series of public listening sessions to support the development of the 2020 OBMP Update. The purpose of the listening sessions was to obtain information, ideas, and feedback from the stakeholders to define their issues, needs, and wants; their collective goals for the 2020 OBMP Update; impediments to achieving the goals; the management actions required to remove the impediments; and a proposed plan to implement the management actions.

Watermaster established an OBMP Update Team to facilitate the stakeholder process, composed of Watermaster staff, Watermaster legal counsel, engineers and scientists from Wildermuth Environmental Inc. (WEI; Watermaster's engineering consultant), and IEUA staff. The OBMP Update Team provided key information prior to and during each listening session to enable the stakeholders to provide their input on each topic discussed. The objectives were to communicate the process for updating the OBMP, to ensure that the ideas and opinions of every stakeholder were heard, to present the information that will be considered for inclusion in the OBMP Update, and to ensure the stakeholder feedback is captured correctly.

The OBMP Update Team held eight listening sessions on the following dates:

- Listening Session 1: January 15, 2019
- Listening Session 2: February 12, 2019
- Listening Session 3: March 21, 2019
- Listening Session 4: May 16, 2019
- Listening Session 5: July 31, 2019
- Listening Session 6: September 11, 2019
- Listening Session 7: October 17, 2019
- Listening Session 8: December 11, 2019

The objectives of the first four listening sessions were (1) to confirm the need to update the OBMP; (2) to identify the issues, needs, and wants of the stakeholders; (3) to define goals for the 2020 OBMP

Update; and (4) to identify new and revised activities that could be included in the 2020 OBMP Update to remove impediments to achieving the 2020 OBMP Update goals. The *2020 OBMP Scoping Report* (Scoping Report) summarized and integrated the work products of these four listening sessions and described the recommended scope of work to implement each of the "2020 OBMP Update Activities" defined by the stakeholders. The final Scoping Report, including responses to stakeholder comments, is included herein as Appendix C and is discussed further in Section 2.2 of this report.

The objectives of Listening Sessions 5 and 6 were to present and obtain feedback on the scopes of work described in Section 3 of the Scoping Report. The objective of Listening Session 7 was to present and obtain feedback on the integration of the 2020 OBMP Update Activities defined in the Scoping Report with the 2000 OBMP PEs. The objectives of Listening Session 8 were to present and obtain feedback on the recommended 2020 OBMP management plan documented in the *Draft 2020 OBMP Update Report* and to begin discussions on the 2020 OBMP Implementation Plan and implementation agreements.

Appendix D to this report documents the stakeholder attendance at the listening sessions. All documents related to the 2020 OBMP Update, including meeting materials from the listening sessions and report deliverables, are available on the Watermaster's website.[9]

1.4 Organization and Use of this Report

This *2020 OBMP Update Report* describes the 2020 OBMP Update process (Section 1), the OBMP goals and new activities for the 2020 OBMP Update (Section 2), the status of the OBMP PEs and ongoing activities within them (Section 3), and the recommended 2020 OBMP management plan – inclusive of ongoing and new activities (Section 4). The management plan in Section 4 will form the foundation for the Parties to develop a final implementation plan (2020 OBMP Implementation Plan) and the agreements necessary to implement it. Exhibit 2 shows the parallels between the 2000 and 2020 documentation and the subsequent processes to develop implementation plans and agreements for approval by the Court and environmental review under CEQA.

Implementation of the management plan described in Section 4 may or may not result in the construction of new facilities, and nothing in this document obligates Watermaster or the Parties to implement the optimization recommendations. However, some of the implementation actions included in the management plan are required by Watermaster to administer the Physical Solution or comply with other Watermaster or regulatory requirements. These required implementation actions may or may not result in the development and implementation of projects.

[9] http://www.cbwm.org/OBMPU.htm

2.0 2020 OBMP Goals and Activities

2.1 OBMP Goals

The issues, needs, and wants of the stakeholders form the basis of the management goals of the 2020 OBMP Update and inform the identification of impediments to the goals as well as the action items to remove the impediments. Through the listening session process, 57 unique needs and wants were identified by the stakeholders. The classes of identified issues were effectively the same as the implications for basin management defined in Exhibit 1. Exhibit 3 is a matrix, summarizing the needs and wants of the stakeholders, organized by basin management issue (rows) and showing attribution to stakeholders that share each need/want (columns).

Through the assessment of basin management issues, needs, and wants, the stakeholders concluded that the goals defined in the 2000 OBMP are still relevant today. The Parties' intent for each goal of the 2020 OBMP Update, as documented in the Scoping Report, are:

> ***Goal No. 1 - Enhance Basin Water Supplies.*** The intent of this goal is to increase the water supplies available for Chino Basin Parties and improve water supply reliability. This goal applies to Chino Basin groundwater and all other sources of water available for beneficial use.
>
> ***Goal No.2 - Protect and Enhance Water Quality.*** The intent of this goal is to ensure the protection of the long-term beneficial uses of Chino Basin groundwater.
>
> ***Goal No.3 - Enhance Management of the Basin.*** The intent of this goal is to encourage sustainable management of the Chino Basin to avoid Material Physical Injury, promote local control, and improve water-supply reliability for the benefit of all Chino Basin Parties.
>
> ***Goal No. 4 - Equitably Finance the OBMP***. The intent of this goal is to identify and use efficient and equitable methods to fund OBMP implementation.

The far right-hand column in Exhibit 3 illustrates the nexus of the OBMP goals to the needs and wants of the Parties.

2.2 New Activities to Achieve the Goals of the 2020 OBMP Update

There are physical, institutional, and financial impediments to achieving the 2020 OBMP goals. The issues, needs, and wants of the stakeholders shown in Exhibit 3 recognize these impediments. The stakeholders identified and described 12 activities that, if implemented, would address their issues, needs, and wants. The 12 activities, as initially defined by the stakeholders, are listed in Exhibit 4 (the activities are identified by the letters A through L). Exhibit 3 illustrates which of the 12 activities the stakeholders believe have the potential to address each of their needs and wants. 55 of the 57 needs and wants were identified as addressed by one or more of the proposed activities.

Exhibit 5 illustrates the nexus of the OBMP goals, the impediments to achieving these goals, the stakeholder-defined activities to remove the impediments, and the potential outcomes (i.e. the implications) of implementing each activity. Exhibit 5 also shows the nexus of each activity to addressing the issues, needs, and wants of the stakeholders, categorized by basin management issues. In the process of describing the nexus of the goals and activities shown in Exhibit 5, it was identified that some of the activities in Exhibit 4 are related enough to be combined into a single management activity. Nine of the activities (A, B, C, D, E, F, G, K, and L) were combined into seven basin management activities. The remaining three activities (H, I, and J) were identified as actions that could either be accomplished by incorporating them into the scopes of work of every activity or were more appropriate for inclusion within an implementation agreement.[10]

The seven basin management activities described in the Scoping Report are:[11]

Activity A – Increase the capacity to store and recharge storm and supplemental water

Activity B – Develop, implement, and optimize Storage and Recovery Programs

Activity CG – Identify and implement regional conveyance and treatment projects/programs and optimize the use of all water supply sources

Activity D – Maximize the reuse of recycled water produced by the IEUA and others

Activity EF – Develop and implement a groundwater-quality management plan to address contaminants of emerging concern

Activity K – Develop a management strategy within the maximum-benefit salt and nutrient management plan to ensure compliance with recycled water recharge dilution requirements.

Activity L – Perform the appropriate amount of monitoring and reporting required to fulfill basin management and regulatory compliance requirements

The Scoping Report described each of the seven activities at the detail required to define a scope of work to implement them. The potential outcomes described in Exhibit 5 provided the basis for the scope of each activity. For each activity, the Scoping Report includes: a description of the activity, the need and function of the activity—including supporting technical demonstrations, the activity's relationship to the OBMP PEs, a recommended scope of work to perform the activity to achieve the desired outcomes, a preliminary schedule for implementing the tasks that comprise the scopes of work, and a budget-level cost estimate to implement the initial tasks that could reasonably be estimated on currently available information.

Each activity is a management process to optimize some aspect of basin management, such as water quality (EF, K) or managed recharge (A). Thus, the scope of work for each activity represents the methodical process to characterize and analyze the basin management challenge (including technical data and institutional information), to define potential management alternatives, and to select the optimum management solution(s). Each management process is generally composed of four phases:

(1) Scoping (S) – In this phase, the stakeholders convene to precisely articulate the objectives of the management process and refine the scope of work, cost, and schedule to execute it.

(2) Evaluate the need for projects or other management solutions (PN) – In this phase, available and/or new data and information are compiled and analyzed to characterize and demonstrate the need for management programs or projects to achieve the stakeholder objectives defined in the scoping phase.

[10] See the *2020 OBMP Scoping Report* (included herein as Appendix C) for more details on how Activities H, I, and J can be incorporated in the activity scopes of work and/or the 2020 OBMP Implementation Plan agreement(s).

[11] The activity names listed here have been simplified from the original descriptions defined by the stakeholders and shown in Exhibit 4.

(3) Define and evaluate management alternatives (PE) – The evaluation phase includes the following generalized steps: develop planning, screening, and evaluation criteria; identify the potential program or project alternatives; develop reconnaissance-level engineering design and operating plans for project alternatives; develop an engineering cost opinion for each alternative; describe how each alternative could be implemented and financed; evaluate alternatives based on the evaluation criteria; and select the preferred program or project alternative.

(4) Implementation (I) – In this phase, the preferred program or project alternative is implemented subject to developing the necessary agreements between participating Parties. If a project is identified, implementation also includes: preparing the preliminary design of the recommended alternative, preparing the environmental documentation that will tier-off the 2020 OBMP Update PEIR, preparing a financial plan for constructing the recommended alternative, preparing final design of the recommended alternative, acquiring permits for constructing and operating the recommended alternative, and constructing the recommended alternative.

The end of each phase represents a check in point where the scope of work can be adapted to deal with changed conditions or an off-ramp where a go/no-go decision can be made to continue with the next phase of the management process. Thus, activities may or may not result in the design and implementation of management plans or facilities.

Exhibits 6 through 12 summarize the key features of each of the seven activities described in detail in the Scoping Report. For each activity, the exhibit summarizes the need and objectives, the scope of work, and a general implementation schedule with go/no-go decision points identified. The scopes of work are divided into tasks, and for each task, the following are identified: the corresponding management process phase (S, PN, PE, I), the expected outcomes, Watermaster's role in implementing the task (if any), and whether Watermaster deems the outcomes as required to administer the Physical Solution or comply with other Watermaster or regulatory requirements.

Implementation of the management processes characterized in Exhibits 6 through 12 may or may not result in the construction of new facilities, and nothing in this document obligates Watermaster or the Parties to implement the scopes as described. In activity implementation, for those outcomes that are deemed necessary to administer the Physical Solution or comply with other requirements, Watermaster will provide for the opportunity to revise the scopes of work and cost in the scoping phase. Any revisions will be subject to the discretion of Watermaster to ensure that the final scope of work achieves the required outcomes.

The following sections summarize the seven 2020 OBMP Update Activities identified by the Parties and describes the new implementation actions for inclusion in the 2020 OBMP Update Management Plan (in Section 4) to accomplish the objectives of the activities.

2.2.1 Activity A – Increase the capacity to store and recharge storm and supplemental water

The stakeholders have identified a lost opportunity for stormwater recharge in the basin and a limitation of Watermaster and the IEUA's existing economic selection criteria for new recharge projects. The use of the existing criteria resulted in a recommendation in the 2018 RMP Update (RMPU) that no new recharge projects be implemented. Thus, the Activity A objectives are (1) to maximize stormwater capture pursuant to Watermaster's diversion permits,[12] (2) to promote the long-term balance of recharge and discharge, (3) to ensure sufficient supplemental water recharge capacity for future replenishment, (4) to reduce dependence on imported water by maintaining or enhancing Safe Yield, (5) to improve water quality, and (6) to ensure a supply of dilution water to comply with recycled water recharge permit requirements. For the remainder of this report, the term "recharge" is inclusive of diverting, storing, and recharging storm and supplemental waters.

The Scoping Report identified that based on the alignment of the scope of work to achieve the outcomes of Activity A with those of the RMPU process, implemented through OBMP PE 2, the outcomes of Activity A can be accomplished as part of the existing RMPU process, which is updated at least every five years as required by the Court. Thus, implementation of the scope of work characterized in the Scoping Report and summarized in Exhibit 6 will result in the completion of the required 2023 RMPU, including obtaining consensus on its objectives, developing an implementation and financing plan, preparing the report, and implementing recharge projects. These outcomes are required by Watermaster to ensure that the yield of the basin is maintained and that the supplemental recharge capacity is sufficient to meet Replenishment Obligations. Although not required, the next (or a future) RMPU process could accomplish the objectives of Activity A by updating the project selection criteria and considering projects that will meet other needs of the Parties, such as providing additional recharge capacity for Storage and Recovery Programs or addressing pumping sustainability issues.

Based on the scope of work and alignment with the existing PE 2 implementation actions, there are no new implementation actions required for inclusion in the 2020 OBMP Update to accomplish Activity A.

2.2.2 Activity B - Develop, implement, and optimize Storage and Recovery Programs

The Peace Agreement states that "Watermaster shall prioritize its efforts to regulate and condition the storage and recovery of water developed in a Storage and Recovery Program for the mutual benefit of the Parties to the Judgment and give first priority to Storage and Recovery Programs that provide broad mutual benefits."[13] For this and other reasons, the Parties desire to develop "optimized" Storage and Recovery Programs that avoid potential MPI and provide broad benefits, such as increased water-supply reliability, protected or enhanced Safe Yield, improvements to water quality, and reduced cost of OBMP implementation.

The objective of Activity B is to prepare a Storage and Recovery Program guidance document in a collaborative setting that clearly articulates the specific objectives of the Parties and the required benefits to be realized from Storage and Recovery Programs. Implementation of the scope of work described in the Scoping Report and summarized in Exhibit 7 will result in: (1) consensus on the objectives and desired benefits of Storage and Recovery programs, (2) conceptual descriptions of various types of Storage and Recovery programs that achieve the defined objectives and benefits and are consistent with the *2020 Storage Management Plan*, (3) reconnaissance-level project designs and

[12] Watermaster holds three permits with the State Water Resources Control Board (State Board) for the diversion and recharge of stormwater in trust for the Parties. The San Bernardino County Flood Control District (SBCFCD) is a co-permittee for two of these permits, 19895 and 20753. Each permit defines a maximum diversion limit and the period over which diversions are allowed to occur each year (diversion season): (1) Permit 19895 has a diversion limit of 15,000 acre-feet (af) from November 1 to April 30, (2) Permit 20753 has a diversion limit of 27,000 af from October 1 to May 1, and (3) Permit 21225 has a diversion limit of 68,500 af from January 1 to December 31.

[13] See Peace Agreement, § 5.2(c)

operating plans and the costs of the Storage and Recovery Program alternatives, and (4) the development of a *Storage and Recovery Program Master Plan* that will support the design of Storage and Recovery Programs that are consistent with the *2020 Storage Management Plan* and the Peace Agreement. Watermaster deems the development of a *Storage and Recovery Program Master Plan* a necessary outcome so that Watermaster is able to review, condition, and approve Storage and Recovery Program applications in a manner that is uniform, predictable, and consistent with the Peace Agreement.

Based on the scope of work, the new implementation actions for inclusion in the 2020 OBMP Update to accomplish Activity B are:

- Develop a *Storage and Recovery Master Plan* to support the design of optimized Storage and Recovery Programs that are consistent with the 2020 Storage Management Plan and to provide the Watermaster with criteria to review, condition, and approve applications in a manner that is consistent with the Judgment and the Peace Agreement.

2.2.3 Activity CG - Identify and implement regional conveyance and treatment projects/programs and optimize the use of all water supply sources

The stakeholders have identified basin management challenges, such as land subsidence and poor water quality, that could limit their ability to fully exercise their pumping rights using existing infrastructure. Thus, the Activity CG objectives are to optimize the use of all sources of water available to the Parties to meet their demands despite these basin management challenges and to potentially help mitigate these challenges. Implementation of the scope of work characterized in the Scoping Report and summarized in Exhibit 8 will result in (1) a plan that describes the universe of water reliability concerns of the Parties, the opportunities and limitations of existing/planned infrastructure to meet the reliability goals, conceptual project designs and operating plans, and the costs of the reliability alternatives; and (2) implementation of the selected reliability project(s). As identified in the Scoping Report, the Activity CG scope of work is effectively the same as the IEUA's existing Integrated Water Resources Plan (IRP) process that addresses water supply reliability for its member agencies. Activity CG is an expansion that would address the water supply reliability concerns of all Parties to the Judgment. Currently, IEUA is preparing its 2020 IRP and other related planning efforts with its member agencies. This effort, or future IRP updates could be expanded by others to include neighboring agencies, including Three Valleys Municipal Water District (TVMWD), Western Municipal Water District (WMWD), or others. To create a coordinated planning effort, any of these agencies could lead and coordinate the collaborative regional effort on behalf of the Parties.

Although this activity optimizes the management of all water supplies in the Chino Basin, Watermaster does not deem these outcomes necessary for administration of the Physical Solution or compliance with other Watermaster or regulatory requirements.

Based on the scope of work, and considering its overlap with IEUA planning efforts, the new implementation actions for inclusion in the 2020 OBMP Update to accomplish Activity CG are:

- The IEUA, the TVMWD, the WMWD, and/or other Party acting as a coordinating agency will establish and/or expand integrated water resources planning efforts to address water supply reliability for all Watermaster Parties.
- Watermaster will support the IEUA, TVMWD, WMWD, and/or others in their efforts to improve water supply reliability to ensure those efforts are integrated with Watermaster's groundwater management efforts.

These implementation actions are included as part of the 2020 OBMP Update to complement existing regional planning efforts, not to duplicate them.

2.2.4 Activity D - Maximize the reuse of recycled water produced by the IEUA and others

The objective of Activity D is to maximize the reuse of recycled water produced by the IEUA and other publicly owned treatment works (POTWs) in proximity to the Chino Basin to meet future demands and improve local water-supply reliability, especially during dry periods. Expanded reuse activities could include direct non-potable reuse (landscape irrigation or industrial uses), artificial recharge by spreading and/or injection (indirect potable reuse), and direct potable reuse. Increasing recycled water reuse is an integral part of the OBMP goal to enhance water supplies. The direct use of recycled water increases the availability of native and imported waters for higher-priority beneficial uses. And, the Judgment states that Watermaster shall give high priority to maximizing the beneficial use of recycled water for replenishment purposes.[14] Implementation of the scope of work characterized in the Scoping Report and summarized in Exhibit 9 will result in (1) a plan that describes the objectives for optimizing and maximizing recycled water reuse, the demand and opportunities for increased recycled water reuse, the impacts of recycled water reuse and required mitigation, conceptual project designs and operating plans, and the costs of the reuse project alternatives; and (2) implementation of the selected recycled water reuse project(s).

As identified in the Scoping Report, the scope of work is similar to the IEUA's existing planning efforts for the IRP and Chino Basin Program (CBP) on behalf of its member agencies. These efforts, or similar future efforts, could be expanded by others to include neighboring agencies, including the TVMWD, the WMWD, or others. To create a coordinated planning effort, any of these agencies could lead and coordinate the collaborative regional effort to maximize recycled water reuse on behalf of the Parties.

Although this activity maximizes the management of recycled water supplies in the Chino Basin, Watermaster does not deem these outcomes necessary for administration of the Physical Solution or compliance with other Watermaster or regulatory requirements. However, any expansion of recycled water reuse would be subject to Watermaster review to ensure compliance with the maximum benefit SNMP.

Based on the scope of work, and considering its overlap with IEUA planning efforts, the new implementation actions for inclusion in the 2020 OBMP Update to accomplish Activity D are:

- IEUA, the TVMWD, the WMWD, and/or other Party acting as a coordinating agency will expand future recycled water reuse planning efforts to maximize the reuse of all available sources of recycled water.
- Watermaster will support the IEUA, TVMWD, WMWD, and/or others in their efforts to maximize recycled water reuse to ensure these efforts are integrated with Watermaster's groundwater and salinity management efforts.

These implementation actions are included as part of the 2020 OBMP Update to complement existing regional planning efforts, not to duplicate them.

[14] See Restated Judgment, ¶ 49(a)

2.2.5 Activity EF - Develop and implement a groundwater-quality management plan to address contaminants of emerging concern

Groundwater contaminants are present across the Chino Basin, new contaminants are being discovered, and water-quality regulations are evolving and becoming more restrictive. These trends threaten to limit the beneficial use of groundwater and increase the cost of the water supply. The objectives of Activity EF are to characterize the water-quality challenges across the Chino Basin and identify the most efficient means to address these challenges, including the potential for multi-benefit collaborative projects to ensure that groundwater is put to beneficial use. Implementation of the scope of work described in the Scoping Report and summarized in Exhibit 10 will result in (1) the development and implementation of initial and long-term emerging contaminants monitoring plans, (2) a water-quality assessment of the Chino Basin that characterizes the need for a groundwater-quality management plan, and (3) the development and implementation of a *Groundwater-Quality Management Plan*. The *Groundwater-Quality Management Plan* would document the most current water-quality assessment, the long-term monitoring and analysis plan, the reconnaissance-level engineering designs and operating plans for alternative water quality improvement projects, the selected project(s) for implementation, and an implementation plan.

As previously noted, Paragraph 41 of the Judgment provides Watermaster the discretion to develop an OBMP that includes both water quantity and water quality considerations. If water quality is not effectively managed, the Parties may not be able to utilize their water rights, which could result in negative impacts to the basin, such as reductions in net recharge, loss of hydraulic control, and movement of contaminant plumes. Effective management of water quality in the Basin to preserve maximum beneficial use can only be accomplished through a systematic assessment of the emerging contaminant threats to the use of groundwater resources, and thoughtfully preparing a plan to respond to those threats. A *Groundwater-Quality Management Plan* would provide the Parties with the comprehensive data and information, including best practices for monitoring, required to understand and manage the future water-quality challenges that could impact the Parties' ability to fully utilize their pumping rights. Hence, Watermaster deems the outcomes of Activity EF as required for administration of the Physical Solution.

Based on the scope of work, the new implementation actions for inclusion in the 2020 OBMP Update to accomplish Activity EF are:

- Develop and implement an initial emerging contaminants monitoring plan.
- Prepare a water quality assessment of the Chino Basin to evaluate the need for a Groundwater Quality Management Plan.
- Develop and implement a long-term emerging contaminants monitoring plan.
- Develop and implement a Groundwater Quality Management Plan.

2.2.6 Activity K - Develop a management strategy within the maximum-benefit salt and nutrient management plan to ensure compliance with recycled water recharge dilution requirements

Watermaster and the IEUA are co-permittees for the Chino Basin maximum-benefit SNMP incorporated in the Water Quality Control Plan for the Santa Ana River Basin (Basin Plan). The maximum-benefit SNMP was developed pursuant to PE 7 (see Section 3.2.7 for additional details) to enable the recharge and reuse of recycled water planned in PEs 2 and 5. It defines the management actions that Watermaster and IEUA must take to manage total dissolved solids (TDS) and nitrate concentrations in Chino Basin groundwater and in the IEUA's recycled water and the TDS and nitrate concentration limitations for recycled water reuse activities. The objective of Activity K is to determine if compliance with the recycled water recharge dilution requirements defined in Watermaster and the IEUA's maximum-benefit SNMP can be achieved under existing management plans and, if not, to develop a plan to achieve compliance. Implementation of the scope of work described in the Scoping Report and summarized in Exhibit 11 will result in (1) the periodic characterization and understanding of the ability to comply with the TDS and nitrate dilution requirements in the short- and long-term; and if non-compliance is projected, (2) a plan that describes the conceptual designs, operating plans, and costs of alternative salt-offset programs or projects, and (3) implementation of the selected salt-offset program or projects. Because the maximum-benefit SNMP is an explicit requirement of Basin Plan, these are required outcomes for Watermaster and the IEUA to continue the recycled water recharge program.

Based on the scope of work, the new implementation actions for inclusion in the 2020 OBMP Update to accomplish Activity K are:

- Periodically prepare TDS and nitrate concentration projections to evaluate compliance with the maximum benefit SNMP dilution requirements, and, if necessary, based on the outcome of the evaluation, prepare a plan and schedule to implement a salt-offset compliance strategy.

2.2.7 Activity L – Perform the appropriate amount of monitoring and reporting required to fulfill basin management and regulatory compliance requirements

Watermaster conducts data-collection programs and prepares reports and data deliverables to comply with regulations, to fulfill its obligations under its agreements and Court orders, to comply with its requirements under CEQA, and to assess the performance of OBMP Implementation. The objective of Activity L is to refine the monitoring and reporting requirements of Watermaster to ensure that the objectives of each requirement are being met efficiently at a minimum cost. Implementation of the Activity L scope of work described in the Scoping Report and summarized in Exhibit 12 will result in (1) the comprehensive review of all monitoring/reporting programs in an open stakeholder process, (2) the development and periodic update of an *OBMP Monitoring and Reporting Work Plan*, and (3) potential revisions to Watermaster's non-discretionary monitoring and reporting programs. Watermaster is required to implement the monitoring and reporting programs to comply with the Judgment and other regulations and obligations; however, these specific outcomes are not required. This activity will allow the Parties to offer more direct input in the implementation of the required monitoring programs, but Watermaster does not deem this outcome necessary to comply with the monitoring requirements.

Based on the scope of work, the new implementation actions for inclusion in the 2020 OBMP Update to accomplish Activity L are:

- Perform review and update of Watermaster's regulatory and Court-ordered monitoring and reporting programs and document them in a work plan: *OBMP Monitoring and Reporting Work Plan*.
- Perform periodic review and update of *the OBMP Monitoring and Reporting Work Plan* and modify the monitoring and reporting programs, as appropriate.

If the above implementation actions are not initiated by the Parties, Watermaster staff and the Watermaster engineer would continue their existing process to periodically review and refine Watermaster's monitoring and reporting efforts to meet all requirements and achieve efficiencies.

3.0 Integration of the 2020 OBMP Update Activities with the 2000 OBMP Program Elements

3.1 Nexus of the 2020 OBMP Update Activities to the 2000 OBMP Program Elements

Through the process of defining the scopes of work to achieve the desired outcomes of the 2020 OBMP Update Activities, it became apparent that the PEs defined in the 2000 OBMP are still relevant today as the overarching program elements of a basin management program. Each of the seven activities in the Scoping Report had objectives and tasks that were directly related to one or more of the 2000 OBMP PEs. Exhibit 13 is a matrix that demonstrates the nexus between the PEs (rows) and the activities (columns) based the PE objectives (listed in Section 1.1 herein) and the objectives of the 2020 OBMP Update Activities (described in Section 2.2 herein). The matrix is symbolized with anchors and dots. Anchors indicate a direct relationship between an activity and a PE (i.e. the activity and the PE have similar or identical objectives and thus the activity can be integrated into the existing PE). Dots indicate an indirect relationship between an activity and a PE (i.e. the activity has the potential to provide benefits to PEs).

Based on this finding, the nine PEs defined in the 2000 OBMP will be retained for the 2020 OBMP Update. Each of the seven activities, and the associated implementation actions, was mapped to the PE to which it is anchored in Exhibit 13. Based on the need for ongoing activities under the existing PE and the new activities defined by the stakeholders, the implementation actions were modernized and updated.

3.2 OBMP Program Elements – Progress and Ongoing Management Actions

For each of the nine PEs, this section describes the objectives and implementation actions of the PE as established in 2000, implementation progress since 2000, and ongoing management activities, including the new actions to be incorporated in the 2020 OBMP, as identified in Section 2.2 of this report.

3.2.1 Program Element 1. Develop and Implement Comprehensive Monitoring Program

The 2000 OBMP included PE 1—*Develop and Implement Comprehensive Monitoring Program* —to provide the information necessary to support the implementation of all other OBMP PEs and to evaluate their performance. The types of monitoring programs called for by PE 1 in the OBMP included:

- Groundwater-level monitoring
- Groundwater-quality monitoring
- Groundwater-production monitoring
- Surface-water discharge and quality monitoring (including managed artificial recharge)
- Ground-level monitoring
- Well construction, abandonment, and destruction

The implementation actions incorporated into the 2000 OBMP Implementation Plan are summarized in Table 1 below. Each implementation action in Table 1 is categorized as a one-time or ongoing action, and the right-most column of the table indicates if the action was implemented.

Table 1. Program Element 1 – Implementation Actions Defined in the 2000 OBMP*

Implementation Actions and Schedule	One-time/ Ongoing	Implemented?
Years 1 through 3		
*Perform initial tasks to survey sites and design and set up all long-term monitoring programs for groundwater level, groundwater quality, ground level, surface water, and recharge monitoring programs.	One-time	✓
Complete initial meter installation program for overlying agricultural pool.	One-time	✓
Develop agreements with county and state agencies regarding notification of new well drilling. Well construction and related information will be requested as new wells are constructed. Prepare and update a list of abandoned wells and coordinate with the counties to ensure that abandoned wells are destroyed properly.	One-time	✓
Years 4 through 50		
*Start and continue all groundwater level, groundwater production, groundwater quality, ground level (including remote sensing), surface water, and well construction/destruction monitoring programs. Key wells should be relocated as necessary.	Ongoing	✓

**Note: Actions marked with "*" are combined from multiple actions in the OBMP Implementation Plan.*

3.2.1.1 Implementation Progress since 2000

Watermaster began implementing its monitoring programs as part of the development of the OBMP. Pursuant to the OBMP Implementation Plan, long-term plans for monitoring groundwater production, groundwater level, groundwater quality, ground level (including remote sensing), surface water, and well construction/destruction monitoring programs have been developed, implemented, and updated as necessary.

The monitoring programs have evolved over time to ensure that the data and information acquired not only meet the OBMP requirements, but also other regulatory requirements and Watermaster obligations under agreements, Court orders, and CEQA. In some instances, the monitoring programs were expanded to satisfy new basin-management initiatives and regulations. In other instances, the scope of the monitoring programs has been reduced with periodic reevaluation and redesign to achieve the monitoring objectives at reduced cost. Table 2 below is a list of each Watermaster monitoring and reporting requirement and the entities that require the monitoring and reporting. The Scoping Report provides a comprehensive overview of the status of the monitoring programs as of 2018.

Watermaster developed a centralized environmental database to store, manage, and visualize its datasets. Data management includes a detailed quality assurance and quality control protocol. The database and the database-management procedures ensure the quality and accuracy of the data, allow for efficient data exploration and analysis, and include standardized reports and data exports in formats for regulatory data deliverables or further analysis (e.g. creation of model input files).

Table 2. Watermaster Monitoring and Reporting Requirements

Monitoring and Reporting Requirement	Requiring Entity					
	Court	State Board	Regional Board	California DFW	California DWR	CEQA
Water Rights Compliance Annual Reports		X		X		
SGMA Annual Report for Adjudicated Basins					X	
Biannual Evaluation of the Cumulative Effect of Transfers	X					
Biannual Evaluation of the Balance of Recharge and Discharge	X					
Annual Finding of Substantial Compliance with the Recharge Master Plan	X					
Annual Report of Compliance with SB 88 and SWRCB Regulations for Measurement and Reporting of Diverted Surface Water		X				
Safe Yield Recalculation	X					
Recharge Master Plan Update (RMPU)	X					
State of the Basin Report	X					
California Statewide Groundwater Elevation Monitoring Program (CASGEM)					X	
Chino Basin Maximum Benefit Annual Report			X			
Annual Report of the Prado Basin Habitat Sustainability Committee						X
Water Recycling Requirements for the Chino Basin Recycled Water Groundwater Recharge Program			X			
Annual Report of the Ground-Level Monitoring Committee	X					
OBMP Semi-Annual Status Reports	X					

3.2.1.2 Ongoing implementation actions for the 2020 OBMP

The following summarizes each of the Watermaster's monitoring and data-collection programs that need to continue to be implemented to satisfy the requirements of the OBMP and the other requirements summarized in Table 2 above. Section 4.1 of this report summarizes the 2020 OBMP Management Plan for PE 1.

Groundwater-production monitoring. Watermaster uses groundwater-production data to quantify and levy assessments pursuant to the Judgment. Estimates of production are also essential inputs to recalibrate Watermaster's groundwater flow model, which is used to inform the recalculation of Safe

Yield, evaluate the state of Hydraulic Control, perform MPI evaluations, and support many other Watermaster initiatives. Members of the Appropriative and Overlying Non-Agricultural Pools and CDA record their own meter data and submit them to Watermaster. For Agricultural Pool wells, Watermaster performs a field program to install totalizing flow meters, repair or replace broken meters, and visit the wells quarterly to record the metered data. Watermaster has determined that for some Agricultural Pool wells it is not practical to repair, replace or install new meters. In these cases, Watermaster applies a water-duty based method to estimate production on an annual basis.

Groundwater-level monitoring. Watermaster's groundwater-level monitoring program supports many Watermaster management functions, including: groundwater model development and recalibration, periodic recalculations of Safe Yield, evaluating the cumulative impacts of transfers and the balance of recharge and discharge, subsidence management, MPI evaluations, estimation of storage change, other scientific demonstrations required for groundwater management, and many regulatory requirements, such as the demonstration of Hydraulic Control, the triennial recomputation of ambient water quality, and Prado Basin habitat sustainability. The monitoring program includes field monitoring programs implemented by Watermaster staff at private wells and monitoring wells, and cooperative programs to compile and store data from well owners and other entities managing monitoring programs, including municipal water agencies, private water companies, the California Department of Toxic Substance Control (DTSC), the County of San Bernardino, and various private consulting firms. To continue to support assessments of Hydraulic Control, and other analyses, it is anticipated that new monitoring wells will need to be constructed to replace the currently monitored private wells that will be lost as land is converted from agricultural uses to urban uses.

Groundwater-quality monitoring. Watermaster's groundwater-quality monitoring program supports many Watermaster management and regulatory-compliance functions, including: compliance with the maximum benefit SNMP, characterization of non-point source contamination and plumes associated with point-source discharges, support for ground-water modeling, characterization of groundwater/surface-water interactions in the Prado Basin area, and characterization of basin-wide trends in groundwater quality as part of the Watermaster's biennial State of the Basin report. The monitoring program includes field monitoring programs implemented by Watermaster staff at private wells and monitoring wells, and cooperative programs to compile and store data from well owners and other entities managing monitoring programs (see examples noted for groundwater-level monitoring). To continue to support the triennial ambient water quality recomputation, and other analyses, it is anticipated that new monitoring wells will need to be constructed to replace the currently monitored private wells that will be lost as land is converted from agricultural uses to urban uses.

Surface-water and climate monitoring. Watermaster's surface-water and climate monitoring program supports many Watermaster management functions, including: groundwater model development and recalibration, periodic recalculations of Safe Yield, evaluating the cumulative impacts of transfers and the balance of recharge and discharge, MPI evaluations, recharge master planning, evaluating Prado Basin habitat sustainability, and evaluating compliance with the SWRCB diversion permits, the maximum benefit SNMP, and the recycled-water recharge permits. Most of the datasets are collected from publicly available sources, including POTW discharge data, USGS stream gaging station data, and precipitation and temperature data measured at public weather stations or downloaded from spatially gridded datasets. Chino Basin stormwater, imported water, and recycled water recharge data are collected by the IEUA and shared with Watermaster. Watermaster staff also performs field surface water monitoring of the Santa Ana River in compliance with the maximum-benefit SNMP.

Ground-level monitoring. Watermaster's ground-level monitoring program is conducted pursuant to the *Chino Basin Subsidence Management Plan*. The ground-level monitoring program consists of high-frequency, groundwater level monitoring at wells, monitoring of the vertical component of aquifer system compression and expansion at Watermaster extensometer facilities, and measurement of horizontal ground-surface deformation across areas that are experiencing differential land subsidence by electronic distance measurements (EDMs) to understand the potential threats and locations of ground fissuring.

Biological monitoring. Watermaster's biological monitoring program is conducted pursuant to the adaptive monitoring program (AMP) for the Prado Basin Habitat Sustainability Program (PBHSP). The objective of the PBHSP is to ensure that the groundwater-dependent ecosystem in Prado Basin will not incur unforeseeable significant adverse impacts due to implementation of the Peace II Agreement. The monitoring program produces a time series of data and information on the extent and quality of the riparian habitat in the Prado Basin over a historical period that includes both pre- and post-Peace II implementation. Two types of monitoring and assessment are performed: regional and site-specific. Regional monitoring and assessment of the riparian habitat is performed by mapping the extent and quality of riparian habitat over time using multi-spectral remote-sensing data and air photos. Site-specific monitoring performed in the Prado Basin includes field vegetation surveys and seasonal ground-based photo monitoring.

Water-supply and water-use monitoring. Watermaster compiles water supply and water-use data from the Parties to support two required reporting efforts: the Watermaster Annual Report to the Court and annual reporting requirements for adjudicated basins pursuant to the Sustainable Groundwater Management Act (SGMA). The data are also used to support calibration of Watermaster's surface water and groundwater models. Monthly water use volumes for supply sources other than Chino Basin groundwater are collected from the Parties; this includes groundwater from other basins, recycled water, imported water, and native surface water.

Planning information. Watermaster periodically collects and compiles information on the Parties' best estimates of their future demands and associated water supply plans. The data are used for future planning investigations that require the use of Watermaster's surface and groundwater models, such as Safe Yield recalculations and RMP updates. These data include:

- Water demands and water-supply plans of the Watermaster Parties:
  i. Projected total water demand
  ii. Projected amount of each water supply by source to meet the projected water demand
  iii. Monthly distribution of water supplies used to meet the demand
  iv. Projected groundwater pumping at each existing well and future planned wells
  v. Groundwater pumping schedules (i.e. well use priorities and capacities)
  vi. Pumping capacities, required pumping combinations, and sustainable pumping levels (pumping sustainability metric) at each well
- Assumptions for how:
  i. Managed storage will be used to meet Replenishment Obligations
  ii. Lands currently in agricultural uses will be converted to urban uses
  iii. Additional potential conservation above that currently required for new land development
- Future projections of location and magnitude of stormwater and supplemental water recharge

Well construction, abandonment, and destruction. Watermaster maintains a database on wells in the basin and performs periodic well inspections. Sometimes, Watermaster staff identifies a new well while implementing its monitoring programs. Well owners must obtain permits from the appropriate county and state agencies to drill a well and to put the well in use. Watermaster has developed cooperative agreements with the State Water Board's Division of Drinking Water (DDW) and the Counties of Los Angeles, Orange, Riverside, and San Bernardino to ensure that the appropriate entities know that a new well has been constructed. Watermaster staff makes best efforts to obtain well design information, lithologic and geophysical logs, groundwater level and quality data, and aquifer stress test data.

The presence of abandoned wells is a threat to groundwater supply and a physical hazard. Watermaster staff periodically reviews its database, makes appropriate inspections, consults with well owners, maintains a list of abandoned wells in the Chino Basin, and provides this list to the counties for follow-up and enforcement. The owners of the abandoned wells are requested to properly destroy their wells following the ordinances developed by the county in which they are located.

3.2.2 Program Element 2. Develop and Implement Comprehensive Recharge Program

The 2000 OBMP included PE 2–*Develop and Implement Comprehensive Recharge Program*—to reverse the loss of yield caused by urbanization and the concrete lining of natural streams overlying the Chino Basin. PE 2 is also meant to ensure that there will be enough supplemental water recharge capacity available to Watermaster to meet Replenishment Obligations.

The implementation actions incorporated into the 2000 OBMP Implementation Plan are summarized in Table 3 below. Each implementation action in Table 3 is categorized as a one-time or ongoing action, and the right-most column of the table indicates if the action was implemented.

Table 3. Program Element 2 – Implementation Actions Defined in the 2000 OBMP

Implementation Action	One-time/ Ongoing	Implemented?
Years 1 through 3		
Watermaster advisory committee will form an ad-hoc committee to coordinate with CBWCD and SBCFCD.	One-time	✓
Implement all high priority recharge projects that involve only re-operation of existing recharge/flood control facilities.	One-time	✓
Complete the RMP.	One-time	✓
Complete design and construction of early action recharge projects identified in the first year of the implementation of the OBMP.	One-time	✓
Years 4 through 50		
By year 5 implement all high priority projects that involve construction and re-operation at existing facilities.	One-time	✓
Implement all other recharge projects based on need and available resources.	Ongoing	✓
Update the comprehensive recharge program every five years.	Ongoing	✓

3.2.2.1 Implementation Progress since 2000

The scope of work defined under PE 2 was to continue the recharge master plan study initiated by Watermaster and the Chino Basin Water Conservation District (CBWCD) in 1998. The implementation plan for PE 2 includes the preparation of a recharge master plan update (RMPU) at least every five years. The objectives and scope of each RMPU are defined at the beginning of each update and are derived from several guiding documents: the Peace Agreement, the Peace II Agreement, and the Special Referee's December 2007 Report. Pursuant to these guiding documents, the general objectives of the RMPU are to ensure there is enough recharge capacity and supplemental water available to meet future replenishment requirements, to balance the recharge and discharge in every area and subarea, to maximize the recharge of recycled and storm waters where feasible, and to protect or enhance Safe Yield. To meet these objectives, the RMPUs must consider and address recharge requirement projections, the availability of storm and supplemental waters for recharge and replenishment, and the physical means to satisfy these recharge projections. To the extent that new or modified facilities are required to meet the objectives, the RMPUs include a schedule for the planning, design, and construction of recharge improvements. The 2001 Recharge Master Plan and subsequent RMPUs (2010, 2013, and 2018) were developed in open and transparent planning processes that were convened by Watermaster through an ad-hoc committee. As part of the *2013 Amendment to the 2010 RMPU* (2013 RMPU), the RMPU Steering Committee, now referred to as the Recharge Investigations and Projects Committee (RIPComm), was created to assist Watermaster and the IEUA in preparing RMPUs. The RIPComm is open to all interested stakeholders and meets regularly through the development of RMPUs. The outcomes of the 2001 Recharge Master Plan and subsequent RMPUs (2010, 2013, and 2018) are summarized below:

- 2001 Recharge Master Plan: Watermaster, in collaboration with the IEUA, constructed the first set of recharge facilities to exercise its rights pursuant to its diversion permits, increasing average annual stormwater recharge by about 9,500 afy. As part of this work, Watermaster and the IEUA modified seventeen existing flood retention facilities to increase diversion rates, conservation storage, and recharge, and constructed two new recharge facilities. The cost of these recharge improvements was about $60 million. The IEUA and Watermaster paid for about half of this cost, while the other half was funded through Proposition 13 grants and other grant programs.
- 2010 RMPU and 2013 Update: As of this writing, Watermaster and the IEUA are completing the final design/construction of five of the recommended 2013 RMPU facilities, and they should be online in 2021. These facilities are expected to increase stormwater recharge by about 4,700 afy.
- 2018 RMPU: The 2018 RMPU did not recommend any new recharge projects. One of the findings of the 2018 recharge master plan update was that Watermaster has enough supplemental water recharge capacity to it meet its Replenishment Obligations via wet-water recharge through 2050.

Upon completion of the 2013 RMPU facilities, the annual average stormwater recharge performed pursuant its diversion permits is expected to be about 14,950 afy.[15] Thus, in the first 20 years of OBMP

[15] WEI (2018). Recharge Master Plan Update. September 2018.
http://www.cbwm.org/docs/engdocs/2018%20RMPU/20180914_2018_RMPU_final.pdf

implementation, stormwater recharge will have increased by about 14,150 afy, and supplemental water recharge capacity will have increased by 27,600 afy. And, the IEUA has increased the recharge of recycled water from about 500 afy in 2000 to about 16,000 afy in 2018. The next RMPU must be completed and submitted to the Court by October 2023.

3.2.2.2 Ongoing implementation actions for the 2020 OBMP

The RMPU process is an ongoing requirement of the 2000 OBMP Implementation Plan. The next RMPU is due to the Court by October 2023 and must be updated no less frequently than every five years thereafter. As identified in Activity A, the Parties have expressed interest in maximizing the recharge of recycled, imported, and storm waters where feasible. Although meeting these objectives is not a requirement for the RMPU, the next (or a future) RMP process could accomplish the objectives of Activity A by considering projects that will meet other needs of the Parties, such as providing additional recharge capacity for Storage and Recovery Programs or addressing pumping sustainability issues. As summarized below and described in further detail in the Scoping Report, there are opportunities and challenges for increasing these efforts in the future:

- The theoretical average annual stormwater discharge available for diversion under the existing water rights permits is about 74,000 afy (ranging from 21,400 to 110,500 afy for the combined permitted diversions) and the annual average stormwater recharge performed pursuant to these permits is expected to be about 14,950 afy. The difference between these two values, about 60,000 afy, is a lost opportunity for stormwater recharge. Improvements to existing facilities and operations and/or new facilities are required to achieve the stormwater recharge potential.
- New recharge facilities and/or improvements to existing facilities may be needed if Parties want to increase supplemental water recharge.
- Based on Watermaster and the IEUA's existing economic selection criteria (projects are selected for implementation only if the melded unit cost of stormwater recharge resulting from the projects is less than the avoided unit cost of purchasing imported water from the Metropolitan Water District of Southern California [Metropolitan]), no new recharge projects were recommended for implementation in the 2018 RMPU. If the Parties desire to develop a list of projects that will increase recharge in the basin, the economic criteria for selecting projects needs to be reevaluated.
- Finally, the criteria on how and where to conduct recharge needs to be updated to more effectively address existing basin management issues, including: land subsidence, maintaining Hydraulic Control, and pumping sustainability. Historically, Watermaster has attempted to manage the recharge of storm and supplemental water to promote the balance of recharge and discharge. This method of managing recharge does not specifically address current basin management issues, such as existing land subsidence in Management Zone 1 (MZ-1) and parts of MZ-2 and pumping sustainability issues in the Jurupa Community Services District (JCSD) and CDA well fields. There is a need to define additional criteria on how and where to conduct recharge to better address existing basin management issues.

Thus, during the scoping phase of the next RMPU, the Parties should determine if the economic and physical criteria for project evaluation should be revaluated to accomplish Activity A.

Section 4.2 of this report summarizes the 2020 OBMP Management Plan for PE 2.

3.2.3 Program Element 3. Develop and Implement a Water Supply Plan for Impaired Areas

The 2000 OBMP included PE 3—*Develop and Implement a Water Supply Plan for Impaired Areas*—to maintain and enhance Safe Yield and maximize beneficial uses of groundwater. The OBMP recognized that urban land uses would ultimately replace agricultural land uses, which had been the primary land use in the southern portion of the basin throughout the 20th century, and that if municipal pumping did not replace agricultural pumping, groundwater levels would rise and discharge to the Santa Ana River. The potential consequences would be the loss of Safe Yield and the outflow of high-TDS and -nitrate groundwater from the Chino Basin to the Santa Ana River—the latter of which could impair downstream beneficial uses in Orange County. The OBMP estimated that to maintain the Safe Yield, approximately 40,000 afy of groundwater would need to be produced to replace Agricultural Pool pumping in the southern part of the basin. The Chino Basin Desalters were identified as the optimal multi-benefit project to replace the expected decrease in agricultural production to maintain or enhance Safe Yield, to pump and treat high-salinity groundwater in support of PE 7, to meet growing municipal demands in support of PE 5, and to protect the beneficial uses of the Santa Ana River. Additionally, PE 6 envisioned that the Chino Basin Desalters could also be used to clean up the volatile organic compound (VOC) plumes that would eventually be intercepted by the Desalter wells.

The implementation actions incorporated into the 2000 OBMP Implementation Plan are summarized in Table 4 below. Each implementation action in Table 4 is categorized as a one-time or ongoing action, and the right-most column of the table indicates if the action was implemented.

Table 4. Program Element 3 – Implementation Actions Defined in the 2000 OBMP

Implementation Action	One-time/ Ongoing	Implemented?
Years 1 through 3		
Complete the Water Facilities Plan Report for the Expansion of the Chino I Desalter and the construction of the Chino II Desalter. It should be noted that this action is entirely consistent with the OBMP, and is being taken prior to completion of the OBMP.	One-time	✓
Start expansion of the Chino I Desalter and the construction of the Chino II Desalter in early 2001.	One-time	✓
Years 4 through 50		
Complete construction and start up of the expanded Chino I and new Chino II Desalters.	One-time	✓
Watermaster, IEUA and WMWD will periodically review the Regional Water Supply Plan and the need for new Desalter capacity in the southern water-quality impaired part of the Basin, and initiate the construction of new Desalter capacity as determined by Watermaster. Expansion of the Desalter capacity will occur as agricultural production in the southern water-quality impaired part of the basin declines.	Ongoing	✓

3.2.3.1 Implementation Progress since 2000

The OBMP established that desalter production would ultimately need to be increased to 40,000 afy to protect Safe Yield. The Peace Agreement provided for the expansion of the Chino I Desalter to a design capacity of up to 14 mgd (15,700 afy) and the construction of the Chino II Desalter, with a capacity of 10 mgd. The Parties executed the Peace II Agreement in 2007, which included a supplement to the OBMP Implementation Plan to expand the Chino Desalter pumping to 40,000 afy (36 mgd) and introduce Re-operation.

The construction and operation of the Chino Basin Desalters also became a fundamental component of the Chino Basin maximum-benefit SNMP developed pursuant to PE 7.[16] Watermaster and the IEUA are jointly responsible for the implementation of the maximum benefit SNMP, which enables the recycled-water reuse and recharge programs in the Chino Basin in support of PEs 2 and 5. The SNMP includes nine "maximum-benefit commitments." One commitment is the achievement and attainment of Hydraulic Control to limit groundwater outflow from the Chino-North Groundwater Management Zone (GMZ) to *de minimis* levels to protect downstream beneficial uses. Hydraulic Control is also necessary to maximize the Safe Yield. The operation of the Chino Basin Desalters is necessary to attain Hydraulic Control. Three of the nine maximum-benefit commitments are related to the design and construction of the Chino Basin Desalters.

As of the writing of this report, there are 31 Chino Desalter wells with the capacity to pump about 34 mgd (37,600 afy) of groundwater from the southern portion of the Chino Basin, though not all wells are currently in operation. Pumped groundwater is conveyed to two treatment facilities (the Chino-I and Chino-II Desalters) that treat the groundwater with reverse osmosis and ion exchange to reduce TDS and nitrate concentrations. The treated water is then delivered to a conveyance system that serves the CDA's member agencies. The brine created in the treatment process is discharged to the Inland Empire Brine Line. Over the last five years, total desalter production has ranged from about 28,100 to 30,000 afy, averaging 29,200 afy. The following describes the history of the expansion of the Chino Basin Desalters:

- The Chino-I Desalter, which included 11 production wells, began operating in 2000 with a design capacity of 8 million gallons per day (mgd; about 9,000 afy).
- In 2005, the Chino-I Desalter capacity was expanded to 14 mgd (about 16,000 afy) with the construction of three additional wells.
- The Chino-II Desalter, which included eight production wells, began operating in June 2006 with a design capacity of 15 mgd (about 17,000 afy).
- In 2012, the CDA completed construction of the Chino Creek Well Field (CCWF) in the western portion of the basin which added five wells and additional capacity of about 1.3 mgd (1,500 afy) to the Chino-I Desalter; four of these wells began pumping between 2014 and 2016.
- In 2015, two additional Chino-II Desalter wells were constructed, and pumping began in 2018. These two wells, plus one additional well that is planned for construction, are part of the final expansion of the Chino Basin Desalters to meet the 40,000 afy pumping requirement of the OBMP, Peace Agreements, and maximum benefit SNMP. This final expansion is expected to be completed by 2021.

[16] Refer to Section 3.2.7 of this report for a complete overview of the maximum-benefit SNMP.

The Chino Basin Desalters are also being used to support the clean-up of point-source contamination in the southern Chino Basin:

- Two of the Chino-II Desalter expansion wells and CDA Well I-11 will be pumped to capture groundwater contaminants from the South Archibald plume. The Chino-II Desalter, which will be modified to treat the volatile organic compounds (VOCs) associated with the plume (see Section 3.2.6).
- The use of two of the CCWF wells is being evaluated for use as part of the remediation solution for the Chino Airport plume; however, the evaluation of the remediation alternatives is ongoing (see Section 3.2.6).

3.2.3.2 Ongoing implementation actions for the 2020 OBMP

The capacity to pump the Chino Basin Desalter goal of 40,000 afy is expected to be achieved by 2021. Operation at this capacity, once all agricultural land uses have converted to urban uses, would fulfill the objectives of PE 3. As previously noted, the operation of the Chino Basin Desalters is necessary to attain Hydraulic Control, which is a regulatory requirement of the maximum benefit SNMP. Thus, the ongoing implementation actions for the 2020 OBMP related to the operation of the Chino Basin Desalters are included under PE 7 (see Sections 3.2.7 and 4.7).

3.2.4 Program Element 4. Develop and Implement Comprehensive Groundwater Management Plan for Management Zone 1

The 2000 OBMP included PE 4—*Develop and Implement Comprehensive Groundwater Management Plan for Management Zone 1*—to characterize land subsidence spatially and temporarily, identify its causes, and, where appropriate, develop and implement a program to manage it. The 2000 OBMP identified pumping-induced decline of groundwater levels and subsequent aquifer-system compaction as the most likely cause of the land subsidence and ground fissuring observed in the southwestern portion of MZ-1 in the early 1990s. PE 4 recognized that the occurrence of land subsidence and ground fissuring in MZ-1 is not acceptable and should be reduced to tolerable levels or stopped.

PE 4 called for the development and implementation of an interim management plan for MZ-1 that would: minimize subsidence and fissuring in the short-term, collect the information necessary to understand the extent, rate, and mechanisms of subsidence and fissuring, and formulate a long-term management plan to prevent future subsidence and fissuring or reduce it to tolerable levels.

The implementation actions for PE 4 that were incorporated into the 2000 OBMP Implementation Plan are summarized in Table 5 below. Each implementation action in Table 5 is categorized as a one-time or ongoing action and the right-most column of the table indicates if the action was implemented.

Table 5. Program Element 4 – Implementation Actions Defined in the 2000 OBMP

Implementation Action	One-time/ Ongoing	Implemented?
Years 1 through 5		
Arrange for the physical recharge of 6,500 afy of Supplemental Water at MZ1 spreading facilities. Evaluate for the continued need after FY2004-05.	Ongoing	✓
Convene a MZ1 technical committee to develop a recommended interim management plan to minimize subsidence while data is collected and a long-term subsidence management plan is developed.	One time	✓
Implement the interim management plan, including appropriate monitoring, annual assessment of data from monitoring programs, and modification of monitoring programs, if necessary.	One time	✓
Develop a long-term subsidence management plan.	One time	✓
Implement the long-term subsidence management plan and adapt if necessary.	Ongoing	✓
Years 6 through 50		
Assess data from the monitoring program every three years and modify the subsidence management plan, if necessary.	Ongoing	✓
Implement the long-term subsidence management plan and adapt if necessary.	Ongoing	✓

3.2.4.1 Implementation Progress since 2000

Supplemental Water Recharge

Since the development of the OBMP, Watermaster has exercised best efforts to arrange for the physical recharge of 6,500 afy of supplemental water at the MZ-1 spreading facilities. And, pursuant to the Peace II Agreement, Watermaster committed to continue the physical recharge of at least 6,500 afy of supplemental water as an annual average through the term of the Peace Agreement.

Subsidence Management Plan

From 2001 to 2005, Watermaster developed, coordinated, and conducted the *MZ-1 Interim Monitoring Program* (IMP)[17] under the guidance of the MZ-1 Technical Committee. The MZ-1 Technical Committee was comprised of representatives from all major MZ-1 producers and their technical consultants, including the Agricultural Pool; the Cities of Chino, Chino Hills, Ontario, Pomona, and Upland; the Monte Vista Water District; the Golden State Water Company; and the California Institution for Men (CIM).

The IMP consisted of three main monitoring elements for use in analyzing subsidence: ground-level surveys, remote-sensing (InSAR), and aquifer-system monitoring. The ground-level surveys and InSAR

[17] Chino Basin Watermaster. (2003). *Optimum Basin Management Program, Management Zone 1 Interim Monitoring Program*. Prepared by Wildermuth Environmental, Inc. January 8, 2003.

analyses were used to characterize vertical ground motion. Aquifer-system monitoring of hydraulic and mechanical changes within the aquifer-system was used to characterize the causes of aquifer-system deformation.

The IMP was implemented in two phases: the Reconnaissance Phase and the Comprehensive Phase.

1. The Reconnaissance Phase consisted of constructing 11 piezometers screened at various depths at Rubin S. Ayala Park (Ayala Park) in the City of Chino and installing pressure transducer data-loggers in nearby pumping wells and monitoring wells to measure hydraulic head. Following installation of the monitoring network, several months of aquifer-system monitoring and testing were conducted. Testing included aquifer-system stress tests at pumping wells in the area.
2. The Comprehensive Phase consisted of constructing a dual-borehole pipe extensometer at Ayala Park (Ayala Park Extensometer), near the area of historical fissuring. Following installation of the Ayala Park Extensometer, two aquifer-system stress tests were conducted, followed by passive aquifer-system monitoring.

The IMP provided enough information for Watermaster to develop “Guidance Criteria” for the MZ-1 Parties that, if followed, would minimize the potential for subsidence and fissuring in the investigation area. The methods, results, and conclusions of the IMP, including the Guidance Criteria, were described in detail in the *MZ-1 Summary Report*.[18] The Guidance Criteria formed the basis for the long-term management plan, documented as the *MZ-1 Subsidence Management Plan* (MZ-1 Plan),[19] which was prepared under the guidance of the MZ-1 Technical Committee. To minimize the potential for future subsidence and fissuring in the Managed Area, the MZ-1 Plan recommended that the MZ-1 Parties manage their groundwater pumping pursuant to the Guidance Criteria. The MZ-1 Plan was approved by the Watermaster Board in October 2007 and the Court in November 2007.

Implementation of the MZ-1 Plan began in 2008. The MZ-1 Plan called for the continuation of monitoring, data analysis, annual reporting, and adjustments to the MZ-1 Plan, as warranted by the data. Additionally, the MZ-1 Plan expanded monitoring of the aquifer-system and land subsidence into other areas of the Chino Basin where the IMP indicated concerns for future subsidence and ground fissuring. These so-called “Areas of Subsidence Concern” are: Central MZ-1, Northwest MZ-1, Northeast Area, and Southeast Area.

The MZ-1 Plan described the following potential expanded investigation: (1) more intensive monitoring of horizontal strain across the zone of historical ground fissuring to assist in developing management strategies related to fissuring, (2) injection feasibility studies within the Managed Area, (3) additional pumping tests to refine the Guidance Criteria, (4) computer-simulation modeling of groundwater flow and subsidence, and (5) the development of alternative pumping plans for the MZ-1 Parties affected by the MZ-1 Plan. The MZ-1 Technical Committee (now called the Ground-Level Monitoring Committee or GLMC) discussed these potential future efforts, and if deemed prudent and necessary, they were

[18] Chino Basin Watermaster. (2006). *Optimum Basin Management Program, Management Zone 1 Interim Monitoring Program, MZ-1 Summary Report*. Prepared by Wildermuth Environmental, Inc. February 2006. http://www.cbwm.org/docs/engdocs/Land%20Subsidence/20071017_MZ1_Plan%20--%20Appendix_A_MZ1_SummaryReport_20060226.pdf

[19] Chino Basin Watermaster. (2007). *Chino Basin Optimum Basin Management Program, Management Zone 1 Subsidence Management Plan*. October 2007. http://www.cbwm.org/docs/engdocs/Land%20Subsidence/20071017_MZ1_Plan.pdf

recommended to Watermaster for implementation. Watermaster and the MZ-1 Parties have performed work to implement (1), (2), and (4) above, but have not performed work on (3) and (5).

The MZ-1 Plan stated that if data from existing monitoring efforts in the Areas of Subsidence Concern indicate the potential for adverse impacts due to subsidence, Watermaster would revise the plan to avoid those adverse impacts. The 2014 Annual Report of the GLMC[20] recommended that the MZ-1 Plan be updated to better describe Watermaster's land subsidence efforts and obligations, including areas outside of MZ-1. As such, the update included a name change to the *2015 Chino Basin Subsidence Management Plan* (Subsidence Management Plan)[21] and a recommendation to develop a subsidence management plan for Northwest MZ-1. Land subsidence in Northwest MZ-1 was first identified as a concern in 2006 in the MZ-1 Summary Report and again in 2007 in the MZ-1 Plan. Since then, Watermaster has been monitoring vertical ground motion in this area via InSAR and groundwater levels with pressure transducers at selected wells.

Of particular concern is that subsidence across the San Jose Fault in Northwest MZ-1 has occurred in a pattern of concentrated differential subsidence—the same pattern of differential subsidence that occurred in the Managed Area during the time of ground fissuring. Ground fissuring is the main subsidence-related threat to infrastructure. Because of the threat for ground fissuring, Watermaster increased monitoring efforts in Northwest MZ-1 beginning in FY 2012/13 to include ground elevation surveys and EDMs to monitor ground motion and the potential for fissuring.

In 2015, the GLMC developed the *Work Plan to Develop a Subsidence Management Plan for the Northwest MZ-1 Area* (Work Plan).[22] The Work Plan is an ongoing Watermaster effort and includes a description of a multi-year scope-of-work, a cost estimate, and an implementation schedule. The Work Plan was included in the Subsidence Management Plan as Appendix B. Implementation of the Work Plan began in 2015.

Pursuant to the Subsidence Management Plan, each year, Watermaster has produced the *Annual Report of the GLMC* that contains the results of ongoing monitoring efforts, interpretations of the data, and recommended adjustments to the Subsidence Management Plan, if any. The annual report includes the results and interpretations for the data collected during the prior year as well as recommendations for Watermaster's ground-level monitoring program for the subsequent fiscal year. The Watermaster publishes the annual reports on its website. The most recent annual report was finalized in October 2019.

[20] WEI. (2015). *2014 Annual Report of the Ground-Level Monitoring Committee*. July 2015. http://www.cbwm.org/docs/engdocs/2014%20Final%20Report%20-%20Ground%20Level%20Monitoring%20Committee/Final_2014_Annual%20Report_July2015.pdf

[21] Chino Basin Watermaster. (2015). *Chino Basin Subsidence Management Plan.* July 23, 2015. http://www.cbwm.org/docs/engdocs/Land%20Subsidence/20150724%20-%20Chino%20Basin%20Subsidence%20Management%20Plan%202015/FINAL_2015_CBSMP.pdf

[22] Chino Basin Watermaster. (2015). *Work Plan, Develop a Subsidence-Management Plan for the Northwest MZ-1 Area.* July 23, 2015. http://www.cbwm.org/docs/engdocs/Land%20Subsidence/20150724%20-%20Chino%20Basin%20Subsidence%20Management%20Plan%202015/FINAL_CBSMP_Appendix_B.pdf

3.2.4.2 Ongoing implementation actions for the 2020 OBMP

Supplemental Water Recharge

Pursuant to the Peace II Agreement, Watermaster will continue to arrange for the physical recharge of at least 6,500 afy of Supplemental Water in MZ-1 as an annual average through the term of the Peace Agreement.

Subsidence Management Plan

The Chino Basin will always be susceptible to the future occurrence of land subsidence and ground fissuring, so Watermaster will continue to implement the Subsidence Management Plan pursuant to PE 4, which includes:

- Conducting the ground-level monitoring program pursuant to the Subsidence Management Plan and the recommendations of the GLMC (The monitoring program includes the monitoring of groundwater pumping, recharge, groundwater levels, aquifer-system deformation, and vertical and horizontal ground motion across the western portion of the Chino Basin. The then-current description of the ground-level monitoring program is always included in each Annual Report of the GLMC [third bullet below]).
- Convening the GLMC annually to review and interpret the data from the ground-level monitoring program.
- Preparing annual reports of the GLMC that include recommendations for changes to the monitoring program (The annual report describes recommended activities for the monitoring program for the future fiscal year[s] in the form of a proposed scope-of-work, schedule, and budget. The recommended scope-of-work, schedule, and budget is run through Watermaster's budgeting process for revisions [if needed] and approval. The final scope-of-work, schedule, and budget for the upcoming fiscal year is included in the final annual report.)
- A key element of the Subsidence Management Plan is the verification of its protective nature against land subsidence and ground fissuring in the Chino Basin. This verification is accomplished through continued monitoring, testing, and reporting by the GLMC (as described above), and revision of the Subsidence Management Plan when appropriate. In this sense, the Subsidence Management Plan is adaptive. (The process of annual data analysis and reporting includes the evaluation of the effectiveness of the Subsidence Management Plan to minimize or stop land subsidence and ground fissuring and, if warranted by the data, a recommendation to update the Subsidence Management Plan. The GLMC will make these recommendations within its annual reports and prepare a draft revised Subsidence Management Plan that will be run through the Watermaster process for revisions and/or approval. Upon Watermaster Board approval, the revised Subsidence Management Plan will be submitted to the Court.)

3.2.5 Program Element 5. Develop and Implement Regional Supplemental Water Program

The 2000 OBMP included PE 5—*Develop and Implement Regional Supplemental Water Program*—to improve regional conveyance and the availability of imported and recycled waters throughout the basin. The OBMP recognized that water demands of the Parties would increase. The demand projections at the time estimated that water demands would reach 348,000 afy by 2000 and increase to 418,000 afy by 2020. The increase was assumed to be driven by municipal and industrial demands. Agriculture demands were expected to decrease from about 48,000 afy in 2000 to 8,000 afy by 2020. The OBMP also recognized the limitations to the traditional supplies, such as imported water from Metropolitan, and the need to find alternative supplies such as recycled water.

The implementation actions incorporated into the 2000 OBMP Implementation Plan are summarized in Table 6 below. Each implementation action in Table 6 is categorized as a one-time or ongoing action and the right-most column of the table indicates if the action was implemented.

Table 6. Program Element 5 – Implementation Actions Defined in the 2000 OBMP

Implementation Action	One-time/ Ongoing	Implemented?
Years 4 through 50		
IEUA will construct recycled water facilities to meet the demand for recycled water and for replenishment.	Ongoing	✓

It should be noted that early in the development of the PE 5 implementation plan, the stakeholders discussed the development of a regional water facilities plan that, when implemented, would enable the Parties to maximize the use of imported water in years when Metropolitan has surplus water and to be able to rely completely on local supplies during years when Metropolitan supplies are low or completely interrupted due to planned or catastrophic outages. This plan involved the construction of new wells and groundwater treatment and regional conveyance improvements; the water produced in this plan would be used exclusively by the Parties. The stakeholders ultimately did not include this plan in the 2000 OBMP Implementation Plan, preferring at that time to focus on expanding groundwater desalting in the lower Chino Basin (PE 3), increasing stormwater recharge (PE 2), and implementing a large-scale recycled water program to maximize its reuse (PEs 2 and 5).

3.2.5.1 Implementation Progress since 2000

Although the water demands of the Parties increased at a slower rate than projected when the OBMP was developed, Watermaster and the IEUA have aggressively pursued programs to improve water supply reliability through the implementation of PEs 2, 3, and 5. Since 2000, the IEUA has constructed and operated a recycled water conveyance system throughout the basin, enabling it to provide recycled water to its member agencies. The IEUA owns and operates four wastewater treatment facilities: Regional Plant No. 1 (RP-1), Regional Plant No. 4 (RP-4), Regional Plant No. 5 (RP-5), and the Carbon Canyon Water Reclamation Facility (CCWRF). Recycled water produced by these plants is used for direct uses, groundwater recharge, and discharged to Chino Creek or Cucamonga Creek, which are tributaries to the Santa Ana River. Historically, the IEUA's operating plan has prioritized the use of recycled water as follows: (1) to meet the IEUA's discharge obligation to the Santa Ana River (17,000 afy), (2) to meet direct reuse demands for recycled water, and (3) to recharge the remaining recycled water.

Although recycled water had been reused since the 1970s, the growth of the IEUA's recycled water reuse programs started in 1997, and in 2005 the OBMP enabled the IEUA's recycled water reuse program to be aggressively expanded. When the OBMP was completed in 2000, the IEUA was recharging about 500 afy of recycled water and utilizing about 3,200 afy for non-potable direct uses. The incorporation of Watermaster and the IEUA's maximum benefit SNMP into the Basin Plan in 2004 triggered the ability to rapidly increase recycled water reuse. Over the last five years, the annual direct reuse of recycled water ranged from 17,000 afy to 24,600 afy and averaged 20,600 afy. And, the annual recycled water recharge ranged from 10,800 to 13,900 afy and averaged 13,000 afy.

The recycled water provided by the IEUA has replaced a like amount of groundwater and imported water that would have otherwise been used for non-potable purposes. Much of the post-2000 increase in supplemental water storage in the Chino Basin is attributable to the increased availability and recharge of recycled water.

3.2.5.2 Ongoing implementation actions for the 2020 OBMP

Recycled Water Reuse

The IEUA is continuing to expand its recycled-water distribution system and recharge facilities throughout the Chino Basin for direct non-potable uses and recharge. Growth is still occurring in the Chino Basin and will result in additional wastewater flows to the IEUA's treatment plants. Much of this supply will be used to meet increasing non-potable demands as the currently remaining agricultural land uses convert to urban uses.

The IEUA is currently performing planning efforts for the CBP, which is a large Storage and Recovery Program to provide for regional, dry-year water supplies and associated infrastructure. The CBP was conditionally awarded approximately $207 million of Proposition 1 Water Storage Investment Program funding. Over its 25-year project life, the CBP would increase recycled water recharge in the Chino Basin by 15,000 afy, and during dry years, the water in storage would subsequently be recovered and pumped into Metropolitan's system for use in Southern California in lieu of imported water from the State Water Project. The planned sources of recycled water for the CBP are currently being evaluated by the IEUA, but it is certain additional supplies beyond those produced by the IEUA will be needed. Thus, the objective to maximize the reuse of recycled water produced by the IEUA and others as envisioned by Activity D is currently being pursued by the IEUA on behalf of the Parties and with the support of Watermaster and other regional entities.

As part of the CBP, the IEUA, together with regional agencies, is developing a significant body of work to evaluate opportunities to acquire the surplus recycled water supplies needed for the CBP. The CBP is still undergoing planning and evaluation, and its implementation is not certain. If the CBP is not implemented, the significant body of work developed by the IEUA can be leveraged to support future planning efforts to maximize recycled water reuse in a manner that is consistent with the Judgment and the maximum-benefit SNMP.

Water Reliability

In addition to the efforts to maximize recycled water reuse, the IEUA and its member agencies are currently preparing the 2020 IRP, which will serve as a regional implementation strategy for long-term water resources management within the IEUA's service area. The objective of the IRP is to identify the facilities needed to ensure that the IEUA's water supplies over the next 25 years are reliable, cost-effective, and environmentally responsible.

As described in the Scoping Report, the total water demand of the Chino Basin Parties is projected to grow from about 290,000 afy in 2015 to about 420,000 afy by 2040, an increase of about 130,000 afy. The projected growth in water demand by the Appropriative Pool Parties drives the increase in aggregate water demand as some Appropriative Pool Parties are projected to serve new urban water demands created by the conversion of agricultural and vacant land uses to urban uses, a similar challenge observed during the development of PEs 3 and 5 in the 2000 OBMP. Table 7 below shows the historical (2015) and projected aggregate water demand and supply plan for all Parties by water source.

Table 7. Aggregate Water Supply Plan for Watermaster Parties: 2015 to 2040[23]

Water Source	2015 (Actual)	2020	2025	2030	2035	2040
Volume (af)						
Chino Basin Groundwater	147,238	145,904	153,804	157,716	168,987	176,652
Non-Chino Basin Groundwater	51,398	55,755	63,441	64,999	66,691	68,483
Local Surface Water	8,108	15,932	15,932	18,953	18,953	18,953
Imported Water from Metropolitan	53,784	86,524	93,738	100,196	102,166	109,492
Other Imported Water	8,861	9,484	10,095	10,975	11,000	11,000
Recycled Water for Direct Reuse	20,903	24,008	24,285	26,583	29,836	33,223
Total	**290,292**	**337,607**	**361,295**	**379,422**	**397,633**	**417,803**
Percentage						
Chino Basin Groundwater	51%	43%	43%	42%	42%	42%
Non-Chino Basin Groundwater	18%	17%	18%	17%	17%	16%
Local Surface Water	3%	5%	4%	5%	5%	5%
Imported Water from Metropolitan	19%	26%	26%	26%	26%	26%
Other Imported Water	3%	3%	3%	3%	3%	3%
Recycled Water for Direct Reuse	7%	7%	7%	7%	8%	8%
Total	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**

Each of the water sources available to the Chino Basin Parties listed has its limitations:

- The ability to produce groundwater from the Chino Basin is limited by current basin management issues, such as ongoing land subsidence in MZ-1 and parts of MZ-2, pumping sustainability issues in the JCSD and CDA well field areas, and water quality.
- The challenges to imported water include reliability of its supply and infrastructure and the local capacity to treat it for municipal supply.
- The reliability of non-Chino Basin groundwater depends on water quality, water rights, and infrastructure to convey it to Parties' water systems.
- The reliability of local surface water depends on the hydrologic characteristics of the individual supplies, water quality, water rights, and infrastructure to convey it from points of diversion to a Party's water system.
- The challenges to maximizing the reuse of recycled water include: the timing of recycled water availability and complying with the maximum benefit SNMP and water quality regulations.

[23] Sourced from: WEI. (2018). *Storage Framework Investigation*. October 2018; revised January 2019. This document is available on Watermaster's FTP site at http://www.cbwm.org/

In addition to the challenges to specific water sources, climate change is likely to result in higher temperatures, longer dry periods, and shorter more intense wet periods, which can ultimately affect the availability and management of all water supply sources. For example, shorter more intense precipitation periods are expected to result in reduced recharge, and longer dry periods are expected to result in reduced imported water supplies (as occurred with State Water Project supplies in the recent drought from 2013 to 2016). And, many of the challenges are interrelated and compounding. For example, the reliability of imported water (and other non-groundwater supplies) not only affects the imported water supply but also the groundwater supplies that are dependent on imported water for blending.

As previously mentioned, the IEUA is currently developing the 2020 IRP, which will serve as a foundational regional implementation strategy for long-term water resources management within IEUA's service area and can be expanded by the Chino Basin Parties for the benefit of the region. Although the TVMWD and WMWD member agencies and Watermaster are participants in the development in the 2020 IRP, the current planning effort could be expanded to address regional reliability and to enhance integration with Watermaster's groundwater management efforts.

3.2.6 Program Element 6. Develop and Implement Cooperative Programs with the Regional Board and Other Agencies to Improve Basin Management

The 2000 OBMP included PE 6—*Develop and Implement Cooperative Programs with the Regional Board and other Agencies to Improve Basin Management*—to assess water quality trends in the basin, to evaluate the impact of OBMP implementation on water quality, to determine whether point and non-point contamination sources are being addressed by water quality regulators, and to collaborate with water quality regulators to identify and facilitate the cleanup of soil and groundwater contamination.

The implementation actions for PE 6 incorporated into the 2000 OBMP Implementation Plan are summarized in Table 8 below. Each implementation action in Table 8 is categorized as a one-time or ongoing action and the right-most column of the table indicates if the action was implemented.

Table 8. Program Element 6 – Implementation Actions Defined in the 2000 OBMP

Implementation Action	One-time/ Ongoing	Implemented?
Years 1 through 3		
Watermaster will form an ad hoc committee, hereafter water quality committee. The schedule and frequency of the meeting will be developed with the Regional Board during the first year of OBMP implementation.	Both	✓
Watermaster will refine its monitoring efforts to support the detection and quantification of water quality anomalies. This may require additional budgeting for analytical staff/support.	One-time	✓
If necessary, Watermaster will conduct investigation to assist the Regional Board in accomplishing mutually beneficial objectives.	Ongoing	✓
Watermaster will seek funding from outside sources to accelerate detection and cleanup efforts.	Ongoing	✓

Implementation Action	One-time/ Ongoing	Implemented?
Years 4 through 50		
Continue monitoring coordination efforts with the Regional Board.	Ongoing	✓
Annually update priority list and schedule for cleaning up known water quality anomalies.	Ongoing	
Continue to seek funding from outside sources to accelerate cleanup efforts.	Ongoing	✓
Implement projects of mutual interest.	Ongoing	✓

3.2.6.1 Implementation Progress since 2000

During the development of the OBMP, Watermaster was conducting a multi-year comprehensive basin-wide water quality monitoring program (from 1999-2001) to sample every well possible to support the development and implementation of the OBMP. The comprehensive water quality monitoring program included collecting data from all Appropriators and cooperators in the Chino Basin and adjacent basins and performing monitoring at all private wells in the southern portion of the basin. During this time, Watermaster performed monitoring at 602 private wells. Data from this comprehensive water quality monitoring program established a baseline on the state of groundwater quality at the start of OBMP implementation. These data also became the foundation for achieving the objectives of PE 6: to assess water quality trends in the basin, to evaluate the impact of OBMP implementation on water quality, and to determine whether point and non-point contamination sources are being addressed by water quality regulators. Since 2000, Watermaster's groundwater quality monitoring efforts have continued in alignment with the Groundwater Quality Monitoring Program described in PE 1 and have been periodically refined as needed to support the detection and quantification of water quality anomalies and contaminants of concern, such as perchlorate, hexavalent chromium, and 1,2,3-trichloroethene (1,2,3-TCP). Watermaster has regularly assessed groundwater quality in the Chino Basin using data compiled through its own monitoring at private production wells and dedicated monitoring wells and the monitoring efforts of others. Watermaster reports on water quality trends and findings in several reports, including the State of the Basin Reports, which are prepared and submitted to the Court every two years.

In 2003, the Water Quality Committee was convened to coordinate many of the activities performed under PE 6. The Committee met intermittently through 2010. The main activities of the Water Quality Committee included investigations to characterize and address point and non-point sources of groundwater contamination in the Chino Basin and collaboration with the Santa Ana Regional Water Quality Control Board (Regional Board) in its efforts to facilitate the cleanup of groundwater contamination. Some of the significant groundwater quality investigations performed under the guidance of the committee included: the characterization of groundwater contamination in MZ-3 near the former Kaiser Steel Mill and Alumax facilities, tracking studies on the source and extent of the Chino Airport plume, the identification of sources and responsible Parties for the South Archibald plumes, and the identification of the sources of legacy perchlorate contamination in groundwater throughout the basin. The investigations were coordinated through the Water Quality Committee for the Chino Airport and South Archibald plumes and contributed to the definitive identification of responsible Parties and the issuance of cleanup and abatement orders by the Regional Board.

Since 2010, Watermaster has continued to perform monitoring for contaminants related to point-source and non-point source contamination, to assist the Regional Board with the investigation and regulation of point source contaminant sites in the Chino Basin, and to prepare status reports on the monitoring and remediation of point-source contaminant sites in the basin. Periodic status reports have been prepared for: the Chino Airport and South Archibald plumes[24] and the General Electric (GE) Test Cell plume, the GE Flatiron plume, the former Kaiser Steel Mill Facility plume, the CIM plume, the Stringfellow plume, and the Milliken Landfill plume. Updated delineations of the spatial extent of the plumes in the Chino Basin are prepared every two years by Watermaster and are included in the plume status reports and biennial State of the Basin Reports.

Currently, the responsible Parties for the Chino Airport plume and South Archibald plume are initiating remedial strategies that include the use of the Chino Basin Desalters for pumping and treating the contaminated groundwater associated with these plumes. This use of the Chino Basin Desalters as a mutually beneficial project was recognized in the OBMP Implementation Plan as a potential management strategy and provides cost sharing benefits to all involved Parties. Additionally, the CDA and IEUA have acquired over $85 million in federal and state grant funds for the Chino Basin Desalter Phase III expansion project that is planned to be used for portions of the remediation of the Chino Airport and South Archibald plumes.

3.2.6.2 Ongoing implementation actions for the 2020 OBMP

Pursuant to the PE 6 implementation plan, Watermaster will continue to perform the following to ensure that point-source contamination is being adequately addressed: monitor water quality at monitoring wells and private wells within the basin and collect data from others to support the quantification of point-source contaminant plumes, prepare updated delineations of the plume extents for the biennial State of the Basin Reports, and track and report on the status of remediation in the recurrent plume status reports and other ad-hoc investigations as needed to support the Regional Board in their efforts to address groundwater contamination. Watermaster will also continue to support the Regional Board or other Parties to identify and implement mutually beneficial projects for addressing groundwater contamination cleanup and identify outside sources to finance the cleanup efforts, such as the funds awarded for the Chino Desalter expansion project. Watermaster will continue to characterize and report on water-quality since OBMP implementation in the biennial State of the Basin Reports using data collected for the PE 1 Groundwater Quality Monitoring Program.

While PE 6 in the 2000 OBMP Implementation Plan provides a strategy to support the Regional Board in its efforts to address groundwater contamination cleanup in the Chino Basin, there are emerging contaminants with regulatory water quality standards set by the DDW that can impact the beneficial uses of groundwater. As described in the Scoping Report for Activity EF, there are contaminants in groundwater that limit its direct use for drinking water supply and reductions in pumping due to water quality challenges can result in negative impacts to the basin, such as reductions in net recharge, loss of hydraulic control, and movement of contaminant plumes. The enforceable drinking water standards developed by the DDW are continuously evolving and becoming more stringent as laboratory analytical technologies to detect contaminants are advancing. Hence, it is likely that new contaminants will be identified and regulated. The *Groundwater Quality Management Plan* envisioned for Activity EF is a

[24] Status reports for the Chino Airport and South Archibald plumes were prepared monthly in 2013; quarterly from 2014-2017; and semi-annually effective in 2018. Status reports for the other plumes and sites are prepared annually effective 2018.

refinement on PE 6 from the 2000 OBMP in that it is a proactive and basin-wide approach to address emerging contaminants to prepare the Parties for addressing compliance with new and increasingly stringent drinking water regulations defined by the DDW and ensure the long-term maximum beneficial use of the Basin.

3.2.7 Program Element 7. Develop and Implement Salt Management Plan

The 2000 OBMP included PE 7—*Develop and Implement Salt Management Plan*—to characterize current and future salt and nutrient conditions in the basin and to subsequently develop and implement a plan to manage them. Such a management strategy was necessary to address historical salt and nutrient accumulation from agricultural operations and to support the aggressive expansion of recycled water recharge and reuse envisioned in PEs 2 and 5.

The implementation actions incorporated into the 2000 OBMP Implementation Plan are summarized in Table 9 below. Each implementation action in Table 9 is categorized as a one-time or ongoing action, and the right-most column of the table indicates if the action was implemented.

Table 9. Program Element 7 – Implementation Actions Defined in the 2000 OBMP

Implementation Action	One-time/ Ongoing	Implemented?
Years 1 through 3		
Develop salt budget goals, develop the salt budget tool and review all the OBMP actions.	One-time	✓
Watermaster will continue to monitor the nitrogen and salt management activities within the basin.	Ongoing	✓
Years 4 through 50		
As part of periodic updates of the OBMP, re-compute the salt budget using the salt budget tool. The salt budget tool will be used to reassess future OBMP actions to ensure the salt management goals are attained.	Ongoing	✓
Watermaster will continue to monitor the nitrogen and salt management activities within the basin.	Ongoing	✓

3.2.7.1 Implementation Progress since 2000

In 2002, recognizing that implementing the recycled water reuse program would require large-scale treatment and mitigation of salt loading under the then-current antidegradation objectives for TDS and nitrate defined in the Basin Plan, Watermaster and the IEUA petitioned the Regional Board to establish a maximum-benefit-based SNMP that involved (1) increasing the TDS and nitrate objectives for the Chino-North GMZ[25] to numerically higher values to enable maximization of recycled water reuse and (2) committing to a program of salt and nutrient management activities and projects ("maximum benefit

[25] The Chino-North GMZ has a maximum-benefit TDS objective of 420 mgl and is a combination of the Chino-1, Chino-2, and Chino-3 antidegradation GMZs that have lower TDS objectives, ranging from 250 to 280 mgl.

commitments") that ensure the protection of beneficial uses of the Chino-North GMZ and downgradient waters (the Santa Ana River and the Orange County GMZ). The technical work performed to support the maximum-benefit SNMP proposal included the development and use of an analytical salt budget tool to project future TDS and nitrate concentrations in the Chino-North GMZ with and without the maximum-benefit SNMP. The maximum-benefit SNMP was incorporated into the Basin Plan by the Regional Board in January 2004.

Implementation of the maximum-benefit SNMP is a regulatory requirement of the Basin Plan. The requirement is also incorporated into Watermaster and the IEUA's recycled water recharge program permit (R8-2007-0039) and the IEUA's recycled water discharge and direct reuse permit (R8-2015-0021; NPDES No. CA 8000409). There are nine maximum-benefit commitments included in the Basin Plan and recycled water permits:

1. The development and implementation of a surface-water monitoring program
2. The development and implementation of a groundwater monitoring program
3. The expansion of the Chino-I Desalter to 10 mgd and the construction of the Chino-II Desalter with a design capacity of 10 mgd
4. The additional expansion of desalter capacity to a total capacity of 40 mgd pursuant to the OBMP and the Peace Agreement
5. The construction of the recharge facilities included in the Chino Basin Facilities Improvement Program
6. The management of recycled water quality to ensure that the IEUA agency-wide, 12-month running average wastewater effluent quality does not exceed 550 milligrams per liter (mgl) for TDS and 8 mgl for total inorganic nitrogen (TIN)
7. The management of the basin-wide, volume-weighted TDS and nitrate concentrations of artificial recycled, storm, and imported waters to concentrations that are less than or equal to the maximum-benefit objectives as a five-year rolling average
8. The achievement and maintenance of the Hydraulic Control of groundwater outflow from the Chino Basin, specifically from the Chino-North GMZ, to protect the water quality of the Santa Ana River and downstream beneficial uses
9. The triennial recalculation of ambient TDS and nitrate concentrations of the Chino Basin GMZs

These commitments are all activities that were planned to be implemented under the OBMP through implementation actions within PEs 1, 2, 3, 5, and 7.

Watermaster and the IEUA are also required to prepare an annual report to the Regional Board on the status of implementation of the maximum-benefit commitments, including reporting of annual data collected through the monitoring program and assessments of compliance with the groundwater and recycled water-quality limits defined in the SNMP. If the maximum-benefit commitments are not implemented to the Regional Board's satisfaction, the antidegradation objectives would apply for regulatory purposes. The application of the antidegradation objectives would result in a finding of no assimilative capacity for TDS and nitrate in the Chino-North GMZ, and the Regional Board would require mitigation for all recycled water discharges to Chino-North that exceeded the antidegradation objectives retroactively to January 1, 2004. The retroactive mitigation for past discharges would be required to be completed within a ten-year period, following the Regional Board's finding that the maximum-benefit commitments were not met.

Watermaster has prepared and submitted annual reports to the Regional Board every year since 2005. As of the most recent annual report for CY 2018, Watermaster and the IEUA remain in compliance with all requirements of the maximum-benefit commitments.[26] A more detailed summary of the commitments and progress towards implementation is provided in Exhibit 14.

3.2.7.2 Ongoing implementation actions for the 2020 OBMP

Compliance with the maximum benefit commitments is an ongoing requirement of the Basin Plan. The ongoing actions to implement the maximum-benefit SNMP as currently defined in the basin, and thus PE 7, will include:

- Continue implementation of the surface and groundwater monitoring programs.
- Complete the expansion of the Chino Basin Desalter pumping capacity to 40,000 afy (expected in 2020).
- Maintain Hydraulic Control of the Chino-North GMZ through operation of the Chino Basin Desalters and other means, as necessary.
- Continue the storm and imported water recharge program to comply with recycled water recharge dilution requirements.
- Periodically analyze and report groundwater, surface water, and recycled water quality data to assess compliance with the metrics established in the maximum-benefit SNMP.
- Construct treatment and/or salt-offset facilities *if* one or more of the compliance metrics is exceeded.

There are three water-quality limitations and associated compliance metrics established in the maximum-benefit SNMP. When these metrics are exceeded, Watermaster and the IEUA must develop a plan and schedule to achieve compliance. The limitations, compliance metrics, and compliance actions are summarized in Exhibit 15.

The management actions for achieving compliance with the metrics once they are exceeded could include, but are not limited to: desalting recycled water to reduce TDS concentrations, increasing the recharge of low-TDS supply sources (storm or imported waters), or additional desalting of high-TDS groundwater as a salt offset.

With the exception of the ambient nitrate concentration of the Chino-North GMZ, which has exceeded the objective of 5.0 mgl since it was established in 2004, none of the other TDS and nitrate limitations have been exceeded. That said, the ambient TDS and nitrate concentrations in the Chino-North GMZ continue to increase due to legacy agricultural activities, recycled water reuse, and current irrigation practices. The current ambient TDS and nitrate concentrations are 360 and 10.3 mgl, respectively. Based on the rate of increase of the ambient TDS concentration since 1997, which has been about three mgl per year, the maximum-benefit objective of 420 mgl is not expected to be exceeded until about 2035.

More recently, the TDS concentration of recycled water has approached the compliance metric defined in commitment number 6. During the 2012 to 2016 drought, the 12-month running-average IEUA agency-wide TDS concentration in recycled water approached the 545 mgl action limit that would require the IEUA and Watermaster to submit a water-quality improvement plan and schedule. In analyzing the available data, the IEUA determined that the primary drivers for the increasing recycled

[26] WEI. (2019). *Optimum Basin Management Program Chino Basin Maximum Benefit Annual Report 2018*. April 2019.

water TDS concentration were the increase in the TDS concentration of the water supplies used by its member agencies and an increase of the TDS waste increment due to indoor water conservation. Similarly, drought conditions also threaten the ability to comply with the recycled water recharge dilution requirements. During drought conditions there is: a reduction in the amount of high-quality stormwater recharge, limited or no availability of imported water for recharge, an increase in the TDS concentrations of imported water, and a concomitant increase in the TDS concentrations of the recycled water. Not only are the two primary sources of low-TDS recharge water less available during drought periods, but the source water quality of municipal water supplies is also higher in TDS due to increases in imported water TDS and indoor water conservation practices. A more detailed discussion of this issue is provided in the Scoping Report. The Scoping Report discussion demonstrated the meaningful impact that drought has on compliance with the various recycled water quality metrics and indicates that climate change, which is expected to result in longer drier droughts, could potentially threaten future compliance with the limits.

Although the 12-month running-average IEUA agency-wide TDS concentration declined from the 2015 peak before reaching the 545 mgl action limit, it was an important indicator that the TDS concentration of recycled water is likely to approach or exceed the recycled water action limit during the next prolonged dry period and trigger the planning for recycled water quality improvements. In May 2017, recognizing the potential cost of implementing recycled water quality improvements for what might be only short-term exceedances of the action limit, Watermaster and the IEUA petitioned the Regional Board to consider updating the maximum-benefit SNMP to incorporate a revised compliance metric for recycled water TDS and nitrate specifically to allow a longer-term averaging period. The Regional Board agreed that an evaluation of the recycled water compliance metric is warranted and directed Watermaster and the IEUA to develop a technical scope of work to demonstrate the potential impacts of the revised compliance metric.

The primary objectives of the technical work to support the maximum-benefit SNMP and permit updates are: to develop and use an updated groundwater solute-transport model to evaluate the TDS and nitrate concentrations of the Chino Basin (e.g. a new salt-budget tool), to define alternative salinity management scenarios, and to project the future TDS and nitrate concentrations in the Chino Basin for each scenario. The results will be used to work with the Regional Board to develop a regulatory compliance strategy that potentially includes a new compliance metric based on a longer-term averaging period for recycled water TDS, contingent on the ongoing modeling and analysis efforts. The regulatory compliance strategy can also address any projected challenges in complying with the recycled water dilution requirements. The work began in September 2017 and is expected to be completed in 2020.

The Regional Board has indicated that in accepting any proposal to modify the recycled water compliance metrics, it will require Watermaster and the IEUA to add a new maximum-benefit commitment to the Basin Plan that involves updating the TDS and nitrate projections every five years. Thus, the need for the proactive planning to achieve compliance, as envisioned by Activity K, is a required ongoing activity under PE 7 and the maximum-benefit SNMP.

3.2.8 Program Element 8. Develop and Implement Groundwater Storage Management Program *and* Program Element 9. Develop and Implement Storage and Recovery Programs

The Judgment recognized the existence of unused storage space within the Chino Basin that could be used to store water for subsequent beneficial use. The Judgment requires that the use of such storage capacity be undertaken only under Watermaster control and regulation to protect all stored water, to protect Safe Yield, and to avoid adverse impacts to groundwater pumpers. The Judgment prioritizes the use of storage space by the Parties over the use of storage space for the export of stored water.

The 2000 OBMP included two PEs to address the management and use of storage space:

Program Element 8. Develop and Implement Groundwater Storage Management Program

Program Element 9. Develop and Implement Storage and Recovery Programs

The objectives of PE 8 are (1) to develop and implement a storage management plan that prevents overdraft, protects water quality, and ensures equity among the Parties, and (2) to periodically recalculate Safe Yield. The objective of PE 9 is to develop Storage and Recovery Programs that benefit all Parties in the basin and ensure that basin waters and storage capacity are put to maximum beneficial use without causing MPI to any producer or the basin.

The 2000 OBMP storage management plan in PE 8 consists of managing groundwater production, replenishment, recharge, and storage such that total storage within the basin ranges from a low of 5,300,000 af to a high of 5,800,000 af. The following definitions are included in the OBMP Implementation Plan to describe the storage management plan:

- Operational Storage Requirement (OSR) is the storage or volume in the Chino Basin that is necessary to maintain the Safe Yield. The OSR was estimated in the development of the OBMP to be about 5.3 million af.[27]
- Safe Storage is an estimate of the maximum amount of storage space in the basin that can be used and not cause significant water-quality and/or high-groundwater related problems. Safe Storage was estimated in the development of the OBMP to be about 5.8 million af.
- SSC is the difference between Safe Storage and the OSR and is the storage space that can be safely used by producers and Watermaster for storage programs. Based on the above, the SSC is about 500,000 af, including water in existing storage accounts. The allocation and use of storage space in excess of the SSC will preemptively require mitigation; that is, mitigation must be defined and resources committed to mitigation prior to its allocation and use.

The Peace Agreement describes the actions, programs, and procedures Watermaster will take in performance of Storage and Recovery Programs.[28]

The implementation plan for PEs 8 and 9 were combined in the OBMP Implementation Plan. The implementation actions incorporated into the 2000 OBMP Implementation Plan are summarized in Table 10 below. Each implementation action is categorized as a one-time or ongoing action and the right-most column of the table indicates if the action was implemented.

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[27] This storage value was set as the estimated storage in the basin in 1997. See Page 2-11 of the OBMP Phase 1 Report.

[28] See Peace Agreement, § 5.2

Table 10. Program Elements 8 and 9 – Implementation Actions Defined in the 2000 OBMP

Implementation Action	One-time/ Ongoing	Implemented?
Years 1 through 3		
Evaluate the need to modify Watermaster UGRR* regarding storage management plans and procedures.	One-time	✓
Determine the operational storage requirement and safe storage.	One-time	✓
Years 4 through 50		
Start assessing losses at 2% per year in year 2005. This amount will be subject to modification in future years.	Ongoing	✓
In year 2010/11 and every ten years thereafter, compute Safe Yield and storage loss rate for prior ten-year period, and reset Safe Yield and storage loss rates for the next ten-year period. Reassess storage management plan and modify Watermaster UGRR, if needed.	Ongoing	✓

*UGRR stands for Uniform Groundwater Rules and Regulations. The UGRR was incorporated in the Watermaster's Rules and Regulations and is no longer a stand along document.

3.2.8.1 Implementation progress since 2000 and ongoing implementation actions for the 2020 OBMP

A final SSC of 500,000 af was established in the OBMP Implementation Plan. The water occupying the SSC includes Carryover, Excess Carryover, Local Storage, and Supplemental Waters stored by the Parties, including water stored for Storage and Recovery Programs. Carryover, Excess Carryover, Local Storage, and Supplemental Waters in storage accounts are referred to collectively as "managed storage."

Storage Agreements and Existing Managed Storage

The Restated Judgment provides that the Basin's groundwater storage capacity may be utilized for the storage and conjunctive use of supplemental water only under Watermaster control and regulation and that no use of such capacity be made except pursuant to written agreement with Watermaster.[29] The Pooling Plans of the Overlying (Non-Agricultural) Pool[30] and the Appropriative Pool[31] each require a Party to have an agreement with Watermaster as a condition of storing Excess Carryover water within the Basin. Watermaster has developed rules and regulations, standard storage agreements, and related forms pursuant to the Judgment and Peace Agreement.

There are three types of storage agreements that result in five types of storage accounts: Excess Carryover, Local Supplemental-Recycled, Local Supplemental-Imported, Pre-2000 Quantified Supplemental, and Storage and Recovery. An Excess Carryover account includes a Party's unproduced rights in the Safe Yield (Safe Yield for Overlying Non-Agricultural Pool Parties and Operating Safe Yield for Appropriative Pool Parties) and Basin Water acquired from other Parties. A Local Supplemental Water account includes imported and recycled water that is recharged by a Party and similar water acquired from other Parties. A Storage and Recovery account includes Supplemental Water and the

[29] See Restated Judgment, ¶ 11, 12 and Peace Agreement, § 5.2(a)

[30] See Restated Judgment Exhibit "G"

[31] See Restated Judgment Exhibit "H"

Peace Agreement requires that Watermaster shall give first priority to Storage and Recovery Programs that produce a "broad and mutual benefit to the Parties to the Judgment."[32]

In evaluating applications for storage agreements, Watermaster conducts an investigation to determine if the water stored and recovered under a proposed storage agreement has the potential to cause MPI to a Party or the basin. If Watermaster determines that implementation of the proposed storage agreement has the potential to cause MPI, the applicant must revise its application and demonstrate that there will be no MPI, or Watermaster must impose conditions in the storage agreement to ensure there is no MPI. Watermaster cannot approve a storage agreement that has the potential to cause MPI.

The Parties, amongst themselves, are also actively involved in water transfers of annual unproduced rights in the Safe Yield and water in their storage accounts. Watermaster has an application and review process for transfers that is similar to the storage agreement application process. Transfers are one way that the Parties recover water held in storage accounts.

The only active Storage and Recovery Program in the basin is the Metropolitan Dry-Year Yield Program (DYYP). The DYYP can store up to 100,000 af with maximum puts of 25,000 afy and maximum takes of 33,000 afy. The DYYP Storage and Recovery agreement provides that puts and takes can exceed these values if agreed to by Watermaster (as was done in fiscal years 2018 and 2009, respectively). The agreement that authorizes the DYYP will expire in 2028.

Watermaster tracks the puts, takes, losses, transfers, and end of year storage totals for all of these storage accounts, and reports on this accounting in the annual assessment process. Starting in 2005, pursuant to the Peace Agreement and OBMP IP, Watermaster began assessing losses in stored water at a rate of 2.0 percent per year. In February 2016, Watermaster changed the loss rate to 0.07 percent per year, based on the estimated groundwater discharge from the Chino-North GMZ to the Santa Ana River (a finding of the Safe Yield recalculation).

Exhibit 16 summarizes the amount of water in managed storage by the Parties and for the DYYP. The total volume of water in managed storage as of June 30, 2019 was about 549,200 af, which includes about 46,000 af stored in the DYYP account. As previously stated, and described below, in 2017, the IEUA adopted an addendum to the Peace II SEIR that provided a temporary increase in the SSC to 600,000 af through June 30, 2021 and required Watermaster to update the storage management plan.

Safe Yield Reset

Starting in 2011, Watermaster began the technical effort to recalculate the Safe Yield of the basin, which at that time was set at 140,000 afy. This work involved updating the hydrogeologic conceptual model of the basin, updating the historical hydrology, updating and recalibrating numerical models that simulate the surface and groundwater hydrology of the Chino Basin area, and projecting the surface and groundwater response of the basin to future management plans that included storage management. Watermaster's methodology for calculating Safe Yield was approved by the Court in April 2017.

This work is documented in *2013 Chino Basin Groundwater Model Update and Recalculation of Safe Yield Pursuant to the Peace Agreement*[33] (hereafter, Safe Yield report). The results of that work yielded a

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[32] See Peace Agreement, §5.2(c)(iv)(b)

[33] WEI. (2015). *2013 Chino Basin Groundwater Model Update and Recalculation of Safe Yield Pursuant to the Peace Agreement.* October 2015. http://www.cbwm.org/docs/engdocs/WEI%202013%20CBWM%20Recalculation%20Model%20Update/20151005_WEI_2013_CBWM_Recal_Model_Final_low.pdf

reassessment of the hydrology of the basin from 1961 through 2011 and projections of basin hydrology through 2050, based on the best available planning information. And, based on the investigation results in the Safe Yield report, the Safe Yield was estimated to be 135,000 afy for the period FY 2010/11 to FY 2019/20.

The conclusions of the Safe Yield report related to storage management were:

- On July 1, 2000, the total water in storage in the basin was about 5,935,000 af, inclusive of about 236,000 af of managed storage. This is about 635,000 af greater than the OSR of 5,300,000 af that was established in the OBMP Implementation Plan.
- Managed storage was projected to increase from 487,000 af in 2016 to about 663,000 af by 2030 (exceeding the SSC by 163,000 af) and decline thereafter to zero af by 2051. Managed storage was projected to be used to meet future Replenishment Obligations.
- Total storage was projected to fall below the OSR of 5.3 million af in 2041.

Based on these findings, Watermaster conducted an investigation to determine if the use of managed storage up to 663,000 af would cause potential MPI and concluded it would not. Subsequently, the IEUA adopted an addendum to the Peace II SEIR to temporarily increase the SSC to 600,000 through June 30, 2021 to enable Watermaster and the Judgment Parties to update the OBMP storage management plan.

The next effort to recalculate Safe Yield is currently underway, and Watermaster is using the same Court-approved methodology used in the Safe Yield report to recalculate Safe Yield for the period FY 2020/21 to FY 2029/30.

2020 Storage Management Plan

The 2000 OBMP storage management plan is based on fixed storage volumes (e.g. the OSR, the SSC, and the Safe Storage), and its technical basis is not supported by new information available after the storage management plan was first developed. Review of the new information developed pursuant to the OBMP since 1999 indicated that it is possible to use more storage space than contemplated in the 2000 OBMP. This new information includes: an updated hydrogeologic conceptual model; 20 years of intensive monitoring of basin operations (not available in 1999), including monitoring the basin response as the total volume of managed storage approached 500,000 af; and groundwater model-based projections of the basin response to future management plans where the managed storage exceeded 500,000 af. The new information developed since 1999 also suggests that the use of managed storage to satisfy future desalter and other Replenishment Obligations could cause potential MPI and other adverse impacts: it has the potential to exacerbate land subsidence and pumping sustainability challenges, impact net recharge and Safe Yield, increase groundwater discharge through the CCWF and cause a loss of Hydraulic Control, and change the direction and speed of the contaminant plumes. Thus, Watermaster initiated a process to update the OBMP storage management plan to enable increased storage by the Parties and to include features that will ensure there is no MPI to a Party or the basin caused by the conjunctive-use activities of the Parties and Storage and Recovery Programs.

The *Storage Framework Investigation* (SFI) was completed in 2018 to the provide the technical information required to update the storage management plan.[34] In the SFI, future projections of the use of managed storage were estimated and evaluated for potential MPI. The SFI projected that for the

[34] WEI. (2018). *Storage Framework Investigation – Final Report*. Prepared for the Chino Basin Watermaster. October 2018.

planned use of up to 700,000 af of managed storage by the Parties that Hydraulic Control would be maintained, that there would be no MPI, and that there would be an adverse impact from the reduction of net recharge and Safe Yield attributable to the use of managed storage. The 2018 SFI also projected that for Storage and Recovery Programs that would operate in an identical manner to the existing Metropolitan DYYP and using the managed storage space between 700,000 af and 800,000 af. The SFI also evaluated the impacts of prospective Storage and Recovery Programs that would use up to an additional 200,000 af of storage space (total storage of 1,000,000 af) and projected that MPI and other adverse impacts could occur and described the potential facilities and operating concepts that, if implemented, would minimize potential MPI. The results of the SFI, together with the *Final 2020 Storage Management Plan White Paper,*[35] were used to inform the development of the *2020 Storage Management Plan* (SMP).

The Watermaster completed the 2020 SMP in December 2019, and it is included herein as Appendix E. The 2020 SMP no longer includes the management concepts of Safe Storage, OSR, and SSC that were a part of the 2000 OBMP storage management plan. The provisions of the 2020 SMP are described below.

The 2020 SMP includes the following provisions regarding the use of storage space in the basin:

- An aggregate amount of 800,000 af is reserved for the Parties' conjunctive-use activities (includes Carryover, Excess Carryover, and Supplemental Accounts) and Metropolitan's DYYP. This amount is referred to as the "First Managed Storage Band" (FMSB).
- An aggregate amount of 800,000 af is reserved for the Parties' conjunctive-use activities (includes Carryover, Excess Carryover, and Supplemental Accounts) and Metropolitan's DYYP. This amount is referred to as the "First Managed Storage Band" (FMSB).
- The managed storage space between 800,000 and 1,000,000 af is reserved for Storage and Recovery Programs.
    - Storage and Recovery Programs that utilize the managed storage space above 800,000 af will be required to mitigate potential MPI and other adverse impacts as if the 800,000 af in the FMSB is fully used.
    - Renewal or extension of the DYYP agreement will require the DYYP to use storage space above the 800,000 af of the FMSB.
- The allocation of storage space for use by Parties and for Storage and Recovery Programs may be revised in subsequent updates of the SMP.
- The use of managed storage greater than 1,000,000 af may be possible provided the storing entity submits a Storage and Recovery Program application, demonstrates that the program has broad mutual benefit, demonstrates that the program's mitigation measures will meet the mitigation requirements of the Watermaster to ensure there will be no MPI and other adverse impacts[36], complies with CEQA, and obtains approval from the Watermaster.

The 2020 SMP includes the following provisions regarding the use of spreading basin facilities for storage programs:

[35] WEI. (2019). *Final 2020 Storage Management Plan White Paper*. Prepared for the Chino Basin Watermaster. July 2019.

[36] Adverse impacts include reductions in net recharge and Safe Yield; and an increase in the groundwater discharge from the Chino North GMZ to the Santa Ana River contributing to a loss of Hydraulic Control.

- Watermaster will prioritize the use of spreading basins to satisfy Watermaster's recharge and Replenishment Obligations over the use of spreading basins for other uses subject to limitations provided in existing agreements with the owners of the facilities.

The 2020 SMP includes the following provisions specific to the Parties and Storage and Recovery Program:

- With regard to the storage management activities of the Parties:
    - Watermaster acknowledges transfers or leases of water rights and water held in managed storage (hereafter transfers) from Parties that are situated such that they pump groundwater outside of MZ-1 to Parties that pump in MZ-1 have the potential to cause potential MPI.
    - Any reduction in net recharge caused by storage in the FMSB is an adverse impact, and Watermaster considers this adverse impact to be mitigated by the prospective calculation of Safe Yield.
- With regard to the Storage and Recovery Programs:
    - Puts and takes should be prioritized to occur in MZ-2 and MZ-3 to avoid new land subsidence and interfering with land subsidence management in MZ-1, to minimize pumping sustainability challenges, to minimize the impact of Storage and Recovery operations on solvent plumes, to preserve the state of Hydraulic Control, and to take advantage of the larger and more useful storage space in MZ-2 and MZ-3.
    - Watermaster will review each Storage and Recovery Program application, estimate the surface and ground water systems response, prepare a report that describes the response and potential MPI, and develop mitigation requirements to mitigate MPI caused by the proposed Storage and Recovery Program. The Storage and Recovery Program applicant will develop mitigation measures pursuant to these requirements and incorporate them into their Storage and Recovery Program application. Upon approval by Watermaster, these mitigation measures will be incorporated into the Storage and Recovery Program storage agreement.
    - Adverse impacts due to a Storage and Recovery Program must be mitigated. Adverse impacts include but are not limited to reductions in net recharge and Safe Yield and an increase in the groundwater discharge from the Chino-North GMZ to the Santa Ana River contributing to a loss of Hydraulic Control.
        - As part of the Storage and Recovery Program application review process, Watermaster will: make a projection of the program's expected impact on net recharge and Safe Yield and on the state of Hydraulic Control and review these impacts and develop mitigation requirements for the proposed Storage and Recovery Program.
        - The Storage and Recovery Program applicant will develop mitigation measures pursuant to these requirements and incorporate them into their Storage and Recovery Program application. Upon approval by Watermaster, these mitigation measures will be incorporated into the Storage and Recovery Program storage agreement.

    - Watermaster will estimate the reduction in net recharge and Safe Yield for each Storage and Recovery Program and deduct it from water stored in each Storage and Recovery Program storage account to compensate for its impact on net recharge and Safe Yield.
  - Watermaster will periodically review current and projected basin conditions and compare this information to the projected basin conditions prepared in the evaluation of the Storage and Recovery Program applications; compare the projected Storage and Recovery Program operations to actual Storage and Recovery Program operations; make findings regarding the efficacy of related mitigation of MPI and other adverse impact requirements and measures in the Storage and Recovery Program storage agreements; and based on its review and findings, require changes in the Storage and Recovery Program agreements to mitigate MPI and adverse impacts.

The 2020 SMP includes the following provisions regarding the Storage Agreement Application Process:

- Watermaster will modify the existing Form 8 Local Storage Agreements to be consistent with an "evergreen agreement" paradigm and establish that the evergreen agreements will be valid for the duration of the Peace Agreement and will be automatically adjusted upon Watermaster's approval of each subsequent Assessment Package so long as the cumulative amount of water in storage is less than the quantity reserved for the Parties' conjunctive-use operations and Metropolitan's DYYP (cumulatively, the FMSB) and Watermaster has made no finding that MPI is threatened to occur as a result of the increase in the quantity of water in storage.

The 2020 SMP includes the following provisions regarding the update of the SMP:

- Watermaster will periodically review and update the SMP at a frequency of no less than a once every five years, when the Safe Yield is recalculated, when it determines a review and update is warranted based new information and/or the needs of the Parties or the basin, and at least five years before the aggregate amount of managed storage by the Parties is projected to fall below 340,000 af.

4.0 2020 OBMP Update Management Plan

This section describes the recommended 2020 OBMP management plan for each of the nine PEs. The management plan is based on the ongoing 2000 OBMP implementation actions of each PE described in Section 3 and includes the new implementation actions listed in Section 2 for each of the 2020 OBMP Update Activities. For each management plan, the implementation action items are assigned a general schedule over a 20-year implementation period, and the actions are characterized as one-time or ongoing. Additionally, for each PE, the entities responsible for implementation of the PE management actions are identified.

The complete 2020 OBMP Update management plan, inclusive of all PEs, is summarized in Exhibit 17. Exhibit 17 lists each implementation action and characterizes if they originated from the 2000 OBMP or the 2020 OBMP Update and whether Watermaster deems their implementation required to administer the Physical Solution of the Judgment or comply with other regulatory or Watermaster requirements, including the basis for the requirements.

4.1 Program Element 1. Develop and Implement Comprehensive Monitoring Program

The objective of PE 1 is to collect the data and information necessary to support the implementation of all other OBMP PEs and to satisfy other regulations and Watermaster's obligations under its agreements, Court orders, and CEQA. Watermaster is responsible for the implementation of PE 1. The implementation actions and general schedule for implementation are summarized in Table 11 below.

Table 11. Program Element 1 – 2020 OBMP Management Plan

Implementation Action	One-time/ Ongoing
Years 1 through 3	
Watermaster will continue to conduct the required monitoring and reporting programs, including collection of: groundwater production, groundwater level, groundwater quality, ground level, surface water, climate, water supply planning, biological, and well construction/destruction monitoring data.	Ongoing
Perform review and update of Watermaster's regulatory and Court-ordered monitoring and reporting programs and document in a work plan: *OBMP Monitoring and Reporting Work Plan.*	One-time
Years 4 through 20	
Watermaster will continue to conduct the required monitoring and reporting programs pursuant to the *OBMP Monitoring and Reporting Work Plan* (or other guidance documents developed by Watermaster).	Ongoing
Perform periodic review and update of the *OBMP Monitoring and Reporting Work Plan* (or other guidance documents developed by Watermaster) and modify the monitoring and reporting programs, as appropriate.	Ongoing

4.2 Program Element 2. Develop and Implement Comprehensive Recharge Program

The objectives of PE 2 are to increase stormwater recharge to offset the recharge lost due to channel lining, to ensure there will be enough supplemental water recharge capacity available to Watermaster to replenish overdraft, and to maximize the recharge of recycled and supplemental waters to protect or enhance Safe Yield.

Watermaster, the IEUA, the CBWCD, and the SBCFCD are partners in conducting recharge in the Chino Basin and are jointly responsible for the implementation of PE 2. The implementation actions and general schedule for implementation are summarized in Table 12 below.

Table 12. Program Element 2 – 2020 OBMP Management Plan

Implementation Action	One-time/ Ongoing
Years 1 through 3	
Continue to convene the Recharge Investigations and Projects Committee.	Ongoing
Complete the 2023 Recharge Master Plan Update (RMPU).	One-time
Years 4 through 20	
Implement recharge projects based on need and available resources.	Ongoing
Continue to convene the Recharge Investigations and Projects Committee.	Ongoing
Update the RMPU no less than every five years (2028, 2033, 2038).	Ongoing

4.3 Program Element 3. Develop and Implement a Water Supply Plan for Impaired Areas

The objectives of PE 3 in the 2000 OBMP were to maintain and enhance Safe Yield and maximize beneficial uses of groundwater by constructing and operating the Chino Basin Desalters at an ultimate capacity of 40,000 afy. As described in Section 3.2.3, the final facilities to reach the ultimate capacity of 40,000 afy are under construction and are expected to be completed by 2021. Operation at this capacity, once all agricultural land uses have converted to urban uses, will fulfill the objectives of PE 3. Because the operation of the Chino Basin Desalters is necessary to attain Hydraulic Control, which is a regulatory requirement of the maximum benefit SNMP under PE 7, the implementation actions related to the ongoing operation of the Chino Basin Desalters are contained in PE 7. Thus, there are no separate implementation actions for PE 3 for the 2020 OBMP Update.

4.4 Program Element 4. Develop and Implement Comprehensive Groundwater Management Plan for Management Zone 1

The objective of PE 4 is to reduce or stop the occurrence of land subsidence and prevent ground fissuring in the Chino Basin or reduce it to tolerable levels. PE 4 achieves this objective by implementing the Watermaster's Subsidence Management Plan and updating the plan as warranted by data, analyses, and interpretations. Watermaster is responsible for the implementation of PE 4 with guidance from the GLMC.

The implementation actions for PE 4 and the general schedule for implementation are summarized in Table 13 below.

Table 13. Program Element 4 – 2020 OBMP Management Plan

Implementation Action	One-time/ Ongoing
Years 1 through 20	
Implement Watermaster's Subsidence Management Plan, and adapt it as necessary.	Ongoing
Watermaster will arrange for the physical recharge of at least 6,500 afy of Supplemental Water in MZ-1 as an annual average. Watermaster may re-evaluate the minimum annual quantity of Supplemental Water recharge in MZ-1 and may increase this quantity through the term of the Peace Agreement.	Ongoing

4.5 Program Element 5. Develop and Implement Regional Supplemental Water Program

The objective of this PE is to improve the regional conveyance and availability of imported and recycled waters throughout the basin. This is a basin-wide activity that involves the Parties, the IEUA, the TVMWD, and the WMWD. IEUA will continue to lead the efforts to maximize the reuse of IEUA recycled water in the Chino Basin. There are other current and forthcoming water supply reliability planning efforts by the IEUA, the Parties, and neighboring agencies that provide a prime opportunity to expand coordination and leverage the efforts for broad, regional benefit. Currently, the IEUA is preparing the 2020 IRP and conducting other related planning efforts with its member agencies. This effort could be expanded by neighboring agencies, including the TVMWD, the WMWD, or other Parties. Any of these agencies could lead and coordinate the collaborative, regional planning effort on behalf of the Parties. Watermaster would participate in the planning efforts, to ensure that any water supply or recycled water projects that are recommended for implementation are integrated with its groundwater management planning efforts and are consistent with the Judgment, Peace Agreements and other agreements, the Watermaster Rules and Regulations.

The implementation actions and general schedule for implementation are summarized in Table 14 below. Each action is categorized as one-time or ongoing.

Table 14. Program Element 5 – 2020 OBMP Management Plan

Implementation Action	One-time/ Ongoing
Years 1 through 20	
The IEUA will maximize the reuse of its recycled water in the Chino Basin.	Ongoing
The IEUA, the TVMWD, the WMWD, and/or other Party acting as a coordinating agency will establish or expand future recycled water planning efforts to maximize the reuse of all available sources of recycled water.	Ongoing
Watermaster will support the IEUA, the TVMWD, the WMWD, and/or others in their efforts to maximize recycled water reuse to ensure these efforts are integrated with Watermaster's groundwater and salinity management efforts.	Ongoing
The IEUA, the TVMWD, the WMWD, and/or other Party acting as a coordinating agency will establish or expand future integrated water resources planning efforts to address water supply reliability for all Watermaster Parties.	Ongoing
Watermaster will support the IEUA, the TVMWD, the WMWD, and/or others in their efforts to improve water supply reliability to ensure those efforts are integrated with Watermaster's groundwater management efforts.	Ongoing

4.6 Program Element 6. Develop and Implement Cooperative Programs with the Regional Board and Other Agencies to Improve Basin Management

The objectives of PE 6 are to perform routine and coordinated water quality monitoring to characterize water quality in the Chino Basin so that there is adequate information to ensure that contamination sources are being addressed by water quality regulators and to help address compliance with new and increasingly stringent drinking water regulations for emerging contaminants established by the DDW.

The implementation actions and general schedule for implementation are summarized in Table 15 below.

Table 15. Program Element 6 – 2020 OBMP Management Plan

Implementation Action	One-time/ Ongoing
Years 1 through 3	
Re-convene the water quality committee and meet periodically to update groundwater quality management priorities.	Ongoing
Develop and implement an initial emerging contaminants monitoring plan.	One-time
Prepare a water quality assessment of the Chino Basin to evaluate the need for a Groundwater Quality Management Plan and prepare a long-term emerging contaminants monitoring plan.	One-time
Continue to support the Parties in identifying funding from outside sources to finance cleanup efforts.	Ongoing
Years 4 through 20	
Develop and implement a Groundwater Quality Management Plan and periodically update it.	Ongoing
Implement long-term emerging contaminants monitoring plan.	One-time
Continue to conduct investigations to assist the Parties and/or the Regional Board in accomplishing mutually beneficial objectives as needed.	Ongoing
Implement projects of mutual interest.	Ongoing

Watermaster will convene the Water Quality Committee and lead the stakeholder process to achieve the implementation actions for PE 6, including the development and implementation of a Groundwater Quality Management Plan and perform the initial and long-term water-quality monitoring at the monitoring and private wells sampled by Watermaster pursuant to PE 1.

Projects of mutual interest will be implemented pursuant to agreements among the implementing Parties with Watermaster support, as needed.

4.7 Program Element 7. Develop and Implement Salt Management Plan

The objective of PE 7 is to implement, and periodically update, the maximum-benefit SNMP. The SNMP is a management program to monitor, characterize, and manage current and future salt and nutrient conditions in the Chino Basin. The maximum-benefit SNMP enables the implementation of the recycled water recharge program in PE 2 and the direct reuse of recycled water in PE 5.

Watermaster and the IEUA are co-permittees for the maximum-benefit SNMP and the recycled water recharge program and will be jointly responsible for implementation of PE 7. The implementation actions and general schedule for implementation are summarized in Table 16 below.

Table 16. Program Element 7 – 2020 OBMP Management Plan

Implementation Action	One-time/ Ongoing
Years 1 through 3	
Complete the 2020 update of TDS and nitrate projections to evaluate compliance with maximum benefit salt and nutrient management plan, and, if necessary, based on the outcome, prepare a plan and schedule to implement a salt offset compliance strategy.	One-time
Continue to implement the maximum-benefit salt and nutrient management plan pursuant to the Basin Plan, including: • Implement monitoring program and reporting requirements • Maintain Hydraulic Control through operation of the Chino Basin Desalters and other means, as necessary • Increase and maintain desalter pumping at 40,000 afy • Continue storm and imported water recharge program to comply with recycled water recharge dilution requirements • Comply with recycled water TDS and TIN limitations • Compute ambient water quality every three years • Construct treatment and/or salt-offset facilities *if* one or more of the compliance limits are exceeded	Ongoing
Years 4 through 20	
Continue to implement the maximum-benefit salt and nutrient management plan pursuant to the Basin Plan, and any amendments thereto.	Ongoing
Starting in 2025 and every five years thereafter, update water quality projections to evaluate compliance with the maximum-benefit salt and nutrient management plan.	Ongoing

4.8 Program Element 8. Develop and Implement Groundwater Storage Program *and* Program Element 9. Develop and Implement Storage and Recovery Programs

The objectives of PEs 8 and 9 are to:

- Implement, and periodically update, a storage management plan that: (1) is based on the most current information and knowledge of the basin, (2) prevents unauthorized overdraft, (3) prioritizes the use of storage space to meet the needs and requirements of the lands overlying the Chino Basin and of the Parties over the use of storage space to store water for export.
- Support the development and implementation of Storage and Recovery Programs in the Chino Basin that provide defined benefits to the Parties and the basin.

Watermaster is responsible for the implementation of PEs 8 and 9. The implementation actions and general schedule for implementation are summarized in Table 17 below.

Table 17. Program Elements 8 and 9 – 2020 OBMP Management Plan

Implementation Action	One-time/ Ongoing
Years 1 through 3	
Complete and submit to the Court the 2020 Safe Yield Recalculation.	One-time
Complete and submit to the Court the 2020 Storage Management Plan.	One-time
Develop a *Storage and Recovery Master Plan* to support the design of optimized Storage and Recovery Programs that are consistent with the 2020 Storage Management Plan and provide the Watermaster with criteria to review, condition, and approve applications in a manner that is consistent with the Judgment and the Peace Agreement.	One-time
Assess losses from storage accounts based on the findings of the 2020 Safe Yield Recalculation.	Ongoing
Years 4 through 20	
Update the Storage Management Plan in 2025 and every five years thereafter and when: • the Safe Yield is recalculated, • Watermaster determines a review and update is warranted based new information and/or the needs of the Parties or the basin, and • at least five years before the aggregate amount of managed storage by the Parties is projected to fall below 340,000 af	Ongoing
Perform Safe Yield recalculation every 10 years (2030, 2040).	Ongoing
Update the storage loss rate following each recalculation of Safe Yield (2030, 2040) and during periodic updates of the SMP.	Ongoing

Exhibit 1 – Drivers and Trends and Their Implications
2020 OBMP Update

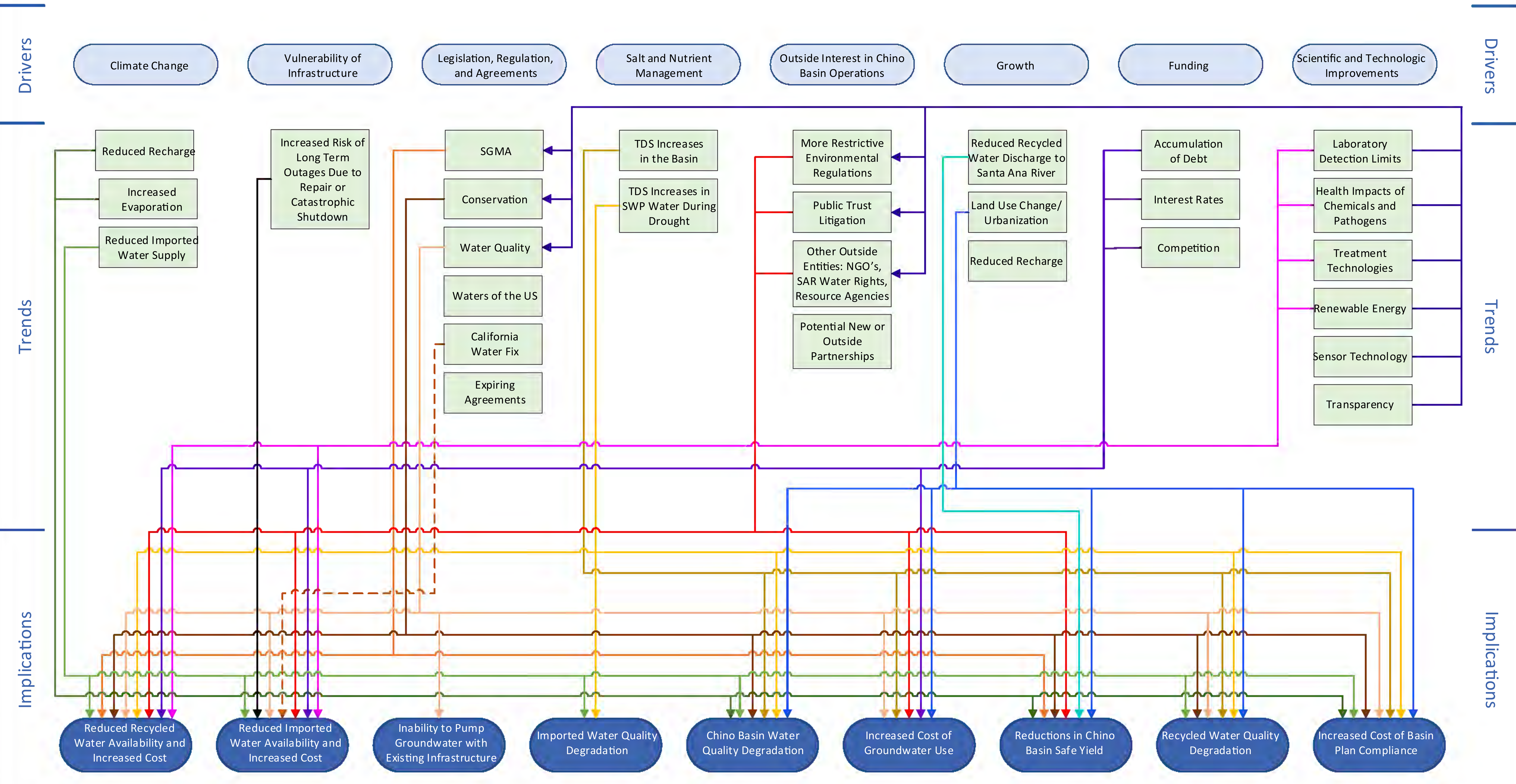

Exhibit 2
Comparison of the 2000 and 2020 OBMP Process

2000 OBMP

OBMP Phase 1 Report
1. Introduction
2. State of the Basin
3. OBMP Goals
4. Management Plan

OBMP Implementation Plan Program Elements (PEs)
1. Monitoring
2. Recharge Program
3. Water Supply Plan for Impaired Areas
4. Subsidence Management
5. Regional Supplemental Water Program
6. Cooperative Program with Regulators
7. Salt Management Plan
8. Storage Management Plan
9. Storage and Recovery Programs

Peace Agreement

OBMP PEIR

2020 OBMP Update

2020 OBMPU Scoping Report (TM1)
1. Introduction
2. Development of Activities
3. Scope of Work to Perform Proposed 2020 OBMP Update Activities.
   - Activity A: Increase the capacity to store and recharge storm and supplemental water
   - Activity B: Develop, implement and optimize Storage and Recovery Programs
   - Activity D: Maximize use of recycled water
   - Activity E/F: WQ Management Plan and Strategic Compliance Solutions
   - Activity C/G: Regional conveyance and treatment
   - Activity K: Salt and Nutrient Management Plan compliance
   - Activity L: Appropriate Monitoring

Integrate 2000 OBMP PEs with 2020 OBMP Update Activities

2020 OBMP Update Report (TM2)
1. Introduction
2. 2020 OMBP Goals and Activities
3. Integration of the 2020 OBMP Update Activities to the 2000 OBMP Program Elements.
4. 2020 OBMP Update Management Plan

2020 OBMP Implementation Plan

Implementation Agreement

2020 OBMP PEIR

Exhibit 3
Issues, Needs and Wants of the Chino Basin Stakeholders

Key: ● Need ● Want/Unspecified

*The letter in this column corresponds with the letter ID of the Activities listed in Table 3

Needs and Wants Categorized by Basin Management Issues	Pool Parties														Others						Addressed by Activities in Table 3*	Alignment with 2000 OBMP Goals
	Appropriative										Agricultural			Overlying Non-Ag								
	Pomona	Chino	Fontana	CVWD	SAWCO	MVWD	Chino Hills	Upland	JCSD	Ontario	Crops	Dairy	State of CA		IEUA	TVMWD	WMWD	Metropolitan	CBWCD	CDA		
Reductions in Chino Basin Safe Yield																						
Develop a storage management plan to optimize the use of unused storage space in the basin, avoid undesirable results, and encourage Storage and Recovery Programs	Need	Need		Need	Need			Need	Need	Need	Need		Want		Need		Need				B, C	1, 2, 3
Design storage management and storage & recovery programs that maintain or enhance Safe Yield	Need	Want						Need	Need	Want			Need		Want		Want			Want	B, C	1, 3
Maintain or enhance the Safe Yield of the basin without causing undesirable results	Need	Want		Need	Need			Need	Need	Need	Want				Want		Want			Need	B, D	1, 3
Manage the basin Safe Yield for the long-term viability and reliability of groundwater supply	Need	Want						Need	Need	Need	Need			Need			Want	Want		Need	A, B, C	1, 3
Reassess the frequency of the Safe Yield recalculation	Want				Want												Want				I	3
Continue to model and track Safe Yield, but utilize other management strategies to address a decline.																	Want				B	1, 3
Develop recharge programs that maintain or enhance Safe Yield	Need	Want					Want	Want	Need	Want					Want		Want			Want	A, B	1, 3
Develop more facilities to capture, store, and recharge water	Want	Need					Need			Want	Want				Want		Want				A, B, D	1, 2
Enhance recharge in northeast MZ-3	Want		Want						Need								Want				A, C	1, 3
Maximize use of existing recharge facilities	Want	Want						Want	Need	Want											A, C, F, G	3
Establish incentives to encourage recharge of high-quality imported water	Want		Want																		H, I	2, 3
Develop an OBMP Update that is consistent with the Physical Solution and allows access to the basin for users to meet their requirements	Need	Want				Need		Need													C, E	3
Engage with regional water management planning efforts in the Upper Santa Ana River Watershed that have the potential to impact Chino Basin operations or Safe Yield	Want														Need		Want			Need	I, D	3

Exhibit 3

Issues, Needs and Wants of the Chino Basin Stakeholders

Key: 🔴 Need ● Want/Unspecified

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	Appropriative										Agricultural			Overlying Non-Ag								
	Pomona	Chino	Fontana	CVWD	SAWCO	MVWD	Chino Hills	Upland	JCSD	Ontario	Crops	Dairy	State of CA		IEUA	TVMWD	WMWD	Metropolitan	CBWCD	CDA		
Inability to Pump Groundwater with Existing Infrastructure																						
Pursue collaborative, regional partnerships to implement regional solutions to water management challenges	●			●	●			●							🔴	●	●	●	🔴	🔴	B, E, F, G, I	3
Ensure that sufficient, reliable water supplies will be available to meet current and future water demands	🔴	🔴	🔴	🔴			●	🔴	●	●	●				🔴	●	●	🔴	●		A, B, D, G	1, 3
Develop conjunctive use agreements that provide certainty in the ability to perform during put and take years by clearly defining facilities/infrastructure and operating plans, and that leverage the lessons learned from obstacles encountered during the implementation of the current Dry Year Yield program	●						●	●	●						●		●	●			B, G, I	1, 2, 3
Develop management strategies that enable the Parties to produce or leverage their respective water rights that may be impacted by physical basin challenges like land subsidence or water quality	🔴						●	🔴							●		●				A, C, D, E, F, G, I	3
Design storage management and storage & recovery programs to raise funding to build infrastructure	●			●											●		●				B, D, I, J	3, 4
Develop process to support/facilitate project implementation	●																				F, H, J	4
Design subsidence management plans to allow flexibility in the location and volume of groundwater production in MZ-1 and MZ-2	●						●	🔴		🔴				●	●						A, C, G	3

Exhibit 3

Issues, Needs and Wants of the Chino Basin Stakeholders

Key: 🔴 Need ⚫ Want/Unspecified

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	Appropriative										Agricultural											
	Pomona	Chino	Fontana	CVWD	SAWCO	MVWD	Chino Hills	Upland	JCSD	Ontario	Crops	Dairy	State of CA	Overlying Non-Ag	IEUA	TVMWD	WMWD	Metropolitan	CBWCD	CDA		
Increased Cost of Groundwater Use																						
Seek supplemental financial resources to support the implementation of the OBMP Update	🔴	🔴		⚫			⚫	🔴	🔴	⚫					⚫	🔴	⚫		⚫		D, F, G, I, J	4
Develop regional partnerships to help reduce costs	⚫			⚫			⚫	⚫	🔴						🔴	⚫	⚫			⚫	F, G, I, J	4
Monetize agencies' unused water rights for equitable balance of basin assets			⚫																		G, H	4
Decrease Watermaster assessment costs	⚫				⚫			⚫													I, J	4
Support to develop a justification for increases in water rates and developer fees to invest in needed water infrastructure	🔴	⚫							⚫								⚫				F, G, H	
Develop an equitable distribution of costs/benefits of the OBMP	⚫	⚫		⚫		🔴	⚫	🔴	🔴	⚫				🔴	⚫						H, J	4
Watermaster assessments for implementation of the OBMP should be allocated based on benefits received	⚫				⚫																H	4
Continue or enhance incentives to pump groundwater from the Chino Basin			🔴																		G, I	3, 4
Improve flexibility for Parties to execute water rights transfers														🔴							G, I	4

Exhibit 3

Issues, Needs and Wants of the Chino Basin Stakeholders

Key: 🔴 Need ● Want/Unspecified

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	Appropriative										Agricultural											
	Pomona	Chino	Fontana	CVWD	SAWCO	MVWD	Chino Hills	Upland	JCSD	Ontario	Crops	Dairy	State of CA	Overlying Non-Ag	IEUA	TVMWD	WMWD	Metropolitan	CBWCD	CDA		
Chino Basin Water Quality Degradation																						
Develop a water quality management plan to ensure ability to produce groundwater rights	🔴	●		●			●	●	●	●				🔴	●		●	●			E, F, G, J	2, 3
Develop regional infrastructure to address water quality contamination and treatment				●	●			●													A, B, C, E, F, G, I, J	2
Plan for and be prepared for new drinking water quality regulations that may result in an increase in groundwater treatment and costs	●	●	🔴	🔴			🔴	●	🔴	●					🔴		●				E, F	2
Be more proactive and engaged in the process to develop new drinking water quality regulations								●													A, B, D, E, G, J	2
Recycled Water Quality Degradation																						
Maintain compliance with recycled water and dilution requirements pursuant to the Chino Basin groundwater recharge permit		●					●	●	🔴	🔴				🔴	🔴						A, B, D, E, G, J	2
Increased Cost of Basin Plan Compliance																						
Develop management strategy to ensure sufficient supplies to blend with recycled water and comply with Salt and Nutrient Management Plan	●	●									🔴				●		●				G, K	2
Perform the minimum amount of monitoring/reporting that is required for basin management and regulatory compliance	●			●			●	●													L	3, 4

Exhibit 3
Issues, Needs and Wants of the Chino Basin Stakeholders

Key: 🔴 Need ● Want/Unspecified

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Needs and Wants Categorized by Basin Management Issues	Pool Parties														Others						Addressed by Activities in Table 3*	Alignment with 2000 OBMP Goals
	Appropriative										Agricultural			Overlying Non-Ag								
	Pomona	Chino	Fontana	CVWD	SAWCO	MVWD	Chino Hills	Upland	JCSD	Ontario	Crops	Dairy	State of CA		IEUA	TVMWD	WMWD	Metropolitan	CBWCD	CDA		
Reduced Recycled Water Availability and Increased Cost																						
Fully utilize IEUA recycled water resources		🔴		●			●	●		🔴					●						A, D, E, F, G	1
Maximize the use of recycled water for direct use or recharge	●	🔴		🔴			●	🔴	🔴	🔴					●						A, D, E, F, G	1
Evaluate the potential for direct potable reuse of recycled water	●								●						●						D, E, F	1
Develop alternative management strategies to comply with the recycled water discharge obligations to the Santa Ana River	●	●		●			●	●		●					●		●				D, E, F	1, 3
Utilize non-IEUA sources of recycled water that are not being put to beneficial use	🔴	●					●	●	🔴	🔴					●		●				D, E, F	1
Other																						
Coordinate timing of agreements, grants, etc. to ensure implementation of the OBMP Update	●							●	🔴	●					●	●	●				F, G, H, I, J	
Improve communication between the Parties	🔴			🔴				●						🔴	●		●				F, H, I	
Educate elected officials and decision makers on the need and urgency to address the water management challenges	●	🔴							🔴						●	●	●				F, G, H, I, J	
Consider a long-term planning horizon of up to 50 years	●								●	●					●						F, G, H, I, J	3

Exhibit 3
Issues, Needs and Wants of the Chino Basin Stakeholders

Key: 🔴 Need ⚫ Want/Unspecified

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Needs and Wants Categorized by Basin Management Issues	Pool Parties														Others						Addressed by Activities in Table 3*	Alignment with 2000 OBMP Goals
	Appropriative										Agricultural			Overlying Non-Ag								
	Pomona	Chino	Fontana	CVWD	SAWCO	MVWD	Chino Hills	Upland	JCSD	Ontario	Crops	Dairy	State of CA		IEUA	TVMWD	WMWD	Metropolitan	CBWCD	CDA		
Reduced Imported Water Availability and Increased Cost																						
Ensure that there is a reliable local water supply to replace imported water during shut down of imported water delivery infrastructure for maintenance and longer-term emergency outages	🔴	⚫	⚫	🔴			⚫	🔴	⚫	⚫					🔴	🔴	🔴	🔴			B, C, G	1, 3
Identify and utilize new sources of supplemental water	🔴	⚫		⚫			🔴	⚫	⚫	⚫					⚫	⚫	⚫				A, B	1, 3
Construct inter-basin and intra-basin connections for the benefit of regional water supply and conjunctive use	⚫	⚫		🔴			⚫	⚫	🔴			🔴			⚫	🔴	⚫	🔴			C, G	1, 3
Understand how imported water reliability from Metropolitan Water District will be affected with and without the California Water Fix	⚫							⚫	🔴						⚫	⚫	⚫				-	1, 3
Develop management strategies that ensure Parties will meet future Chino Basin Desalter Replenishment Obligation and have the money to fund it	⚫	⚫		🔴			🔴		⚫								⚫			🔴	H, I, J	3
Increase water-supply reliability at the lowest possible cost	🔴			⚫			⚫	⚫				🔴		🔴	⚫		⚫				A, B, D, J	3
Need a better understanding of the water management plans of the Parties to be able to better plan for imported water needs and to assure reliability of Metropolitan Water District water supply	⚫			⚫					🔴			🔴			⚫	⚫	⚫	🔴			A	3
Analyze water management scenarios that plan for unexpected challenges and emergencies	⚫							⚫	🔴	⚫					⚫	⚫	⚫				E, G	3
Ensure that sufficient supplemental water supplies will be available to meet future replenishment requirements							⚫		🔴	⚫		🔴			⚫					🔴	A	1, 3
Despite the best efforts of the Parties to decrease reliance on imported water, the cost of the total water supply continues to increase	⚫																				-	3
Use more recycled water for Replenishment Obligation	⚫			🔴			🔴		🔴								⚫				A, D, E, F	3
Continue to build collaborative programs between the Metropolitan Water District and Chino Basin	🔴						⚫	⚫	⚫						⚫		⚫	⚫			B, I	3

Exhibit 4

Activities for Consideration in the 2020 OBMP Update

ID	Activity
A	Construct new facilities and improve existing facilities to increase the capacity to store and recharge storm and supplemental water, particularly in areas of the basin that will promote the long-term balance of recharge and discharge
B	Develop, implement, and optimize Storage-and-Recovery Programs to increase water-supply reliability, protect or enhance Safe Yield, and improve water quality.
C	Identify and implement regional conveyance and treatment projects/programs to enable all stakeholders to exercise their pumping rights and minimize land subsidence.
D	Maximize the reuse of recycled water produced by IEUA and others
E	Develop and implement a water-quality management plan to address current and future water-quality issues and protect beneficial uses
F	Develop strategic regulatory-compliance solutions to comply with new and evolving drinking water standards that achieve multiple benefits in managing water quality
G	Optimize the use of all sources of water supply by improving the ability to move water across the basin and amongst stakeholders, prioritizing the use of existing infrastructure.
H	Develop an equitable distribution of costs/benefits of the OBMP Update and include in the OBMP update agreements
I	Develop regional partnerships to implement the OBMP Update and reduce costs and include in OBMP Update agreement
J	Continue to identify and pursue low-interest loans and grants or other external funding sources to support the implementation of the OBMP Update
K	Develop management strategy within the Salt and Nutrient Management Plan to ensure ability to comply with dilution requirements for recycled water recharge
L	Perform the appropriate amount of monitoring and reporting required to fulfill basin management and regulatory compliance

Exhibit 5
OBMP Update Goals, Impediments to the Goals, Activities to Remove the Impediments, Expected Outcomes of Activities, and Nexus to Addressing the Issues Needs and Wants of the Stakeholders

Impediments	Activities to Remove Impediments	Potential Outcomes of Activities	Issues, Needs and Wants, as Categorized by Basin Management Issues, that are Addressed by Activities							
			Reductions in Chino Basin Safe Yield	Inability to Pump Groundwater with Existing Infrastructure	Increased Cost of Groundwater Use	Chino Basin Water Quality Degradation	Recycled Water Quality Degradation	Increased Cost of Basin Plan Compliance	Reduced Recycled Water Availability and Increased Cost	Reduced Imported Water Availability and Increased Cost
Goal 1 - Enhance Basin Water Supplies										
1a • Not all of the stormwater runoff available to the Chino Basin is diverted and recharged; failure to divert and recharge stormwater is a permanently lost opportunity. • The existing methodology to select recharge projects for implementation is based on the cost of imported water. There are currently no known projects with a unit cost lower than the cost of imported water, hindering expansion of stormwater capture and recharge • Pumping capacity in some areas of the basin is limited due to low groundwater levels, land subsidence, and water quality	A Construct new facilities and improve existing facilities to increase the capacity to store and recharge storm and supplemental water, particularly in areas of the basin that will promote the long-term balance of recharge and discharge	• Increases recharge of high-quality stormwater that will: • protect/enhance the Safe Yield, • improve water quality, • reduce dependence on imported water, • increase pumping capacity in areas of low groundwater levels and areas of subsidence concern, and • provide new supply of blending water to support the recycled-water recharge program. • Provides additional supplemental-water recharge capacity for replenishment and implementation of Storage and Recovery Programs. • Provides additional surface water storage capacity. • Revised economic criteria for selecting recharge projects for implementation.	✓	✓	✓	✓	✓	✓		✓

Exhibit 5
OBMP Update Goals, Impediments to the Goals, Activities to Remove the Impediments, Expected Outcomes of Activities, and Nexus to Addressing the Issues Needs and Wants of the Stakeholders

Impediments	Activities to Remove Impediments	Potential Outcomes of Activities	Issues, Needs and Wants, as Categorized by Basin Management Issues, that are Addressed by Activities							
			Reductions in Chino Basin Safe Yield	Inability to Pump Groundwater with Existing Infrastructure	Increased Cost of Groundwater Use	Chino Basin Water Quality Degradation	Recycled Water Quality Degradation	Increased Cost of Basin Plan Compliance	Reduced Recycled Water Availability and Increased Cost	Reduced Imported Water Availability and Increased Cost
Goal 1 - Enhance Basin Water Supplies										
1b • There is a surplus of recycled water potentially available to the Chino Basin Parties that is not being put to beneficial use. • Existing infrastructure limits the expansion or reuse and recharge of recycled water in the Chino Basin. • Existing requirements to discharge recycled water to the Santa Ana River limit the amount of IEUA recycled water available for reuse and recharge •The Department of Drinking Water and the Regional Board blending requirements for recycled water recharge could limit expanded recharge opportunities	D Maximize the reuse of recycled water produced by IEUA and others	• Results in a new, consistent volume of in-lieu and/or wet water recharge that will: • protect/enhance the Safe Yield, • reduce dependence on imported water, • improve water-supply reliability, especially during dry periods, and • increase pumping capacity in areas of low groundwater levels and areas of subsidence concern. • Identify additional sources of water to satisfy IEUA discharge requirements pursuant to the Santa Ana River Judgment.	✓	✓					✓	✓

Exhibit 5

OBMP Update Goals, Impediments to the Goals, Activities to Remove the Impediments, Expected Outcomes of Activities, and Nexus to Addressing the Issues Needs and Wants of the Stakeholders

Impediments	Activities to Remove Impediments	Potential Outcomes of Activities	Issues, Needs and Wants, as Categorized by Basin Management Issues, that are Addressed by Activities							
			Reductions in Chino Basin Safe Yield	Inability to Pump Groundwater with Existing Infrastructure	Increased Cost of Groundwater Use	Chino Basin Water Quality Degradation	Recycled Water Quality Degradation	Increased Cost of Basin Plan Compliance	Reduced Recycled Water Availability and Increased Cost	Reduced Imported Water Availability and Increased Cost
Goal 2 - Protect and Enhance Water Quality										
2a • Areas of the basin are contaminated with VOCs, nitrate, perchlorate and other contaminants of emerging concern (CECs). • Water-quality regulations are evolving and becoming more restrictive, which limits the beneficial uses of groundwater. • Groundwater treatment may be necessary to meet beneficial uses, but can be expensive to build and operate. • The basin is hydrologically closed, which causes accumulation and concentration of salts, nutrients, and other contaminants. • Some stored water in the Chino Basin cannot be used due to water quality and insufficient treatment capacity • Recharge sources may contribute CECs to the groundwater basin	E Develop and implement a water-quality management plan to address current and future water-quality issues and protect beneficial uses F Develop strategic regulatory-compliance solutions to comply with new and evolving drinking water standards that achieve multiple benefits in managing water quality	• Proactively addresses new and near-future drinking water regulations. • Enables the Parties to make informed decisions on infrastructure improvements for water-quality management and regulatory compliance. • Removes groundwater contaminants from the Chino Basin and thereby improves groundwater quality. • Enables the Parties to produce or leverage their water rights that may be constrained by water quality. • Ensures that groundwater is pumped and thereby protects/enhances the Safe Yield.	✓	✓	✓	✓				✓
2b • Water-quality regulations are evolving and generally becoming more stringent, which could limit the reuse and recharge of recycled water.	K Develop management strategy within the Salt and Nutrient Management Plan to ensure ability to comply with dilution requirements for recycled water recharge	• Enables the continued and expanded recharge of recycled water, which will: • protect water quality, • improve water-supply reliability, especially during dry periods, and • protect/enhance the Safe Yield.	✓			✓	✓	✓		✓

Exhibit 5

OBMP Update Goals, Impediments to the Goals, Activities to Remove the Impediments, Expected Outcomes of Activities, and Nexus to Addressing the Issues Needs and Wants of the Stakeholders

	Impediments		Activities to Remove Impediments	Potential Outcomes of Activities	Issues, Needs and Wants, as Categorized by Basin Management Issues, that are Addressed by Activities							
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Goal 3 - Enhance Management of the Basin												
3a	• Existing infrastructure (pumping and treatment capacity and conveyance) is insufficient to conduct puts and takes under proposed storage programs. • There is unused storage space in the Basin the use of which is constrained by the storage limits defined in existing CEQA documentation. • Watermaster's current storage management plan is not optimized to protect/enhance basin yield, improve water quality, avoid new land subsidence, ensure balance of recharge and discharge, maintain Hydraulic Control, etc. • Storage and recovery operations could be limited by contaminant plumes or other CECs in groundwater	B	Develop, implement, and optimize Storage and Recovery Programs to increase water-supply reliability, protect or enhance Safe Yield, and improve water quality.	• Storage programs that protect/enhance basin yield, improve water quality, avoid new land subsidence, ensure balance of recharge and discharge, maintain Hydraulic Control, etc. • New regional infrastructure to optimize put and take operations • Leverages unused storage space in the Basin. • Reduces reliance on imported water, especially during dry periods. • Potentially provides outside funding sources to implement the OBMP Update. • Improves water quality through the recharge of high quality water.	✓	✓	✓	✓				✓

Exhibit 5

OBMP Update Goals, Impediments to the Goals, Activities to Remove the Impediments, Expected Outcomes of Activities, and Nexus to Addressing the Issues Needs and Wants of the Stakeholders

Impediments	Activities to Remove Impediments	Potential Outcomes of Activities	Issues, Needs and Wants, as Categorized by Basin Management Issues, that are Addressed by Activities							
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Goal 3 - Enhance Management of the Basin										
3b • Land subsidence in northwest MZ1 may limit the ability for Parties to pump their respective rights in this area. • Poor water quality and increasingly restricting water quality regulations limits the ability for some Parties to pump their respective rights. • Low groundwater levels impact pumping capacity	C Identify and implement regional conveyance and treatment projects/programs to enable all stakeholders to exercise their pumping rights and minimize land subsidence. G Optimize the use of all sources of water supply by improving the ability to move water across the basin and amongst stakeholders, prioritizing the use of existing infrastructure.	• Enables producers in MZ1 and MZ2 to obtain water through regional conveyance, which supports management of groundwater levels to reduce the potential for subsidence and ground fissuring. • Enables the Parties to increase production in areas currently constrained by poor water quality. • Removes groundwater contaminants from the Chino Basin and thereby improves water quality. • Protects/enhances the Safe Yield. • Maximizes the use of existing infrastructure, which will minimize costs. • Provides infrastructure that can also be used to implement Storage and Recovery Programs.	✓	✓	✓	✓				✓
3c • Watermaster needs information to comply with regulations and its obligations under its agreements and Court orders, yet financial resources to collect this information are limited.	L Perform the appropriate amount of monitoring and reporting required to fulfill basin management and regulatory compliance	• Ensures full compliance with regulatory requirements. • Ensures full support of basin management initiatives. • Enables Parties to monitor the performance of the OBMP Update. • Continual review and revision of requirements and monitoring program to ensure cost efficiency	✓	✓	✓	✓	✓	✓	✓	✓

Exhibit 5

OBMP Update Goals, Impediments to the Goals, Activities to Remove the Impediments, Expected Outcomes of Activities, and Nexus to Addressing the Issues Needs and Wants of the Stakeholders

Impediments	Activities to Remove Impediments	Potential Outcomes of Activities	Issues, Needs and Wants, as Categorized by Basin Management Issues, that are Addressed by Activities							
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Goal 4 - Equitably Finance the OBMP										
4a • The distribution of benefits associated with the OBMP Update is not defined. • Funding needed for the OBMP implementation activities of the Watermaster is not projected beyond the current year budget, which limits Parties ability to plan required funding for the future. • There is currently no formal process to evaluate and adapt the OBMP implementation plan, schedule and cost.	H Develop an equitable distribution of costs/benefits of the OBMP Update and include in the OBMP update agreements	• Provides transparency as to the benefits of the OBMP Update activities • Identifies Watermaster roles and costs to the Parties • Formal process to revisit implementation plan and adjust priorities and schedule as necessary to address changed conditions • Periodic updates of cost projections for OBMP implementation needed to plan financial resources. • Improves readiness to apply for grants as they become available • Improves the likelihood that the OBMP will be implemented.			✓			✓	✓	✓
4b • Limited financial resources constraint the implementation of the OBMP. • Future reliability of grant funding is uncertain	I Develop regional partnerships to implement the OBMP Update and reduce costs and include in OBMP Update agreement	• Lowers the cost of OBMP implementation. • Improves the likelihood that the OBMP will be implemented.			✓			✓	✓	✓
	J Continue to identify and pursue low-interest loans and grants or other external funding sources to support the implementation of the OBMP Update				✓			✓	✓	✓

Exhibit 6

2020 OBMP Update - Activity A:

Construct new facilities and improve existing facilities to increase the capacity to store and recharge storm and supplemental waters, particularly in areas of the basin that will promote the long-term balance of recharge and discharge

Need and Objectives: The objectives of Activity A are (1) to maximize stormwater capture pursuant to Watermaster's diversion permits, (2) to promote the long-term balance of recharge and discharge, (3) to ensure sufficient supplemental water recharge capacity for future replenishment, (4) to reduce dependence on imported water by maintaining or enhancing Safe Yield, (5) to improve water quality, and (6) to ensure a supply of dilution water to comply with recycled water recharge permit requirements. Based on the alignment of the objectives of Activity A with those of the RMPU, Activity A can be accomplished through the existing RMPU process.

Phase	Task	Outcomes	Watermaster Role	Are these outcomes necessary for Watermaster to Administer the Physical Solution or Comply with Other Requirements ?
S	1 – Define objectives and refine scope of work	Consensus on objectives of 2023 RMPU	Convene the Recharge Investigations and Projects Committee	The process to perform these steps is required to the extent that additional recharge capacity is needed to meet replenishment obligations. If, in scoping the committee does not establish the additional need to evaluate projects beyond replenishment capacity, those projects are not required to be evaluated.
PN	2 – Develop planning, screening, and evaluation criteria	New criteria for selecting projects	Technical support role	
PAE	3 – Describe recharge enhancement opportunities 4 – Develop reconnaissance-level engineering design and operating plan	Conceptual design, operating plans, and costs of recharge alternatives Project implementation and financing plan	Technical support role	
I	5 – Plan, design, and construct selected recharge projects	New recharge projects	Technical support role	Yes, to the extent that additional recharge capacity is needed for replenishment.

**Phase Descriptions: S = Scoping PN = Evaluate need for project PAE = Project alternative evaluation I = Implementation*

Activity Implementation Schedule and Go/No-Go Decision Points

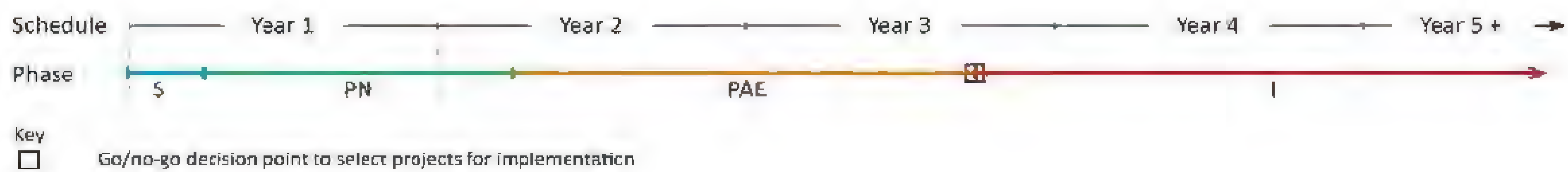

Exhibit 7

2020 OBMP Update - Activity B

Develop, implement, and optimize Storage and Recovery Programs to increase water-supply reliability, protect or enhance Safe Yield, and improve water quality

Need and Objectives: The parties desire to develop and implement "optimized" Storage and Recovery Programs that avoid potential MPI and provide broad benefits, such as increased water-supply reliability, protected or enhanced Safe Yield, improvements to water quality, and reduced cost for OBMP implementation. The objectives of Activity B are to prepare a *Storage and Recovery Master Plan* in a collaborative setting that clearly articulates the specific objectives of the parties and the required benefits to be realized from storage and recovery programs. The master plan will assist the parties and their storing partners to select and implement Storage and Recovery Programs that achieve the their objectives and the desired benefits.

Phase*	Task	Outcomes	Watermaster Role	Are these outcomes necessary for Watermaster to Administer the Physical Solution or Comply with Other Requirements ?
S	1 – Convene the Storage and Recovery Program Committee, define objectives, and refine scope of work	Consensus on objectives and desired benefits of Storage and Recovery Programs	Convene committee	Section 5.2.c.iv.(b) of the Peace Agreement states that "Watermaster shall prioritize its efforts to regulate and condition the storage and recovery of water developed in a Storage and Recovery Program for the mutual benefit of the Parties to the Judgment and give first priority to Storage and Recovery Programs that provide broad mutual benefits." Watermaster must document the basis by which it will review, condition, and approve applications in a manner that is predictable, uniform, and consistent with the Peace Agreement and the 2020 SMP. A master plan is the most efficient process to do this.
PN	2 – Develop conceptual alternatives for Storage and Recovery Programs at various scales	Conceptual descriptions of various types of Storage and Recovery Programs that achieve the objectives defined in Task 1	Assist in the development and documentation of conceptual alternatives	
PAE	3 – Describe and evaluate reconnaissance-level facility plans and costs for Storage and Recovery Program alternatives	Conceptual design, operating plans, and costs for various Storage and Recovery Program alternatives	Assist in development of alternatives Groundwater modeling to estimate basin response	
I	4 – Prepare *Storage and Recovery Program Master Plan*	*Storage and Recovery Program Master Plan* that will support Storage and Recovery Program selection, solicitation of storing partners, applications for funding, and Watermaster approvals	Prepare draft and final master plan	

**Phase Descriptions: S = Scoping PN = Evaluate need for project PAE = Project alternative evaluation I = Implementation*

Activity Implementation Schedule and Go/No-Go Decision Points

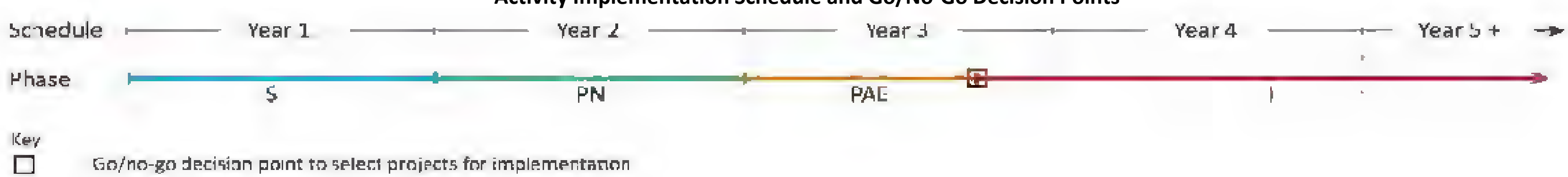

Exhibit 8
2020 OBMP Update - Activity CG:

Identify and implement regional conveyance and treatment projects/programs to enable all stakeholders to exercise their pumping rights and minimize land subsidence AND Optimize the use of all sources of water supply by improving the ability to move water across the basin and amongst stakeholders, prioritizing the use of existing infrastructure

Need and Objectives: The parties have identified that there are basin management challenges, such as land subsidence and poor water quality, that could limit their ability to exercise their pumping rights using existing infrastructure. Additionally, there are numerous challenges to the reliability of the non-Chino Basin groundwater water supplies available to the Chino Basin parties and the infrastructure that deliver them. The objectives of Activity CG is to optimize the use of all sources of water available to the parties to meet their demands despite these challenges and potentially help mitigate them.

Phase	Task	Outcomes	Watermaster Role	Are these outcomes necessary for Watermaster to Administer the Physical Solution or Comply with Other Requirements ?
S	1 - Form the Water Supply Reliability Committee, define objectives, and refine scope	Mutual understanding of the universe of water reliability concerns of parties	Work with IEUA or other activity lead	Although these actions optimize the management of all available water supplies to achieve water supply reliability, they are not required outcomes.
PN	2 - Characterize water demands, water supply plans, and existing/planned infrastructure and its limitations	Identify opportunities and limitations in the existing/planned infrastructure to meet reliability goals defined in Task 1	Work with IEUA or other activity lead	
PAE	3 – Develop planning, screening, and evaluation criteria 4 – Identify and describe water supply reliability opportunities 5 – Develop reconnaissance-level engineering design and operating plan	Conceptual design, operating plans, and costs of reliability alternatives Project implementation and financing plan	Work with IEUA or other activity lead	
I	6 – Plan, design, and build water reliability projects	New water reliability projects	None	

**Phase Descriptions: S = Scoping PN = Evaluate need for project PAE = Project alternative evaluation I = Implementation*

Activity Implementation Schedule and Go/No-Go Decision Points

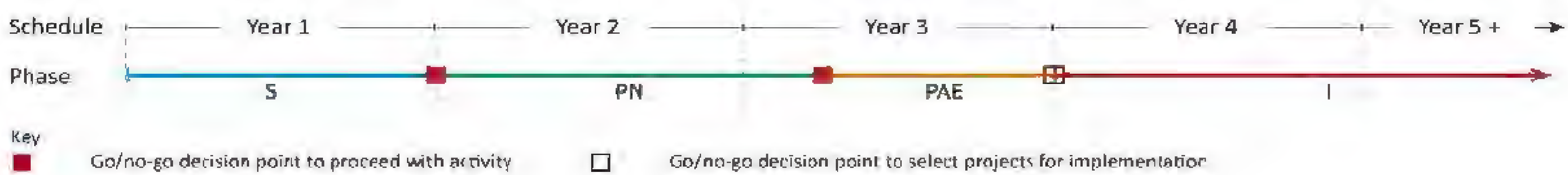

Exhibit 9

2020 OBMP Update - Activity D:

Maximize the reuse of recycled water produced by IEUA and others

Need and Objectives: The objective is to maximize the reuse of recycled water produced by the IEUA and other publicly owned treatment works (POTWs) in proximity to the Chino Basin to meet future demands and improve local water-supply reliability, especially during dry periods. Expanded reuse activities could include direct non-potable reuse (landscape irrigation or industrial uses), groundwater recharge (indirect potable reuse), and direct potable reuse. Increasing recycled water reuse is an integral part of the OBMP's goal to enhance water supplies. The direct use of recycled water increases the availability of native and imported waters for higher-priority beneficial uses.

Phase	Task	Outcomes	Watermaster Role	Are these outcomes necessary for Watermaster to Administer the Physical Solution or Comply with Other Requirements ?
S	1 – Convene Recycled Water Projects Committee, define objectives and refine scope of work	Consensus on the objectives for optimizing and maximizing recycled water reuse	Work with IEUA or other activity lead	Although these actions optimize the management of all available recycled water supplies to achieve water supply reliability, they are not required outcomes.
PN	2 – Characterize the availability of all recycled water supplies and demands	Understanding of demand and opportunities for increased recycled water reuse	Work with IEUA or other activity lead	
PAE	3 – Develop planning, screening, and evaluation criteria 4 – Identify and describe potential projects for evaluation 5 – Conduct a reconnaissance-level study for the proposed projects	Conceptual design, operating plans, and costs of reuse projects Characterization of SNMP impacts of reuse projects Project implementation and financing plan	Work with IEUA or other activity lead	
I	6 – Plan, design, and construct selected projects	New recycled water reuse projects	None	

**Phase Descriptions: S = Scoping PN = Evaluate need for project PAE = Project alternative evaluation I = Implementation*

Activity Implementation Schedule and Go/No-Go Decision Points

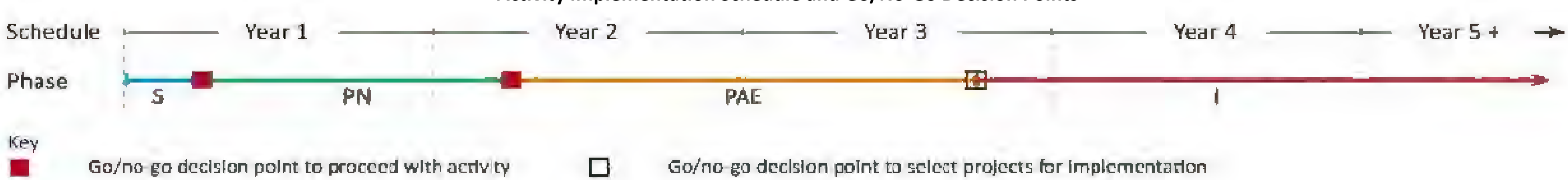

Exhibit 10

2020 OBMP Update - Activity EF

Develop and implement a water-quality management plan to address current and future water-quality issues and protect beneficial uses AND Develop strategic regulatory-compliance solutions that achieve multiple benefits in managing water quality

Need and Objectives: Groundwater contaminants are present across the Chino Basin, new contaminants are being discovered, and water-quality regulations are evolving and becoming more restrictive. These trends are limiting the beneficial use of groundwater and increasing the cost of the water supply. The objectives of Activity EF are to characterize the water-quality challenges across the Chino Basin and identify the most efficient means to address the water-quality challenges, including the potential for multi-benefit collaborative projects, to ensure that groundwater can be put to beneficial use.

Phase*	Task	Outcomes	Watermaster Role	Are these outcomes necessary for Watermaster to Administer the Physical Solution or Comply with Other Requirements ?
S	1 - Convene the Water Quality Committee, define objectives, and refine scope of work	Mutual understanding of the universe of water quality concerns of parties	Convene committee	Paragraph 41 of the Judgement provides for both water quantity and quality considerations to maximize the beneficial utilization of the Basin. If water quality is not effectively managed, the Parties may not be able to utilize their water rights, which could result in negative impacts to the basin. Effective management of water quality can only be accomplished through a systematic assessment of the emerging contaminant threats to the use of groundwater resource and a development of a plan to respond to those threats.
PN	2 - Develop and implement an initial emerging-contaminants monitoring plan	Data	Prepare monitoring plan; collect and compile data	
PN	3 – Perform a water quality assessment and prepare a scope to develop and implement a *Groundwater Quality Management Plan*	Understanding of scale of problem; scope/cost to evaluate project alternatives; long-term monitoring plan	Perform characterization	
PAE	4 – Develop planning, screening, and evaluation criteria 5 – Identify and describe potential projects for evaluation 6 – Conduct a reconnaissance-level study for the proposed projects 7 – Prepare the *Groundwater Quality Management Plan*	Conceptual design and operating plans for project alternatives Understanding of cost to manage Chino Basin groundwater quality with and without collaborative projects Management plan to document project implementation plan and supporting info	Technical support role to evaluate project alternatives and characterize potential for MPI (if necessary) Technical support role to prepare the *Groundwater Quality Management Plan*	
I	8 – Plan, design, and build water quality management projects	New groundwater quality improvement projects	None	No

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Activity Implementation Schedule and Go/No-Go Decision Points

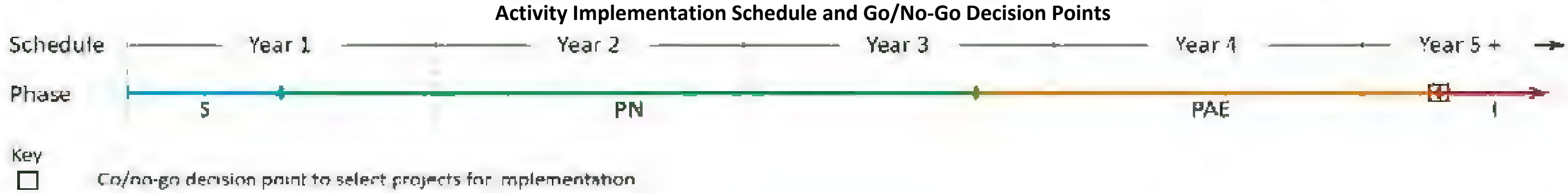

Exhibit 11
2020 OBMP Update - Activity K:

Develop a management strategy within the salt and nutrient management plan to ensure the ability to comply with the dilution requirements for recycled water recharge

Need and Objectives: The Watermaster and IEUA implement a recycled water recharge program to improve supply reliability. The Maximum Benefit SNMP requires that the recharge be diluted with other sources of low-salinity water to comply with Basin Plan Objectives. If sufficient dilution supplies are not available to comply with the dilution metric, treatment of recycled water, or other salt offset program will be required by the Regional Board. The objective of this activity is to determine if compliance with the Maximum Benefit SNMP recycled water recharge dilution requirements can be achieved under existing management plans, and if not, to develop a plan to achieve compliance.

Phase	Task	Outcomes	Watermaster Role	Are these outcomes necessary for Watermaster to Administer the Physical Solution or Comply with Other Requirements ?
S/PN	1 – Prepare projection to evaluate compliance with recycled water dilution requirements 5 – Periodically reevaluate compliance with dilution requirements	Understanding of ability to comply with the TDS and nitrate dilution requirements in the SNMP (near-term and long-term)	Perform technical work in collaboration with IEUA	Yes. Watermaster and IEUA have already begun this project and are required to complete it by the Regional Board to obtain a revised recycled water compliance program related to total dissolved solids concentrations. If approved, the Regional Board will require the study to be updated every five years to re-evaluate the need for revised compliance strategies.
PAE	2 – Identify alternative compliance strategies 3 – Evaluate alternative compliance strategies	Conceptual design, operating plans, and costs of project alternatives Report to document compliance plan and supporting info	Technical support role to IEUA to evaluate hydrogeologic impacts of project alternatives	
I	4 – Implement the selected compliance strategy	Compliance project (or other compliance action)	Level of support depends on the compliance action	

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Activity Implementation Schedule and Go/No-Go Decision Points

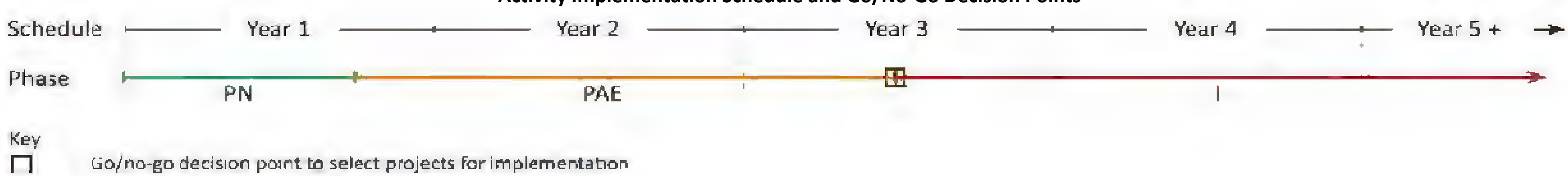


Exhibit 12

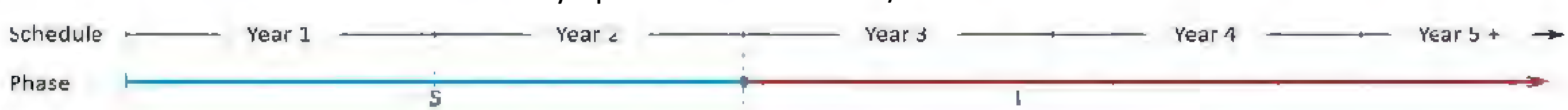
2020 OBMP Update - Activity L

Perform the appropriate amount of monitoring and reporting required to fulfill basin management and regulatory compliance

Need and Objectives: Watermaster conducts data-collection programs and prepares reports and data deliverables to comply with regulations, to fulfill its obligations under its agreements and Court orders, to comply with its requirements under CEQA, and to assess the performance of the evolving OBMP IP, including the 2020 OBMP Update. These monitoring and reporting efforts are described in the Scoping Report, and will need to continue. The objective of Activity L is to refine the monitoring and reporting requirements of Watermaster to ensure that the objectives of each requirement are being met efficiently at a minimum cost.

Phase*	Task	Outcomes	Watermaster Role	Are these outcomes necessary for Watermaster to Administer the Physical Solution or Comply with Other Requirements?
S, PN	1 – Convene Monitoring and Reporting Committee and prepare the *Monitoring and Reporting Work Plan*	Understanding of all monitoring/reporting programs *Monitoring and Reporting Work Plan* *Recommended Revisions to Watermaster's Non-Discretionary Monitoring and Reporting Programs*	Convene committee Prepare work plan	No, however, monitoring and reporting are required to implement the Judgment and comply with regulations and Watermaster obligations. Since the beginning of OBMP implementation, Watermaster staff and engineer have continually refined the monitoring and reporting efforts to meet all requirements and achieve efficiencies and will continue to do so. This activity continues these refinement efforts in closer collaboration with the parties.
I	2 – Implement recommendations in *Monitoring and Reporting Work Plan*	Revisions to Watermaster's non-discretionary monitoring and reporting programs Future updates to the *Monitoring and Reporting Work Plan*	Perform technical demonstrations to gain approval for revisions to the monitoring/reporting program Update work plan, when necessary	
PN, I	3 – (recurring future task) – Bi-Annual review of scope of work and cost to implement the *Monitoring and Reporting Work Plan* in the subsequent fiscal year	Update to *Monitoring and Reporting Work Plan* A scope of work and budget for the subsequent fiscal year	Update the work plan Prepare scope and budget recommendation for subsequent year	

Activity Implementation Schedule and Go/No-Go Decision Points



**Phase Descriptions: S = Scoping PN = Evaluate need for project PAE = Project alternative evaluation I = Implementation*

Exhibit 13
Nexus of the 2020 OBMP Update Activities to the 2000 OBMP Program Elements

2000 OBMP Program Elements (PEs)	**2020 OBMP Update Activities**						
	A - Increase Recharge	**B** - Optimize Storage and Recovery	**CG** - Regional Conveyance	**D** - Maximize RW Reuse	**EF** - Water Quality Mgmt.	**K** - Plan for SNMP Dilution Compliance	**L** - Monitoring
1 - Monitoring							⚓
2 - Recharge Program	⚓	●					●
3 - Impaired Areas		●			●	●	●
4 - Subsidence Mgmt.	●	●	●				●
5 - Supplemental Water		●	⚓	⚓	●		●
6 - Water Quality	●	●	●	●	⚓	●	●
7 - SNMP				●		⚓	●
8 – Storage Mgmt. Plan		●					●
9 – S&R Programs	●	⚓	●				●

⚓ Direct relationship between an activity and a PE (i.e. the activity and the PE have similar or identical objectives and thus the activity can be integrated into the existing PE)

● Indirect relationship between an activity and a PE (i.e. the activity has the potential to provide benefits to PEs)

Exhibit 14
Status of Compliance with the Chino Basin Maximum-Benefit Commitments

Description of Commitment	Compliance Date – as soon as possible, but no later than	Status of Compliance
1. Surface Water Monitoring Program[1] a. Submit draft Monitoring Program to Regional Board b. Implement Monitoring Program c. Submit Draft Revised Monitoring Program to Regional Board d. Implement Revised Monitoring Program e. Submit Draft Revised Monitoring Program(s) (subsequent to that required in "c", above) to Regional Board f. Implement Revised Monitoring Program(s) g. Annual data report submittal	a. January 23, 2005 b. Within 30 days from the date of Regional Board approval of the monitoring plan c. 15 days from 2012 Basin Plan Amendment (BPA) approval d. Upon Regional Board approval e. Upon notification of the need to do so from the Regional Board Executive Officer and in accordance with the schedule prescribed by the Executive Officer f. Upon Regional Board approval g. April 15th	a. Draft work plan submitted to the Regional Board on January 23, 2005 b. Monitoring plan initiated prior to Regional Board approval c. Draft work plan submitted to the Regional Board on February 16, 2012, six days after 2012 BPA approval d. Revised monitoring program began in December 2012 after the BPA was approved by the Office of Administrative Law on December 6, 2012 e. No revisions requested by the Regional Board f. n/a g. All annual reports submitted by April 15 of each year since 2006
2. Groundwater Monitoring Program[1] a. Submit Draft Monitoring Program to Regional Board b. Implement Monitoring Program c. Plan and schedule for demonstrating Hydraulic Control	a. January 23, 2005 b. Within 30 days from the date of Regional Board approval of the monitoring plan c. By December 31, 2013	a. Draft monitoring plan submitted to Regional Board on January 23, 2005 b. Monitoring program initiated prior to Regional Board approval c. Plan and schedule for demonstrating Hydraulic Control submitted in the 2014 Work Plan to the Regional Board on December 23, 2013

[1] The commitments related to surface water and groundwater monitoring were revised by a Basin Plan amendment approved by the Regional Board on February 10, 2012. The commitments and status of compliance shown in this table reflect the amended commitments for surface water and groundwater monitoring.

Exhibit 14
Status of Compliance with the Chino Basin Maximum-Benefit Commitments

Description of Commitment	Compliance Date – as soon as possible, but no later than	Status of Compliance
d. Implement Hydraulic Control demonstration e. Submit Draft Revised Monitoring Program(s) (subsequent to that required in “a”, above) to Regional Board f. Implement revised monitoring plans (s) g. Annual data report submittal	d. Upon Regional Board approval e. Upon notification of the need to do so from the Regional Board Executive Officer and in accordance with the schedule prescribed by the Executive Officer f. Upon Regional Board approval g. April 15th	d. Hydraulic Control demonstration reported in all annual reports e. No revisions requested by Regional Board f. n/a g. All annual reports submitted by April 15 of each year
3. Chino Desalters a. Chino-I Desalter expansion to 10 mgd b. Chino-II Desalter construction to 10 mgd capacity	a. Prior to the recharge of recycled water b. Recharge of recycled water allowed once award of contract and notice to proceed issued for construction of desalter treatment plant	a. Chino-I Desalter expansion to about 14 mgd was completed in April 2005 and operation began in October 2005; recycled water recharge began in July 2005. b. Contract for Chino-II Desalter awarded in early 2005; construction was completed to a capacity of 15 mgd, and the facility went online in June 2006.
4. Submittal of future desalters plan and schedule	October 1, 2005 Implement plan and schedule upon Regional Board approval	Several plans for desalter expansion have been submitted to the Regional Board since 2005. The capacity of the constructed desalter wells in 2015 was about 27 mgd (about 30,000 afy). Watermaster and the IEUA submitted a plan to the Regional Board on June 30, 2015 to construct three additional wells to achieve the ultimate capacity of 36 mgd (40,000 afy), per the Peace and Peace II Agreements. The first two wells are constructed and began operating in 2018. The construction of the the third well is anticipated to begin in late 2019.

Exhibit 14
Status of Compliance with the Chino Basin Maximum-Benefit Commitments

Description of Commitment	Compliance Date – as soon as possible, but no later than	Status of Compliance
5. Recharge facilities (17) built and in operation	June 30, 2005	Watermaster and the IEUA partnered with the San Bernardino County Flood Control District and the Chino Basin Water Conservation District for completion of the Chino Basin Facilities Improvement Program to construct and/or improve eighteen recharge sites. There are currently 17 basins in the Chino Basin Groundwater Recharge Program.
6. Submittal of IEUA wastewater quality improvement plan and schedule	60 days after agency-wide, 12-month running average effluent TDS quality equals or exceeds 545 mgl for 3 consecutive months, or after agency-wide, 12-month running average TIN equals or exceeds 8 mgl in any month Implement plan and schedule upon approval by Regional Board	These threshold events have not occurred; therefore, a wastewater quality improvement plan has not been submitted
7. Recycled water will be blended with other recharge sources such that the volume-weighted, 5-year running average TDS and nitrate-nitrogen concentrations of recharge are equal to or less than the maximum benefit water quality objectives. a. Submit a report that documents the location, amount of recharge, and TDS and nitrogen quality of storm water recharge before the OBMP recharge improvements were constructed and what is projected to occur after the recharge improvements are completed.	Compliance must be achieved by the end of the 5th year after initiation of recycled water recharge operations. a. Prior to initiation of recycled water recharge	a. No documentation of water quality data or quantity for storm water prior to OBMP initiation exists. Storm water has been monitored for flow, TDS, and nitrogen since 2005.

Exhibit 14
Status of Compliance with the Chino Basin Maximum-Benefit Commitments

Description of Commitment	Compliance Date – as soon as possible, but no later than	Status of Compliance
b. Submit documentation of the amount and TDS and nitrogen quality of all sources of recharge and recharge locations. For storm water recharge used for blending, submit documentation that the recharge is the result of OBMP enhanced recharge facilities.	b. Annually, by April 15th, after initiation of construction of basins/other facilities to support enhanced storm water recharge	b. The volume-weighted, 5-year running average TDS and nitrate-nitrogen concentrations of Chino Basin recharge are less than the maximum-benefit water quality objectives
8. Hydraulic Control Failure a. Plan and schedule to correct loss of Hydraulic Control b. Achievement and maintenance of Hydraulic Control c. Mitigation plan for temporary failure to achieve/maintain Hydraulic Control	a. 60 days from Regional Board finding that Hydraulic Control is not being maintained b. In accordance with plan and schedule approved by the Regional Board c. By January 23, 2005	a. No mitigation plan and schedule for the loss of Hydraulic Control has been requested. b. Hydraulic Control has been achieved to the east of Chino-I Desalter Well 20. Groundwater model estimates published in 2015 indicate that production at the CCWF will achieve Hydraulic Control in the west to *de minimis* levels (<1,000 afy of groundwater flow past the CCWF well field to the Prado Basin Management Zone). Full production at the CCWF was achieved in 2016. Watermaster and the IEUA submitted a plan on June 30, 2015 to the Regional Board to construct three additional wells to achieve the ultimate Desalter capacity of 40,000 afy. Construction of two wells is completed and they began operating in 2018. Construction of the third well is anticipated to begin in late 2019.

Exhibit 14
Status of Compliance with the Chino Basin Maximum-Benefit Commitments

Description of Commitment	Compliance Date – as soon as possible, but no later than	Status of Compliance
		c. Plan submitted to the Regional Board on March 3, 2005. No mitigation action has been triggered.
9. Ambient groundwater quality determination	July 1, 2005 and every three years thereafter	Watermaster and the IEUA have participated in the regional triennial ambient water quality determinations coordinated through Basin Monitoring Program Task Force, administered through the Santa Ana Watershed Project Authority. Watermaster and the IEUA provide their fair share of funds and substantial groundwater data for this effort.

Exhibit 15
Limitations, Compliance Metrics, and Compliance Actions for the Chino Basin Maximum-Benefit Commitments

Source Waters with Water Quality Limitations in the Chino Basin SNMP	Water Quality Limitation	Compliance Metric	Action Limit	Required Compliance Action when Compliance Metric Exceeds the Action Limit
IEUA Recycled Water (Commitment 6)	TDS: 550 mgl	The agency-wide, 12-month running-average concentration	When the compliance metric exceeds 545 mgl for three consecutive months	Submit to the Regional Board for approval a plan and schedule to comply with the water quality limitations within 60 days.
	TIN: 8 mgl		When the compliance metric exceeds 8 mgl in any month	
Combined water sources used for managed recharge: storm, imported and recycled waters (Commitment 7)	TDS: 420 mgl Nitrate: 5 mgl	The five-year, volume-weighted running-average concentration of all sources of managed recharge	TDS: 420 mgl Nitrate: 5 mgl	Prepare a salt offset plan to mitigate salt loading from recharge greater than 420 mgl. Offsets could include desalting of recycled water or groundwater, or increased recharge of low-TDS waters.
Groundwater (Commitment 9)	TDS: 420 mgl	The volume-weighted concentration of groundwater in the Chino North GMZ (computed every three years)	TDS: 420 mgl	Reduce the TDS concentration of IEUA recycled water to comply with the maximum-benefit TDS objective or prepare a salt offset plan to mitigate loading from the use of recycled water than 420 mgl.
	Nitrate: 5 mgl		n/a	This action limit was already exceeded when the objective was established. So long as all other maximum benefit commitments are met, no compliance action is required.

Exhibit 16

Ending Balances in Managed Storage in the Chino Basin[1]

(af)

Fiscal Year ending June 30	Appropriative Pool				Overlying Non-Agricultural Pool			Total Managed Storage by Parties	Dry Year Yield Program Storage	Total Managed Storage
	Carryover (1)	Excess Carryover (2)	Local Supplemental Storage (3)	Subtotal (4)	Carryover (5)	Excess Carryover (6)	Subtotal (7)	(8) = (7) + (4)	(9)	(10) = (9) + (8)
2000	28,911	170,342		199,253	6,541	31,031	37,572	236,825	0	236,825
2001	15,940	77,907	92,813	186,660	5,301	32,330	37,631	224,291	0	224,291
2002	13,521	70,103	87,801	171,425	5,285	33,727	39,012	210,437	0	210,437
2003	18,656	71,329	81,180	171,165	6,743	36,850	43,593	214,758	7,738	222,496
2004	21,204	70,503	80,963	172,670	7,177	40,881	48,058	220,728	26,300	247,028
2005	21,289	76,080	88,849	186,218	7,227	45,888	53,115	239,333	38,754	278,087
2006	32,062	56,062	86,170	174,294	7,227	49,178	56,405	230,699	58,653	289,352
2007	34,552	50,895	83,184	168,631	7,084	51,476	58,560	227,191	77,116	304,307
2008	41,626	83,962	81,520	207,108	6,819	45,248	52,067	259,175	74,877	334,052
2009	42,795	101,908	79,890	224,593	6,672	46,600	53,272	277,865	34,494	312,359
2010	41,263	120,897	90,133	252,293	6,934	47,732	54,666	306,959	8,543	315,502
2011	41,412	146,074	98,080	285,566	6,959	49,343	56,302	341,868	0	341,868
2012	42,614	209,981	116,138	368,733	6,914	13,993	20,907	389,640	0	389,640
2013	39,413	225,068	116,378	380,859	7,073	15,473	22,546	403,405	0	403,405
2014	41,708	224,496	123,484	389,688	6,478	12,812	19,290	408,978	0	408,978
2015	40,092	239,517	127,994	407,603	6,823	12,225	19,048	426,651	0	426,651
2016	39,733	248,013	131,522	419,267	7,195	9,949	17,144	436,411	0	436,411
2017	38,340	260,682	143,552	442,575	7,226	8,292	15,519	458,093	6,315	464,408
2018	34,582	254,221	155,018	443,821	7,198	10,775	17,973	461,795	41,380	503,174
2019	38,605	279,033	166,406	484,044	7,227	12,004	19,231	503,275	45,969	549,244

1 -- WEI. (2019). Draft Storage Management Plan.

Exhibit 17
Implementation Actions for the 2020 Optimum Basin Management Program Update by Program Element

Implementation Actions for the Next 20 Years by Program Element	Action Added in 2000* or 2020?	Schedule (Yr 1-3, 4-20, or 1-20)	Is the Action Required by Watermaster to Administer the Physical Solution or Comply with Other Regulatory or Court Requirements?	
			Yes/No	Basis
Program Element 1 - Develop and Implement Comprehensive Monitoring Program				
Watermaster will continue to conduct the required monitoring and reporting programs, including collection of: groundwater production, groundwater level, groundwater quality, ground level, surface water, climate, water supply planning, biological, and well construction/destruction monitoring data.	2000*	Years 1-20	Yes	This action included in the 2000 OBMP IP is required by the July 2000 Court Order to implement the Peace Agreement. The monitoring requirements have evolved over time. The requirements are described in Table 2 of the OBMP Update Report, which lists each Watermaster monitoring and reporting program and the associated entity (e.g. Court, Regional Board, etc.) requiring each program.
Perform review and update of Watermaster's regulatory and Court-ordered monitoring and reporting programs and document in a work plan: *OBMP Monitoring and Reporting Work Plan.*	2020	Years 1-3	No	These actions will allow the Parties to offer more direct input in the implementation of the required monitoring programs, but it is not necessary for Watermaster to convene this process to comply with the monitoring requirements. Watermaster annually reviews ongoing monitoring to achieve efficiency.
Perform periodic review and update of the *OBMP Monitoring and Reporting Work Plan* (or other guidance documents developed by Watermaster) and modify the monitoring and reporting programs, as appropriate.	2020	Years 4-20	No	
Program Element 2 - Develop and Implement Comprehensive Recharge Program				
Continue to convene the Recharge Investigations and Projects Committee.	2000	Years 1-20	Yes	These actions included in the 2000 OBMP IP are required by the July 2000 Court Order to implement the Peace Agreement. The Peace II Agreement and the Special Referee's December 2007 Report further establish the requirement and need for the recharge program. In its December 2007 Order, the Court ordered the implementation of the Peace II Agreement.
Complete the 2023 Recharge Master Plan Update (RMPU).	2000*	Years 1-3	Yes	
Implement recharge projects based on need and available resources.	2000	Years 1-20	Yes	
Update the RMPU no less than every five years (2028, 2033, 2038).	2000	Years 4-20	Yes	
Program Element 3 - Develop and Implement a Water Supply Plan for Impaired Areas				
n/a				As described in Section 3.2.3.2 of the 2020 OBMP Update report, there are no separate implementation actions for PE3 in the 2020 OBMP. The ongoing operation of the Chino Basin Desalters, which were the subject of the implementation actions of PE 3 in the 2000 OBMP is now part of PE 7 to Develop and Implement a Salt Management Program.
Program Element 4 - Develop and Implement Comprehensive Groundwater Management Plan for Management Zone 1				
Implement Watermaster's Subsidence Management Plan, and adapt it as necessary.	2000*	Years 1-20	Yes	These actions included in the 2000 OBMP are required by the July 2000 Court Order to implement the Peace Agreement. The Peace II Agreement established further requirements for the continued recharge in MZ-1 through the term of the Peace Agreement.
Watermaster will arrange for the physical recharge of at least 6,500 any of Supplemental Water in MZ-1 as an annual average. Watermaster may re-evaluate the minimum annual quantity of Supplemental Water recharge in MZ-1 and may increase this quantity through the term of the Peace Agreement.	2000*	Years 1-20	Yes	

Exhibit 17
Implementation Actions for the 2020 Optimum Basin Management Program Update by Program Element

Implementation Actions for the Next 20 Years by Program Element	Action Added in 2000* or 2020?	Schedule (Yr 1-3, 4-20, or 1-20)	Is the Action Required by Watermaster to Administer the Physical Solution or Comply with Other Regulatory or Court Requirements?	
			Yes/No	Basis
Program Element 5 - Develop and Implement Regional Supplemental Water Program				
The IEUA will maximize the reuse of its recycled water in the Chino Basin.	2000*	Years 1-20	Yes	Pursuant to the Basin Plan, IEUA and Watermaster are required to maximize recycled water reuse in the Chino-North GMZ consistent with the Maximum Benefit SNMP.
The IEUA, the TVMWD, the WMWD, and/or other Party acting as a coordinating agency will establish or expand future recycled water planning efforts to maximize the reuse of all available sources of recycled water.	2020	Years 1-20	No	Although these actions optimize the management of all available recycled water supplies to achieve water supply reliability, they are not required by Watermaster to administer the Physical Solution or other regulatory requirements. These implementation actions are included as part of the 2020 OBMP Update to complement regional planning efforts, not to duplicate them.
Watermaster will support the IEUA, the TVMWD, the WMWD, and/or others in their efforts to maximize recycled water reuse to ensure these efforts are integrated with Watermaster's groundwater and salinity management efforts.	2020	Years 1-20	No	
The IEUA, the TVMWD, the WMWD, and/or other Party acting as a coordinating agency will establish or expand future integrated water resources planning efforts to address water supply reliability for all Watermaster Parties.	2020	Years 1-20	No	Although these actions optimize the management of all available water supplies to achieve water supply reliability, they are not required by Watermaster to administer the Physical Solution or other regulatory requirements. These implementation actions are included as part of the 2020 OBMP Update to complement regional planning efforts, not to duplicate them.
Watermaster will support the IEUA, the TVMWD, the WMWD, and/or others in their efforts to improve water supply reliability to ensure those efforts are integrated with Watermaster's groundwater management efforts.	2020	Years 1-20	No	
Program Element 6 - Develop and Implement Cooperative Programs with the Regional Board and Other Agencies to Improve Basin Management				
Re-convene the water quality committee and meet periodically to update groundwater quality management priorities.	2000*	Years 1-3	Yes	Paragraph 41 of the Judgment states: "Watermaster Control. Watermaster, with the advice of the Advisory and Pool Committees, is granted discretionary powers in order to develop an optimum basin management program for Chino Basin, including both water quantity and quality considerations. Withdrawals and supplemental water replenishment of Basin Water, and the full utilization of the water resources of Chino Basin, must be subject to procedures established by and administered through Watermaster with the advice and assistance of the Advisory and Pool Committees composed of the affected producers. Both the quantity and quality of said water resources may thereby be preserved and the beneficial utilization of the Basin maximized." (Pgs. 19-20 of the Restated Judgment) If water quality is not considered and effectively managed, the Parties may not be able to utilize their water rights, which could result in negative impacts to the basin, such as reductions in net recharge, loss of hydraulic control, and movement of contaminant plumes. Effective management of water quality in the Basin to preserve maximum beneficial use can only be accomplished through a systematic assessment of the emerging contaminant threats to the use of groundwater resources, and thoughtfully preparing a plan to respond to those threats.
Develop and implement an initial emerging contaminants monitoring plan.	2020	Years 1-3	Yes	
Prepare a water quality assessment of the Chino Basin to evaluate the need for a *Groundwater Quality Management Plan* and prepare a long-term emerging contaminants monitoring plan.	2020	Years 1-3	Yes	
Develop and implement a *Groundwater Quality Management Plan* and periodically update it.	2020	Years 4-20	Yes	
Implement long-term emerging contaminants monitoring plan.	2020	Years 4-20	Yes	
Continue to conduct investigations to assist the parties and/or the Regional Board in accomplishing mutually beneficial objectives as needed.	2000	Years 1-20	Yes	This action included in the 2000 OBMP is required by the July 2000 Court Order to implement the Peace Agreement. Recommendations for investigations will be made to Watermaster by the Water Quality Committee.
Continue to support the Parties in identifying funding from outside sources to finance cleanup efforts.	2000	Years 1-20	Yes	This action included in the 2000 OBMP is required by the July 2000 Court Order to implement the Peace Agreement. Requests for support will be made to Watermaster by the Water Quality Committee.
Implement projects of mutual interest.	2000	Years 1-20	No	The implementation of projects is not required by the 2000 OBMP IP, however Watermaster is required to support the Parties, as requested by the Committee, and as appropriate.

Exhibit 17

Implementation Actions for the 2020 Optimum Basin Management Program Update by Program Element

Implementation Actions for the Next 20 Years by Program Element	Action Added in 2000* or 2020?	Schedule (Yr 1-3, 4-20, or 1-20)	Is the Action Required by Watermaster to Administer the Physical Solution or Comply with Other Regulatory or Court Requirements? Yes/No	Basis
Program Element 7 - Develop and Implement Salt Management Plan				
Continue to implement the maximum benefit salt and nutrient management plan pursuant to the Basin Plan.	2000*	Years 1-20	Yes	Watermaster and IEUA must perform these actions pursuant to the maximum benefit SNMP in the Basin Plan.
Complete the 2020 update of TDS and nitrate projections to evaluate compliance with maximum benefit salt and nutrient management plan, and, if necessary, based on the outcome, prepare a plan and schedule to implement a salt offset compliance strategy.	2020	Years 1-3	Yes	Watermaster and IEUA have already begun this project and are required to complete it by the Regional Board to obtain a revised recycled water compliance program related to total dissolved solids concentrations.
Starting in 2025 and every five years thereafter, update water quality projections to evaluate compliance with the maximum benefit salt and nutrient management plan.	2020	Years 4-20	Yes	Watermaster and IEUA will be required to perform these actions pursuant to an anticipated amendment to the maximum benefit SNMP in the Basin Plan.
Program Element 8/9 - Develop and Implement Groundwater Storage Program *and* Develop and Implement Storage and Recovery Programs				
Complete and submit to the Court the 2020 Safe Yield Recalculation.	2000*	Years 1-3	Yes	The 2000 OBMP IP identified the ten-year recalculation requirement, which is binding on Watermaster through the 2000 Court Order. Additionally, section 4.2 of the April 2017 Court Order that followed the 2015 Safe Yield Reset further establishes the date by which the next 10-year updates must occur (2020) and affirms the 10-year update frequency.
Complete and submit to the Court the 2020 Storage Management Plan (SMP).	2020	Years 1-3	Yes	Paragraph 41 of the Judgment requires "...procedures to be established and administered through Watermaster with the advice and assistance of the Advisory and Pool Committees for the withdrawals and supplemental water replenishment of Basin water..." The SMP in the 2000 OBMP is insufficient to meet the needs of the Parties as storage already exceeds the limits in the established procedures. A new SMP is required to issue storage agreements as of July 1, 2020. And, the CEQA coverage for the existing SMP expires in July 2021.
Develop a *Storage and Recovery Master Plan* to support the design of optimized storage and recovery programs that are consistent with the 2020 Storage Management Plan and provide the Watermaster with criteria to review, condition, and approve applications in a manner that is consistent with the Judgment and the Peace Agreement.	2020	Years 1-3	Yes	Section 5.2.c.iv.(b) of the Peace Agreement states that "Watermaster shall prioritize its efforts to regulate and condition the storage and recovery of water developed in a Storage and Recovery Program for the mutual benefit of the Parties to the Judgment and give first priority to Storage and Recovery Programs that provide broad mutual benefits." Watermaster must document the basis by which it will review, condition, and approve applications in a manner that is predictable, uniform, and consistent with the Peace Agreement and the 2020 SMP. A master plan is the most efficient process to do this.
Assess losses from storage accounts based on the findings of the 2020 Safe Yield Recalculation.	2000*	Years 1-3	Yes	Section 5.2.b.xii of the Peace Agreement requires that Watermaster shall set the annual rate of loss from Local Storage for parties to the Judgment at zero through 2005. Thereafter, the rate of loss from Local Storage for parties to the Judgment will be 2% until recalculated based upon the based available scientific information. Losses will be deducted annually from each party to the Judgment's storage account. The loss rate is assessed as part of the Safe Yield recalculation.
Update the Storage Management Plan in 2025 and every five years thereafter, and when: the Safe Yield is recalculated, Watermaster determines a review and update is warranted based new information and/or the needs of the parties or the basin, and at least five years before the aggregate amount of managed storage by the parties is projected to fall below 340,000 af.	2020	Years 4-20	Yes	The 2020 SMP is based on present planning projections and technical understanding of the basin. This information can change over time and the limits established in the 2020 SMP must be revisited from time to time to ensure it meets the needs of the Parties. These triggers for updating the SMP are defined in the 2020 SMP.
Perform Safe Yield recalculation every 10 years.	2000	Years 4-20	Yes	See above basis for the 2020 Safe Yield recalculation.
Update the storage loss rate following each recalculation of Safe Yield and during periodic updates of the SMP.	2020	Years 4-20	Yes	See above basis for assessing losses based on the 2020 Safe Yield recalculation. The loss rate may also be evaluated in future SMP updates.

For the 2000 OBMP implementation actions annotated with a "", the description of the action has been modernized to reflect current terminology, reports, and requirements established after the 2000 OBMP was finalized.

Appendix A

White Paper – 2020 Update to the Chino Basin Optimum Basin Management Program

White Paper – 2020 Update to the Chino Basin Optimum Basin Management Program

Introduction

This white paper describes the Optimum Basin Management Program (OBMP) that was developed in 2000 and updated in 2007, the efficacy of the OBMP, and the need to update it. This paper is organized as follows:

- Existing OBMP – this section describes the history and accomplishments of the OBMP that was developed in 2000 and updated in 2007.
- Need to Update the OBMP – this section summarizes the need to update the OBMP.
- Benefits from Updating the OBMP – this section summarizes the benefits from updating the OBMP.
- Process to Update the OBMP – this section summarizes the process to update the OBMP.

Existing OBMP

The Chino Basin Judgment gave Watermaster the authority to develop an OBMP for the Chino Basin, including both water quantity and quality considerations. Watermaster, with direction from the Court, began the development of the OBMP in 1998 and completed it in July 2000. The OBMP was developed in a collaborative public process that identified the needs and wants of all stakeholders, described the physical state of the groundwater basin, developed a set of management goals, identified impediments to those goals, developed a series of actions that could be taken to remove those impediments and achieve the management goals, and developed agreements to implement the OBMP. The OBMP goals and the activities to achieve them were stated in the OBMP Phase I report as follows[1]:

- "Goal 1 - Enhance Basin Water Supplies. This goal applies not only to local groundwater but also to all sources of water available for the enhancement of the Chino Groundwater Basin. The following activities enhance basin water supplies:
    - Enhance recharge of storm water runoff. Increasing the recharge of storm water in the basin will increase the water supplies in the Chino Basin. The relatively low TDS and nitrate concentrations of storm flow will improve groundwater quality.
    - Increase the recharge of recycled water. The recharge of recycled water above that required for replenishment obligations can be used for safe yield augmentation and/or conjunctive use.
    - Develop new sources of supplemental water. New sources of supplemental water, including surface and groundwater from other basins, can be used to meet Chino Basin area demands, reduce dependency on Metropolitan supplies, and improve drought reliability.

[1] See Optimum Basin Management Program, Phase 1 Report, August 1999, pages 3-2 to 3-4. Document is located here: http://www.cbwm.org/docs/engdocs/OBMP%20-%20Phase%20I%20(Revised%20DigDoc).pdf

- Promote the direct use of recycled water. Promoting the direct use of recycled water for non-potable uses will make more native groundwater available for higher-priority beneficial uses.
- Promote the treatment and use of contaminated groundwater. In some parts of the basin, groundwater is not produced because of contamination problems and thus the yield of the basin may be reduced. The yield of the basin can be maintained and enhanced by the production and treatment of these contaminated waters.
- Reduce groundwater outflow. Increasing groundwater production near the Santa Ana River will increase the streambed percolation of the Santa Ana River into the groundwater basin and reduce groundwater outflow from the basin and thereby increase the supply of groundwater in the basin.
- Re-determine safe yield. Recent studies suggest that the safe yield may be greater than the 140,000 acre-ft as stated in the Judgment. The activities listed above will cause the yield to increase further. Continuing to operate the basin at 140,000 acre- ft/yr will cause groundwater in the basin to be lost to the Santa Ana River. The safe yield will be re-determined on an as-needed basis to maximize the current yield and to cause future increases in yield.

- Goal 2 - Protect and Enhance Water Quality. This goal will be accomplished by implementing activities that capture and dispose of contaminated groundwater, treat contaminated groundwater for direct high-priority beneficial uses, and encourage better management of waste discharges that impact groundwater. The following activities will protect and enhance water quality:
    - Treat contaminated groundwater to meet beneficial uses. Groundwater in some parts of the basins is not produced because of contamination problems. Groundwater quality can be protected by intercepting contaminants before they spread. Intercepted groundwater could be treated and used directly for high priority beneficial uses or injected back into the aquifer.
    - Monitor and manage the basin to reduce contaminants and to improve water quality. Actively assisting and coordinating with the Regional Board, the EPA, and other regulatory agencies in water quality management activities would help improve water quality in the basin.
    - Manage salt accumulation through dilution or blending and the export of salt.
    - Address problems posed by specific contaminants.

- Goal 3 - Enhance Management of the Basin. This goal will be accomplished by implementing activities that will lead to the optimal management of the Chino Basin. The following activities will protect and enhance the management of the basin:
    - Develop policies and procedures that will encourage stable, creative, and fair water resources management in the basin.
    - Optimize the use of local groundwater storage. Policies and procedures for local storage, cyclic storage, and other types of storage accounts will be created to maximize drought protection and improve water quality, and to create an

efficient system to transfer water from producers with surplus water to producers that need water.
  - Develop and/or encourage production patterns, well fields, treatment and water transmission facilities, and alternative water supply sources to ensure maximum and equitable availability of groundwater and to minimize land subsidence. Develop conjunctive-use programs with others to optimize the use of the Chino Basin for in-basin producers and the people

- Goal 4 - Equitably Finance the OBMP. This goal is based on the following principles:
  - The primary source of revenue to finance the implementation will be consumers of Chino Basin groundwater.
  - Consumers in the Chino Basin must be treated equitably by passing the cost of the OBMP on a per acre-foot basis or by other methods, based on formulas to be determined.
  - Financial incentives and disincentives will be established to assure that existing groundwater is pumped out of the basin and a higher quality of water is used to replenish the basin.
  - Opportunities for creativity will be provided to the producers so that they are motivated to use their assets and abilities in the implementation of the OBMP.
  - Recover value from utilization of storage of supplemental water and from rising water outflow."

The actions to remove the impediments to the OBMP goals were logically grouped into sets of coordinated activities called Program Elements. Each Program Element contains a list of definitive actions and an implementation schedule. The OBMP Implementation Plan consists of nine Program Elements. The relationship of the goals to the Program Elements is shown in the following table.

Relationship of Goals and Program Elements in the 2000 OBMP

Program Element	Goal 1 - Enhance Basin Water Supplies	Goal 2 - Protect and Enhance Water Quality	Goal 3 - Enhance Management of the Basin	Goal 4 - Equitably Finance the OBMP
Program Element 1. Develop and Implement Comprehensive Monitoring Program (Comprehensive Monitoring Program)	X	X	X	X
Program Element 2. Develop and Implement Comprehensive Recharge Program (Comprehensive Recharge)	X	X	X	X
Program Element 3. Develop and Implement a Water Supply Plan for Impaired Areas (Groundwater Desalting)	X	X	X	X
Program Element 4. Develop and Implement Comprehensive Groundwater Management Plan for Management Zone 1 (Land Subsidence Management)			X	X
Program Element 5. Develop and Implement Regional Supplemental Water Program (Recycled Water Reuse)	X	X	X	X
Program Element 6. Develop and Implement Cooperative Programs with the Regional Board and Other Agencies to Improve Basin Management (Water Quality Management)	X	X	X	X
Program Element 7. Develop and Implement Salt Management Plan (Salt and Nutrient Management Plan)	X	X	X	X
Program Element 8. Develop and Implement Groundwater Storage Program (Groundwater Storage Management)	X	X	X	X
Program Element 9. Develop and Implement Conjunctive Use Program (Conjunctive Use)	X	X	X	X

Since October 2000, Watermaster, the Judgment parties, the IEUA, the TVMWD, and the WMWD have implemented most of the actions described in the Program Elements and the OBMP goals have been partially achieved. Some of the requirements and scope of the Program Elements have changed over time as impediments to the goals have been refined by new information, evolving technological and institutional challenges, and funding opportunities. The accomplishments from the implementation of the 2000 OBMP are summarized below.

Program Element 1. Develop and Implement Comprehensive Monitoring Program (Comprehensive Monitoring Program)

The objectives of this Program Element are to collect the data necessary to support the implementation of the other eight Program Elements and periodic updates to the state of the basin. The types of data collected include: groundwater data from wells (location, construction, lithology, pumping, water level and water quality); surface water (measuring location, discharge, recharge and water quality); ground level (vertical displacement from remote sensing, ground survey and extensometers, horizontal displacement from ground surveys); climatic data (precipitation from terrestrial stations, PRISM, NEXRAD, bias corrected and spatially disaggregated projections of future precipitation, evaporation, ET and temperature); land use and vegetation maps; normalized difference vegetation index mapping; facilities information (drainage maps, sewershed, water systems and facilities details); aerial photography; and LIDAR surveys. All these data are in stored in a relational database, GIS or other digital formats. The monitoring requirements have been reviewed annually and modified to ensure that the monitoring program delivered the minimum data required for OBMP implementation.

Program Element 2. Develop and Implement Comprehensive Recharge Program (Comprehensive Recharge)

The objectives of this Program Element include increasing stormwater recharge to offset the recharge lost due to channel lining, increase Safe Yield and to ensure that there will be enough supplemental water recharge capacity available to Watermaster to replenish overdraft. Recharge master plans were completed in 2001, 2013, and 2018. Watermaster and the IEUA implemented the 2001 recharge master plan and constructed recharge improvements that increased storm water recharge by about 9,000 afy. Watermaster and the IEUA completed a recharge master plan update in 2013 (2013 RMPU), and they are currently in the process of designing and constructing the recommended 2013 RMPU recharge projects. When completed in 2021, the 2013 RMPU projects will increase stormwater recharge by another 4,800 afy and recycled water recharge capacity by 7,100 afy. Finally, Watermaster and the IEUA completed a recharge master plan update in 2018 that recommended no new recharge projects. In the first 20 years of OBMP implementation, stormwater recharge will have increased about 13,800 afy, and supplemental water recharge capacity will have increased by 27,600 afy. One of the findings of the 2018 recharge master plan update is that Watermaster has enough supplemental water recharge capacity to it meet its replenishment obligations through wet-water recharge through 2050. The IEUA has increased the recharge of recycled water from about 500 afy in 2000 to about 16,000 afy in 2018.

Program Element 3. Develop and Implement a Water Supply Plan for Impaired Areas (Groundwater Desalting)

The objectives of this Program Element are to maintain and enhance the Safe Yield of the basin. The groundwater desalting program was designed to replace declining agricultural groundwater pumping in the southern part of the basin with new groundwater pumping to meet increasing municipal water demands in the same area. The new wells used in the groundwater desalting program were constructed in strategic locations to minimize groundwater outflow to the Santa Ana River and to increase the Santa Ana River recharge into the basin. In 2000, the groundwater desalting program included a 6,000 afy treatment plant and a series of wells constructed in the southern part of the Chino Basin near the Chino Airport. Under the OBMP, as of 2018, the desalting program has grown to two treatment plants and additional wells that in aggregate pump and treat about 30,000 afy degraded groundwater, and the program will reach the OBMP objective of 40,000 afy in 2019. The groundwater desalting program facilities are owned by the Chino Basin Desalter Authority (CDA) whose members include the Cities of Chino, Chino Hills, Ontario, and Norco; the Jurupa Community Services District; the Santa Ana River Water Company; the IEUA; and the WMWD.

Program Element 4 Develop and Implement Comprehensive Groundwater Management Plan for Management Zone 1 (Land Subsidence Management)

The objectives of this Program Element include the spatial and temporal characterization of land subsidence, identification of its causes, and, where appropriate, the development and implementation of a program to minimize or abate land subsidence. In the early 2000s, Watermaster constructed specialized monitoring wells to characterize land subsidence in the City of Chino. This work yielded two things: a successful voluntary management plan specific to certain wells located within a designated "Managed Area in the City of Chino; and a monitoring and investigative plan to characterize land subsidence throughout MZ1 and a part of MZ2. As of 2018, land subsidence monitoring is ongoing, and a focused effort is underway to develop a land subsidence management plan for the northwestern part of MZ1.

Program Element 5 Develop and Implement Regional Supplemental Water Program (Recycled Water Reuse)

The objective of this Program Element is to improve the regional conveyance and availability of imported and recycled waters throughout the basin. Since 2000, the IEUA has constructed and operated a recycled water conveyance system throughout the basin enabling it to provide recycled water to its member agencies. Recycled water deliveries grew from about 3,400 afy in 2000 to about 34,000 afy in 2017. The recycled water provided by the IEUA has replaced a like amount of groundwater and imported water that would have otherwise been used for non-potable purposes. Much of the post-2000 increase in supplemental water storage in the Chino Basin is attributable to the increased availability of recycled water. Recycled water is more reliable than imported water, and thus using it in lieu of imported water has improved the sustainability of the Chino Basin and water supply reliability. Improvements in the regional conveyance and availability of imported water were not achieved.

Program Element 6 Develop and Implement Cooperative Programs with the Regional Board and Other Agencies to Improve Basin Management (Water Quality Management)

The objectives of this Program Element are the identification of water quality trends in the basin and the impact of the OBMP implementation on them, the determination of whether point and non-point contamination sources are being addressed by water quality regulators, and to collaborate with water quality regulators to identify and facilitate the cleanup of soil and groundwater contamination. Since 2000, Watermaster, through its own monitoring activities and the efforts of cooperating entities, has compiled surface and ground water quality and related data, assessed water quality trends, and periodically reported its findings to the Judgment parties. Watermaster has collaborated with the Regional Board in its efforts to work with dischargers to facilitate the cleanup of soil and groundwater contamination in the basin. The 2000 OBMP Implementation Plan identified the opportunities to use the Chino Desalters to assist in the remediation of the Chino Airport and South Archibald plumes, which, as of this writing, is coming to fruition.

Program Element 7 Develop and Implement Salt Management Plan (Salt and Nutrient Management Plan)

The objectives of this Program Element are to characterize current and future salt and nutrient conditions in the basin and to subsequently develop and implement a plan to manage them. Watermaster and the IEUA developed an innovative salt and nutrient management plan (SNMP) for the Chino Basin that created assimilative capacity for total dissolved solids (TDS) and that when combined with the planned new recharge of stormwater and imported water, groundwater desalting, achievement of Hydraulic Control, and monitoring, enabled the use of recycled water without treatment to reduce the TDS concentration in recycled water. The SNMP was initiated in 2004. Ambient TDS and nitrate concentrations continue to increase in the Chino Basin due to legacy agricultural activities and current irrigation practices.

Program Element 8 Develop and Implement Groundwater Storage Program (Groundwater Storage Management)

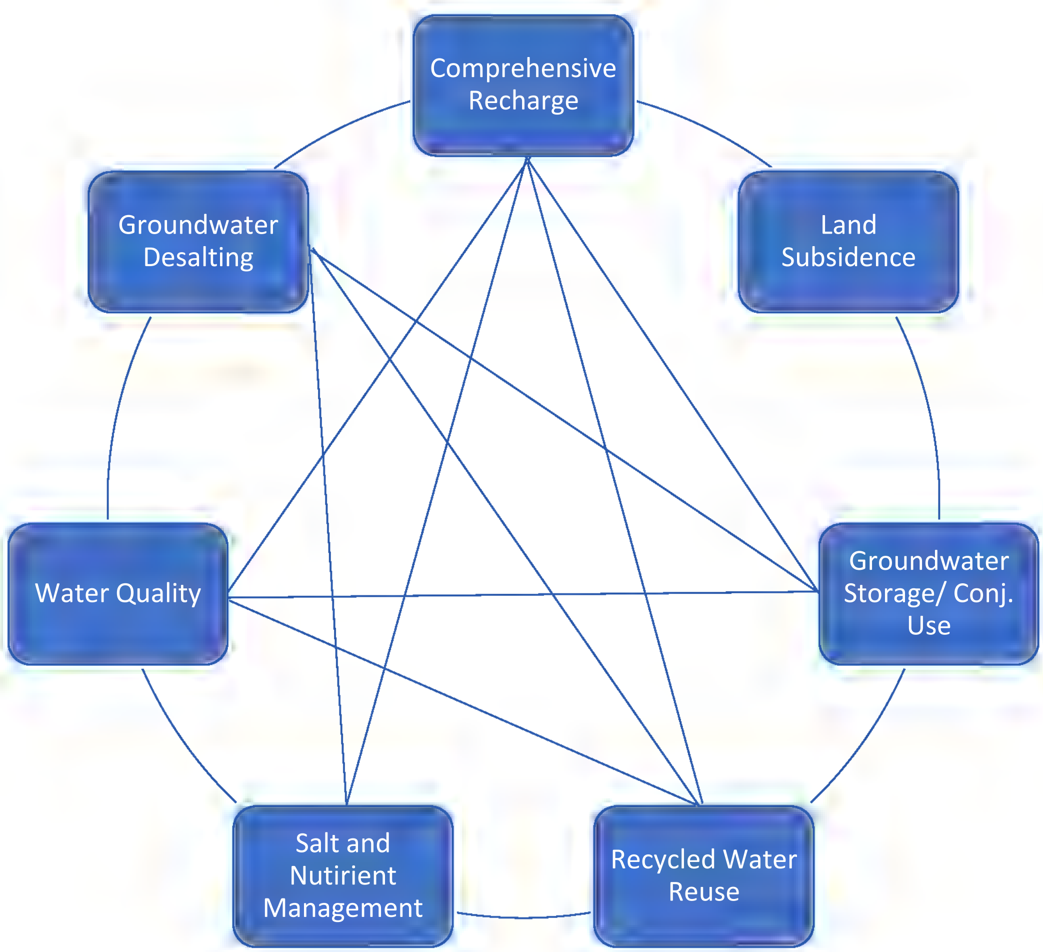
The objectives of this Program Element are to develop and implement a storage management program that is protective of water quality, prevents overdraft, and ensures equity among the Judgment parties. This Program Element also includes the recalculation of Safe Yield. The storage management plan in the OBMP implementation plan was implemented in 2000 and revised in 2016, raising the Safe Storage Capacity for managed storage from 500,000 af to 600,000 af through June 2021. Safe yield was recalculated in 2015 and, as of this writing, has not been approved by the Court. Losses from storage were initially assigned to zero through 2005, estimated at 2 percent from 2006 through 2017, and reduced to 0.07 percent thereafter with the achievement of Hydraulic Control. Watermaster conducted a Storage Framework Investigation in 2017 and 2018 to provide technical information to support the development of a new storage management plan in 2019. Technical work has commenced to recalculate the Safe Yield in 2020.

Program Element 9 Develop and Implement Conjunctive Use Program (Conjunctive Use)

The objective of this Program Element is to develop Storage and Recovery programs that will provide broad mutual benefit to the Judgment parties and reduce the cost of OBMP implementation. Watermaster, the IEUA, the TVMWD, the WMWD, and the Metropolitan Water District of Southern California (Metropolitan) implemented a 100,000 af storage program called the Dry-Year Yield Program (DYYP) in 2005. This program runs through 2028. Other than the DYYP, no Storage and Recovery programs have been implemented since 2000. IEUA is currently working to obtain a $207 million grant to develop and implement a Storage and Recovery program that will provide broad mutual benefit to the Judgment parties and state.

The 2000 OBMP Program Elements are highly related as is shown in the figure below. For example, the management activities associated with groundwater recharge impact land subsidence (a possible land subsidence management tool), groundwater storage and conjunctive use (recharge as a means to get water into storage), recycled water reuse (recharge as a means to get recycled and dilution water into the basin), and the salt and nutrient management plan (managed recharge must be blended to meet SNMP requirements). Furthermore, recharge impacts water quality directly, it has the potential to displace contaminant plumes, and future recharge increases with high quality storm and imported waters will be used to increase pumping rights and reduce future desalting requirements.

Relationship of the 2000 OBMP management activities



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Peace Agreements and CEQA

The 2000 OBMP and the Peace Agreement were completed in 1999 and 2000, respectively. The operable features of the OBMP were incorporated into the OBMP Implementation Plan. The OBMP Implementation Plan is Exhibit B to the Peace Agreement. The Peace Agreement was reviewed in a programmatic environmental impact report (PEIR), completed by the IEUA in July 2000.

Subsequent to the PEIR, Watermaster and the Judgment parties developed revisions to the OBMP based on the need to expand the desalting capacity to the 40,000 afy of groundwater pumping required in the OBMP Implementation Plan. Concurrently, the IEUA and Watermaster worked with the Santa Ana Regional Water Quality Control Board (Regional Board) to revise the total dissolved solids (TDS) and nitrate objectives for the Chino North Management Zone to enable the reuse of the IEUA's recycled water without desalting it for a period estimated to be at least 30 years and without impairing the beneficial use of groundwaters in the Chino and Orange County Basins (Program Element 7). One of the Regional Board's conditions for raising the TDS and nitrate objectives was the achievement of Hydraulic Control. Hydraulic Control is the elimination of groundwater discharge from the Chino North Management Zone to the Santa Ana River or its reduction to less than 1,000 afy. Hydraulic Control is a goal of the OBMP with the intent of maintaining and enhancing the Safe Yield of the basin by ensuring that agricultural groundwater pumping in the southern half of the basin will be replaced by groundwater pumping for municipal uses as the land use in that area transitions from agricultural uses to urban uses. Through extensive investigations, the expansion of desalter groundwater pumping to 40,000 afy and Reoperation were determined necessary to achieve Hydraulic Control and maintain the Safe Yield.

The Peace II Agreement was developed to implement the changes in the OBMP required to expand the desalters to 40,000 afy of groundwater pumping, to incorporate Reoperation and Hydraulic Control, and to resolve other issues. There was no change to the storage management plan in the OBMP Implementation Plan to address the implications of the reduction in storage of basin water by 400,000 af as provided for by Reoperation.

The IEUA completed and subsequently adopted a supplemental environmental impact report (SEIR) for the Peace II Agreement in 2010. The technical investigations conducted to support the expansion of desalter groundwater pumping to 40,000 afy and Reoperation also indicated that the Safe Yield of the Chino Basin had become less than that stated in the Chino Basin Judgment due to changes in cultural conditions in the watershed overlying and tributary to the Chino Basin.

Starting in 2011, Watermaster began the technical effort to recalculate the Safe Yield. This work involved updating the hydrogeologic conceptual model of the basin, updating the historical hydrology, updating and recalibrating numerical models that simulate the surface and ground water hydrology of the Chino Basin area, and projecting the surface and groundwater response of the basin to future management plans that included storage management. This work is documented in *2013 Chino Basin Groundwater Model Update and Recalculation of Safe Yield Pursuant to the Peace Agreement* (WEI, 2015; hereafter, Safe Yield report)[2].

In 2017, the IEUA adopted an addendum to the Peace II SEIR to revise the storage management plan in the OBMP through June 30, 2021. The addendum was supported with engineering work that demonstrated that the Safe Storage Capacity could be safely increased from 500,000 af to 600,000 af with the commitment that Watermaster would update the OBMP storage management plan by June 30, 2021.

Need to Update the OBMP

Understanding of the basin hydrogeology and hydrology has improved since 2000, and new water management challenges have been identified that need to be addressed to ensure long-term groundwater pumping sustainability. The strategic drivers/trends that shaped the OBMP in the late 1990s have since changed. There are several drivers and trends that will challenge the ability of the Judgment parties to rely on the OBMP environmental documentation and court approved management agreements (CAMA) to protect their collective interests in the Chino Basin and their water supply reliability. Exhibit 1 graphically illustrates these drivers, associated trends, and their basin management implications. The term “driver” as used herein corresponds to external forces that cause changes in the Chino Basin water space. Grouped under each driver are expected trends that emanate from each driver. The management implications of the drivers/trends on the present and future Chino Basin management are located on the bottom of Exhibit 1. The relationship of the drivers/trends to the management implications are shown by arcs that connect trends to implications. There may be other important drivers/trends and they will be identified in the OBMP update process. The text below summarizes the drivers, trends and management implication shown in Exhibit 1.

Climate Change

Reduced recharge. Present predictions of future precipitation indicate that precipitation patterns will change with more precipitation falling over shorter periods of time and that future droughts will be longer in duration and occur more frequently. This translates into a reduction in precipitation-based recharge to the basin and, if not mitigated, a decline in Safe Yield.

Reduced availability of imported water. Imported water supplies from the State Water Project and surface water sources in the Santa Ana River Watershed will become less reliable with climate change. The availability of imported groundwater from adjacent basins will be reduced for the same reason the Safe Yield of the Chino Basin will likely be reduced.

Legislation and Regulation

Climate science is advancing and generally reporting that the impacts of anthropogenic climate change will occur faster and be more severe than previously anticipated. New laws and regulations will be enacted to reduce greenhouse gas emissions and to mitigate climate change

[2] This report is located here:
http://www.cbwm.org/docs/engdocs/WEI%202013%20CBWM%20Recalculation%20Model%20Update/20151005_WEI_2013_CBWM_Recal_Model_Final_low.pdf

impacts. These new laws and regulations will likely place additional restrictions on water use to extend existing water supplies and to protect habitat.

Sustainable Groundwater Management Act (SGMA). Pursuant to SGMA, the Chino Basin is exempt from the development of a Groundwater Sustainability Plan (GSP). Currently, Watermaster is required to annually provide limited information to the state. In the near future, it is likely that adjudicated basins will come under greater scrutiny and be required to demonstrate sustainable groundwater management like that required for non-adjudicated basins.

Conservation. New laws and regulations to increase water conservation will reduce the deep infiltration of precipitation and applied water to the basin and, unless mitigated, will decrease the Safe Yield. Conservation may also impact a party's ability to make use of it pumping rights.

Water quality. Drinking water regulations will continue to become more stringent in the future due to new information on the health effects of various chemical and pathogenic constituents and the ability to measure constituents at increasingly lower detection levels.

Salt and Nutrient Management

TDS Increases in the Basin. Watermaster and the IEUA are co-permitees for the use of recycled water in the Chino Basin. The use of recycled water could become more difficult in the future because the ambient TDS concentration in the Chino Basin is increasing and thereby reducing assimilative capacity. Increases in ambient TDS concentrations in the future will cause an increase in the TDS concentration in recycled water produced by the IEUA and will eventually cause the IEUA to desalt its' recycled water when assimilative capacity for TDS is lost in the Chino North Management Zone. When assimilative capacity for TDS is lost under the current SNMP, the IEUA will be required to desalt its recycled water to the TDS groundwater objective of 420 mgl prior to reuse in the Chino Basin.

TDS Increases in SWP Water during Droughts. The TDS concentration in the IEUA's recycled water increased during the recent drought due to concurrent increases in TDS concentration in SWP water and almost triggered a requirement, pursuant to the current SNMP in the Basin Plan, to start the planning process to desalt recycled water. Future droughts will likely be longer in duration and occur more frequently. Unless the SNMP is updated, the requirement to implement recycled water desalting could start with the next drought.

Outside Interest in Chino Basin Operations

There is increasing interest from outside entities in how the regional water agencies and Judgment parties operate the Chino Basin. The State of California consistently enacts more restrictive laws and regulations to protect the environment and to improve habitat sustainability. Public Trust related litigation has been used to halt project development and limit water rights. The Resource Agencies, non-governmental organizations, and Santa Ana River parties are showing renewed interest in Santa Ana River discharges for habitat, water supply, and water rights.

Grant and Low-Interest Loan Project Funding

California voters have a recent history of passing bond initiatives to support water resources projects. The accumulating debt at the national and state level will make it more difficult in the future to obtain grant and low-interest loan funding for water projects. Competition for available funding will increase. Projects approved and constructed in the next few years are more likely to obtain grants and low-interest loans over projects that are deferred into the future.

Improvements in Science and Technology

Laboratory Detection Limits. Improvements in laboratory methods will reduce the detection limits for water quality constituents.

Health Impacts of Chemicals and Pathogens. The number of regulated chemicals will increase, and regulatory standards, based on new research, will become more stringent.

Treatment Technologies. Water treatment technology will improve, enabling water agencies to treat water to more restrictive drinking water standards.

Renewable Energy. The amount of renewable energy available will increase as will the need/requirement to incorporate renewable energy into new projects.

Sensor Technology. There is an increasing trend in the development, cost-efficient availability, and deployment of new terrestrial, aircraft-borne and space-borne sensors that enable the monitoring of the basin and assessment of hydrologic and ecological trends; this will result in improved hydrologic understanding of the basin.

Transparency. Federal and state agencies are requiring that water agencies submit monitoring and other data to them and that these data be made available to the public. The proliferation of these and other publicly available data sources will lead to greater regulatory scrutiny and interest by environmental organizations

The water resource management implications of these drivers and trends for the Judgment parties include:

- reductions in Chino Basin safe yield,
- Chino Basin water quality degradation,
- increased cost of groundwater use,
- reduced imported water availability,
- imported water quality degradation,
- reduced recycled water availability and increased cost,
- recycled water quality degradation, and
- increased cost of Basin Plan compliance.

Mitigation of these implications requires a proactive integrated approach to updating the OBMP.

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The OBMP CEQA Document Needs to Be Updated

The PEIR and SEIR for the OBMP are eighteen and eight years old, respectively: knowledge of the basin's characteristics has improved since these documents were adopted, water management challenges have intensified, and environmental considerations have changed. The PEIR and SEIR are not sufficiently current to support present decision-making and further investment. The existing environmental clearance is too old to be relied upon for receiving state grant and low interest loan funding and render Watermaster and the IEUA to make decisions relying on the earlier environmental evaluations that are vulnerable to collateral attack.

Accordingly, Watermaster needs to review and update (if necessary) its groundwater management goals, articulate impediments to those goals, update the OBMP and its implementation agreement as required by Paragraph 41 of the Judgment, and complete a new CEQA process.

Benefits from Updating the OBMP

The current OBMP contains a set of management activities that improve the reliability and long-term sustainability of the Chino Basin and the water supply reliability of the Judgment parties. The OBMP was developed in 1998 and 1999, based on the goals of the Judgment parties, the hydrologic understanding of the basin, the institutional and regulatory environment, an assessment of the impediments to achieving the Judgment parties' goals, and the actions required to remove the impediments and achieve the goals.

The Judgment parties need to consider whether the OBMP goals have changed, update them, and define the impediments to achieving the goals based on the present and expected hydrologic conditions in the basin, and current and projected trends in the institutional, regulatory, and financing spaces. The parties can then develop an action plan to overcome impediments to achieve the updated OBMP goals. In the absence of an updated OBMP, it will grow increasingly difficult to maintain current and projected groundwater pumping and recycled water reuse and to utilize the unused storage capacity in the basin. An updated OBMP will provide the Judgment parties with: a program-level water resources management plan that maximizes their pumping rights, use of recycled water, use of storage space, and an updated CEQA document to provide certainty for implementation.

Process to Update the OBMP

The process for the development of the 2000 OBMP involved the description of the state of the Chino Basin, the articulation of the Judgment parties' "issues, needs and wants," the Judgment parties' development of OBMP management goals, the articulation of the impediments to achieving the goals, the description of the actions required to remove the impediments, the development of an implementation plan and an agreement among the Judgment parties to fund and implement the OBMP, and the preparation of CEQA documentation. The table below summarizes the effort for the 2000 OBMP and the OBMP update. The text that follows summarizes the update process.

Steps involved in OBMP development

	OBMP Development Step	2000	2020
1	Prepare state of the basin assessment	X	
2	Articulate "issues, needs and wants" and management goals	X	X
3	Describe impediments to management goals	X	X
4	Develop actions to remove impediments	X	X
5	Develop implementation plan	X	X
6	Develop implementation agreement	X	X
7	Prepare CEQA documentation	X	X
8	Court approval	X	X
9	Prepare financing plan		X

1. The combination of the existing 2016 State of the Basin Report, annual report of the Ground Level Monitoring Committee, 2018 Recharge Master Plan Update report, and 2018 Storage Framework report are sufficient to understand the current state of the basin. Also, the 2018 State of Basin report is currently in preparation and will be available to the Judgment parties during the OBMP update process.

2. One to two listening sessions will be held to enable the Judgment parties to articulate their "issues, needs and wants" and their recommended goals for basin management. Watermaster staff will prepare documents that combine and systematize these items and obtain concurrence from the parties that their concerns and goals expressed at these listening sessions have been captured in the planning documents.

3. One to two listening sessions will be held to describe the impediments to achieving the goals. Watermaster staff will prepare documents that combine and systematize the impediments and obtain concurrence from the parties that the impediments expressed at these workshops have been captured in the planning documents.

4. Watermaster staff will develop an initial set of actions that if taken will remove the impediments to the OBMP goals, prepare reconnaissance-level cost estimates to implement the actions, and document this work in a draft TM. Up to three listening sessions will be held to present the actions to the Judgment parties, obtain their comments and suggestions, revise the actions, and subsequently finalize the TM.

5. Watermaster staff will create a draft implementation plan for the OBMP update and document it in a draft TM. One or two listening sessions will be held to present the implementation plan to the Judgment parties, obtain their comments and suggestions, and subsequently incorporate them into the draft TM.

6. Watermaster will provide a facilitated process for the Judgment parties to develop an agreement to implement the OBMP update.

7. The IEUA will prepare the appropriate CEQA documentation for the OBMP update.

8. Upon completion of the implementation agreement and CEQA, Watermaster and the Judgment parties will seek Court approval of the OBMP update.

9. After the CEQA document is adopted by the IEUA, the Judgment parties, the IEUA, and interested entities will prepare a financing plan.

OBMP Update Schedule

Steps 1 through 5, ending with the development of the OBMP implementation plan, will be completed in the period of January 2019 through December 2019. The development of the OBMP implementation agreement and CEQA will be completed in the period of January 2020 through June 2020. Court approval and the development of a financing plan will occur thereafter.

Appendix B

Response to Comments on the November 22, 2019
Draft 2020 OBMP Update Report

NOTE: In addition to any changes made to the 2020 OBMP Update Report based on the following comments, the text of Section 3.2.8.1 was edited to align with the final 2020 SMP published on December 11, 2019.

2020 OBMP Update Report Comments

Overlying Non-Agricultural Pool – Comments reported out of 12/12/19 Confidential Session

1. ***The Pool requests further clarification on its comment #2 regarding conjunctive use and its definitions in the Storage Management Plan:***
   Page 1-4 and Page 2-1 – Conjunctive-Use. Section 1.2 and Section 2.1 talk about conjunctive-use. How is conjunctive-use defined? What is included and excluded?

   RESPONSE: Page 1-4 of the final 2020 Storage Management Plan describes the conjunctive use activities of the Parties as "storing Basin and Supplemental Waters that are in excess of their demands and subsequently recover that water as their individual needs arise". More generally speaking, conjunctive use is the coordinated use of surface and groundwater resources such that surface water is used to augment groundwater storage (direct or in-lieu) in wet years and groundwater is used in dry years. For the SMP, this term is being used as a descriptive term, and not a term that requires definition.

City of Chino – Comments Provided by Dave Crosley (via email 12/19/19)

1. ***Typos are noted on scanned copies of pages 4, 8, 19, 24, and 35 (attached).***

   RESPONSE: Typos have been noted and corrected.

2. ***The draft OBMP Update indicates that some of the described implementation actions are required for Watermaster to properly administer the Judgment. Stakeholder agreement that these actions are "required" may be the subject of some continuing discussion. We suggest the OBMP Update remain in draft form designation until such discussion has concluded.***

   RESPONSE: The rationale for identifying implementation actions associated with the OBMP Update activities as "required" is described in part in Section 2 of the 2020 OBMP Update Report. During the forthcoming drafting sessions for the Implementation Plan Update, Watermaster will respond to questions about the basis for any specific action. To provide additional clarity, a new table (Exhibit 17) has been added to Section 4 of the final report that includes a description of the rationale for each required action in the management plan.

3. ***It would be helpful to expand Program Element tables 11 -17, describing proposed 2020 OBMP Implementation Actions, to include an additional column describing anticipated/estimated annual expense associated with the implementation of each activity (e.g. as presented in various tables included in the scoping report).***

   RESPONSE: The cost estimates for the activity scopes of work in the 2020 OBMP Update Scoping Report (TM1) were developed based on many assumptions, and should be used as very general guidance as to potential costs based a specific scope of work. These estimates have been provided only to describe a concept, i.e. the conceptual phases envisioned by Watermaster staff/consultants in developing the Implementation Actions' scope, and are not a fixed number or a budgetary commitment. The Committees envisioned to oversee the management processes will ultimately guide the actual efforts (i.e. scope, expense, schedule) similar to the GLMC. Estimated cost ranges have been described in TM1, which are included in the OBMP Update Report (TM2) as Appendix B. The draft OBMP IP Update (under preparation by Watermaster staff, to be released late January) will include a consolidated listing of the proposed new Implementation Actions and their associated cost estimates to assist the parties.

4. ***To the extent that information obtained from technical analyses performed in support of, and described in, the 2000 OBMP have been updated by more recent technical analyses, the more recently developed and updated information should be included in the draft 2020 OBMP Update to clarify the current understanding of basin circumstances.***

   RESPONSE: We understand that your question is in regard to the concept of the Safe Storage Capacity (SSC). The SSC was part of the storage management construct in the 2000 OBMP. As described in the 2018 Storage Framework Investigation, and summarized in the 2020 OBMP Update Report, the new hydrogeologic understanding of the basin developed through implementation of the OBMP has indicated that the management construct in the 2000 OBMP is no longer valid and the concept of SSC is not included in the new 2020 Storage Management Plan. The text of Section 3.2.8.1 of the 2020 OBMP Update Report has been modified to more clearly articulate this. This section was also edited to align with the final 2020 SMP published on December 11, 2019.

5. ***The draft 2020 Storage Management Plan (SMP) indicates a reduction in net recharge is believed (based on modeling) to be caused by storage, and that Watermaster considers this impact to be mitigated by the prospective calculation of Safe Yield. [a] Related to this circumstance, the SMP indicates that storage accounts may be adjusted based on findings of the 2020 Safe Yield recalculation. As the 2020 Safe Yield recalculation is currently a work-in-progress, the suggestion that storage accounts may be adjusted is premature at this time. [b] Additionally, the OBMP Update should clarify that storage is only one of several contributing factors (cultural conditions) that may have an effect on net recharge.***

   RESPONSE: 5(a) The final 2020 SMP does not state that Watermaster will adjust the storage accounts of the Parties based their water in managed storage. It does say that it will debit the storage accounts for each Storage and Recovery Program for its storage impact on net recharge and Safe Yield caused by the Storage and Recovery Program. The loss rate (reduction in net recharge caused by storage) will be established uniquely for each Storage and Recovery Program and is independent of the 2020 Safe Yield recalculation.

   5(b) Comment noted. Please see the final 2020 SMP, Appendix B2, City of Chino comment number 3 and Watermaster staff response.

6. ***The draft OBMP Update describes, pertinent to various Activities, the formation of new, or re-convening of past/existing, specific committees for the purpose of focusing attention on matters related to the subject Activity. These committees should have responsibility for recommending the scope and frequency of tasks pertinent to Activity implementation.***

   REPONSE: Comment noted. This is the intent for implementation of each management process, as articulated in Section 2, page 12, in the last paragraph, sub-bullet (1).

Overlying (Agricultural) Pool – Comments Provided by Robert Feenstra (12/20/19 letter)

7. ***Watermaster staff have requested comments on the draft 2020 OBMP Update Report (Technical Memorandum 2) (Update Report) by close of business on Friday, December 20, 2019. The Overlying (Agricultural) Pool (Ag Pool) has reviewed the draft Update Report, which incorporates the 2020 Storage Management Plan. The Ag Pool has consistently expressed concern regarding water storage that has been accumulating and used without adequate storage management, including contesting the Watermaster's continued approval of water storage and transfer/sale agreements of the Appropriative Pool. The 2020 Storage Management Plan is not complete as it must still be finalized and approved as part of the 2020 OBMP Update. The Ag Pool urges Watermaster to move forward expeditiously with the final adoption and approval of the OBMP Update including storage management.***

   RESPONSE: Comment noted

8. ***Section 1.2 of the Update Report (at page 8) uses two new terms, "water management space" and "Chino Basin water space." These new terms should be defined.***

   RESPONSE: The terms are being used as descriptive terms, and not terms that require definition.

9. ***Section 2.1. Page 11 in the Updated Report describes the attached Exhibit 3 as "a matrix, summarizing the needs and wants of the stakeholders..." But the attached Exhibit 3 does not accurately represent the Ag Pool's needs and wants as a Pool or as Pool subgroups of "Crops, Dairy, and State." The items shown in Exhibit 3 represent comments made by individuals in an early OBMP listening session/workshop that included comments from most of the other Basin stakeholders. After the initial meeting/listening session, the Ag Pool indicated to Watermaster that it preferred to report out its needs and wants as a Pool rather than as subgroups, but the Ag Pool did not complete the matrix after seeing the progress and direction of the OBMP Update process in subsequent listening sessions/workshops. Consequently, Exhibit 3 for the Ag Pool's "needs and wants" should be considered incomplete because not all needs and wants are represented and there is also mutual support between each Ag Pool subgroup (i.e., Crops, Dairy, and State) for the needs and wants indicated by the other subgroups.***

   RESPONSE: Comment noted; the OAP has been invited to offer edits to Exhibit 3 that would fully represent its Issues/Needs/Wants.

10. ***Section 3.2.3.1. At page 28 in the draft Updated Report, the first sentence of the first full paragraph uses the term "brackish." However, the term "brackish" covers a wide range of total dissolved solids (TDS), from freshwater to sea water (500 to 30,000 milligrams per Liter). We suggest being more specific or defining the general range of TDS concentrations.***

    COMMENT: The text will be adjusted for clarity.

Monte Vista Water District – Comments Provided by Justin Scott-Coe (12/23/19 letter)

11. ***If a subsequent and new OBMP Implementation Plan is agreed to by the Peace Agreement parties, will all parties initially be required to pay for the planning and management efforts (not including CEQA costs) envisioned in the OBMPU Update? If so, how will future project participants reimburse non-participants for their share of associated CEQA coverage and OBMPU planning and management costs (i.e., beneficiary pays)?***

    RESPONSE: The development of the OBMP Update to date has assumed that the existing methodology for sharing OBMP expenses will continue. Should the parties wish to share costs differently in the future, Watermaster will assess the parties accordingly.

12. ***As part of Program Element No.6, the implementation action of "develop and implement an initial emerging contaminants monitoring plan and prepare a water quality assessment of the Chino Basin to evaluate the need for a Groundwater Quality Management Plan and prepare a long-term emerging contaminants monitoring plan" has been identified as a required Watermaster action. The language of Judgment paragraph 41 does not seem to require Watermaster to perform this action. Please identify what court approved document and its language make the said implementation action a requirement.***

    RESPONSE: Paragraph 41 of the Judgment states: *"Watermaster Control. Watermaster, with the advice of the Advisory and Pool Committees, is granted discretionary powers in order to develop an optimum basin management program for Chino Basin, **including both water quantity and quality considerations**. Withdrawals and supplemental water replenishment of Basin Water, and **the full utilization of the water resources of Chino Basin, must be subject to procedures established by and administered through Watermaster with the advice and assistance of the Advisory and Pool Committees** composed of the affected producers. **Both the quantity and quality of said water resources may thereby be preserved and the beneficial utilization of the Basin maximized**."* (Pgs. 19-20 of the Restated Judgment)

    Paragraph 41 states that maximization of the beneficial use of the Basin requires consideration of both water quantity and water quality considerations. The Judgment could not and does not prescribe every conceivable water quality management action necessary to address every potential contaminant. It does recognize that If water quality is not effectively managed, Parties may not be able to utilize their water rights, which could result in negative impacts to the basin, such as reductions in net recharge, loss of hydraulic control, and movement of contaminant plumes. Program Element 7 of the 2000 OBMP, the salt and nutrient management plan, is an example of a water quality management program not specifically named in the Judgment that has been a successfully implemented to avoid the negative impacts of reduced/re-located pumping to avoid high-TDS and high-nitrate groundwater. Effective management of water quality in the Basin to preserve maximum beneficial use can only be accomplished through a systematic assessment of the emerging contaminant threats to the use of groundwater resources, and thoughtfully preparing a plan to respond to those threats.

13. ***The Storage and Recovery Master Plan, found in Program Elements 8/9, should not be considered required by Watermaster, and request that the "required" label be removed from this proposed activity in the final version of the OBMP Update and associated documentation.***

    RESPONSE: Please refer to the response to City of Chino comment #2.

14. ***MVWD encourages the Watermaster to pursue the CEQA process which will allow the up to 1 million acre-feet of storage within the basin, premised in part on the completed Storage Framework Investigation.***

    RESPONSE: Comment Noted. Watermaster is proceeding with the analysis of storage of up to 1 million acre-feet, consistent with the Appropriative Pool recommendation.

15. ***Our understanding is that, while Watermaster has discretion in managing storage through agreements, the current Storage Management Plan that Watermaster has agreed and been ordered by the Court to follow is part of the OBMP Implementation Plan, which is a component of a negotiated settlement and agreement among the parties to the Peace Agreement. Therefore, adoption of a new Storage Management Plan should be seen as an amendment to this negotiated settlement/agreement and follow the process for amending the Peace Agreement. Please confirm if this understanding is correct.***

    RESPONSE: Updating the Storage Management Plan, an element of the 2000 OBMP IP that is an Exhibit to the Peace Agreement, is an update of the OBMP IP. Other thanthe Peace Agreement's requirement of unanimous approval for amendments, as have been done on two past occasions, Watermaster is not aware of any specific procedures for amending the Peace Agreement.

16. ***Before drafting and publishing the Draft OBMP Implementation Plan, MVWD encourages Watermaster to have dialog with Peace Agreement parties to determine what elements those parties would want included in such plan.***

    RESPONSE: The implementation actions arising from the parties identification of their issues, needs, and wants have been publicly available and were last distributed during the December Advisory Committee meeting. The planned process of developing a draft Implementation Plan, as has been discussed during the Listening Sessions, and Committee meetingss , includes the initiation of drafting sessions (as needed) in early February where all concerns related to the implementation plan can be openly discussed amongst all stakeholders.

City of Ontario – Comments Provided by Scott Burton (12/20/19 letter)

17. ***The draft Optimum Basin Management Plan (OBMP) Update report represents a comprehensive set of ideas related to water management in the region including topics such as water resources, water infrastructure, emerging water quality requirements and protecting the groundwater basin. The listening sessions and guided input have provided ample opportunity for participating stakeholders to share their ideas. It is important to note that while stakeholders have had the opportunity to comment, the disposition, vetting and deliberation of varying stakeholder views was largely deferred to a later date. Currently, the draft OBMP Update report reflects the recommendations of Watermaster staff planned for the Watermaster Board.***

    RESPONSE: The OBMP Update reflects stakeholder input received by Watermaster during Listening Sessions held in 2019. The document is a compilation of all input and Watermaster staff and consultants believes it represents a collective view of what could be done to manage the Basin. The document reflects Watermaster staff conclusions of which implementation actions (management processes) are required for Watermaster to perform its duties, and captures all the suggestions offered by stakeholders.

18. ***The draft OBMP Update report includes a list of activities whose outcomes are identified as either optional or necessary for Watermaster. A number of these activities are already underway in various retail and regional forums peripheral to Watermaster. Examples include storage and recovery, movement of water between retail agencies, regional water treatment and conveyance, water supply reliability and water quality management. While the City of Ontario (Ontario) agrees that there are necessary activities in managing this critical water resource, there are some activities defined by Watermaster staff as necessary which we think may be more at the option of the stakeholders. It is highly recommended that this definitional distinction be vetted and deliberated with the stakeholders prior to the Watermaster Board acting on the OBMP Update report.***

    RESPONSE: Please refer to the response to the City of Chino comment #2.

19. ***Ontario supports the effort to consider and update the OBMP implementation with some of these new and continued ideas and believes that, consistent with the Peace Agreement, it is a step toward the meet and confer process in the 25th year of the agreement to discuss any new or modified terms. While Watermaster staff seems to consider the draft OBMP Update report substantially complete, the most critical and in-depth phase of the OBMP implementation update is just beginning. The next step is for the stakeholders to develop an Implementation Plan and Implementing Agreement(s) that reflect the common interests of the parties to the Judgement. This may differ from what is envisioned by Watermaster staff. It is Ontario's hope that to the extent there are differences, they can be reconciled prior to Watermaster Board action on the OBMP Update report.***

    RESPONSE: As with prior amendments to the Peace Agreement, Watermaster staff understands that an update of the 2000 OBMP IP can be undertaken through a focused effort as to this narrow set of issues, without addressing unrelated portions of the Peace Agreement.

Watermaster staff envisions the same next steps of creating an IP Update and crafting an amendment to the Peace Agreement to move forward. The process will begin in early February, during which all the stakeholders can weigh in on their interests and concerns on each component of the implementation plan.

20. ***As we have discussed, there are activities within the draft OBMP Update report that Ontario believes are either not necessary, already underway or may be more appropriately stakeholder managed outside of the Watermaster forum. As part of determining the OBMP implementation scope, Ontario intends to consider things such as cost-benefit analysis, prioritizing available financial resources in the context of other retail agency needs, the optimal forum for various activities to occur, avoidance of redundant efforts, determination of appropriate stakeholder funding, impact on the cost to produce groundwater, and assurance towards a reliable and sustainable groundwater basin. For activities currently required by the Peace Agreements, the Stakeholders may decide to modify or otherwise update the requirement. In addition, Ontario will need to complete its internal review process and timeline to facilitate Ontario's City Council making an informed decision on behalf of the public they represent.***

    RESPONSE: Comment noted.

21. ***The very important work ahead includes decisions still to be discussed, deliberated, and formalized in an amended Peace Agreement. Taking the technical ideas from draft report to a completed Implementation Plan and Implementing Agreement(s) requires flexibility, finesse and collaboration. Ontario is concerned that prioritizing the schedule above all else may compromise the result. As a next step, Ontario requests that the stakeholders be provided the opportunity to collaborate with Watermaster staff in setting a reasonable and realistic schedule and approach to enhance a successful outcome for this effort and the investments that will follow.***

    RESPONSE: Watermaster has engaged the stakeholders in a process designed to meet the short term needs as well as enable long term management of the Basin for the interest of the stakeholders. The City, as all stakeholders, is encouraged to provide feedback on the schedule and approach necessary to achieve a successful outcome for this effort.

Appropriative Pool – Comments provided by Tom Harder (01/22/2020 letter)

22. ***Section 3.2.8 Program Element 8. Develop and Implement a Storage Management Program and Program Element 9. Develop and Implement Storage and Recovery Programs:***
In Table 10 or preceding text, please define UGRR

    RESPONSE: The term means "Uniform Groundwater Rules and Regulations". The UGRR is now part of the Watermaster Rules and Regulations. A footnote will be added to the table for clarification.

23. ***Section 3.2.8.1 Implementation Progress Since 2000 and Ongoing Implementation Actions for the 2020 OBMP:***

    Pg. 47, section that starts, "The 2020 SMP includes the following provisions specific to the Parties and Storage and Recovery Program:" Second minor bullet under second major bullet:

    • With regard to the storage management activities of the Parties:

    o ~~The~~ Any reduction in net recharge caused by storage in the FMSB is an adverse impact, and Watermaster considers this adverse impact to be mitigated by the prospective calculation of Safe Yield.

    As written, this sentence makes it sound like reduction in net recharge is a given if the volume of groundwater in storage changes. Groundwater pumping patterns also impact net recharge. This is why the change indicated in red above is recommended.

    RESPONSE: The text has been modified to reflect this suggested change.

24. ***Pg. 47, last bulleted item, "Watermaster will periodically review current and projected basin conditions and compare this information to the projected basin conditions…"***

    It is recommended that future reviews of the impact of storage and recovery projects be done on an annual basis.

    RESPONSE: Comment noted

25. ***Section 4 2020 OBMP Update Management Plan***
In general, it is noted multiple places in Section 4 reference the preparation of work plans and management plans. Program Element 1 (Table 11) describes the need to prepare an OBMP Monitoring and Reporting Work Plan. Elsewhere in the document, there are other water quality and monitoring/management work plans identified under Program Element 6, including:

    • Emerging Contaminants Monitoring Plan (Table 15 – 2nd and 3rd Row)

    • Groundwater Quality Management Plan (Table 15 – 5th Row).

    In addition, the Salt and Nutrient Management Plan (SNMP) under Program Element 7 includes monitoring and reporting of groundwater quality data. [A] Is it possible to combine the monitoring and reporting work plans into one comprehensive document instead of multiple individual plans? [B] Are there any negative consequences of doing so? [C] Would the

existing OBMP Maximum Benefit Monitoring Program 2014 Work Plan be replaced by the OBMP Monitoring and Reporting Work Plan?

RESPONSE:
[A] and [B] The intent is to have one single monitoring program work plan, the OBMP Monitoring and Reporting Work Plan, that covers all of the Watermaster programs listed in Table 2 of the OBMP Update Report, with the exception of the initial emerging contaminant (EC) monitoring program included in PE 6. The initial EC monitoring program is envisioned as a stand-alone work plan as it is intended to be a short-term, one-time effort to collect the data needed to evaluate ECs in the Chino Basin. PE 6 also provides for the development of a long-term EC monitoring plan as part of the development of the Groundwater Quality Management Plan. This long-term EC monitoring plan, once developed, would be incorporated into the OBMP Monitoring and Reporting Work Plan.

[C] Yes, if the Parties elect to prepare the OBMP Monitoring and Reporting Work Plan, the existing 2014 OBMP Maximum Benefit Monitoring Program Work Plan would be incorporated as part of the new work plan. Note that Watermaster and IEUA are currently working on an update to the Chino Basin maximum benefit SNMP commitments, which could result in changes to the monitoring plan described in the 2014 OBMP Maximum Benefit Monitoring Program Work Plan. Once the SNMP update work is completed and any recommended changes are approved by the Regional Board, these changes would be documented in the governing work plan.

Appendix C

2020 Optimum Basin Management Program Scoping Report

Appendix C

To: Chino Basin Watermaster Stakeholders

From: Watermaster 2020 OBMP Update Team

Subject: 2020 OBMP Update: Scoping Report – Development of Activities for Consideration

Date: Draft Part 1, July 24, 2019; Draft Part 2, August 22, 2019;
Final November 22, 2019

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1. Introduction and Background

Objectives and Purpose of the Scoping Report

The Chino Basin Watermaster (Watermaster) is in the process of updating its Optimum Basin Management Program (OBMP) and its implementation plan. The objectives of this first Technical Memorandum, *2020 OBMP Update: Scoping Report – Development of Activities for Consideration* (Scoping Report), are: (1) to describe the stakeholder process to develop the 2020 OBMP Update, (2) to document the key outcomes of the stakeholder process to date, and (3) to describe the proposed scope of work, implementation actions, schedule, and cost to perform the following eight activities developed by the stakeholders for consideration for inclusion in the 2020 OBMP Update:

1. Construct new facilities and improve existing facilities to increase the capacity to store and recharge storm and supplemental water—particularly in areas of the basin that will promote the long-term balance of recharge and discharge (Activity A).
2. Develop, implement, and optimize Storage and Recovery Programs to increase water-supply reliability, protect or enhance Safe Yield, and improve water quality (Activity B)
3. Maximize the reuse of recycled water produced by IEUA and others (Activity D).
4. Develop and implement a water-quality management plan to address current and future water-quality issues, protect beneficial uses, and develop strategic regulatory-compliance solutions to comply with new and evolving drinking water standards that achieve multiple benefits (Activity E/F).
5. Develop a management strategy within the salt and nutrient management plan to ensure the ability to comply with the dilution requirements for recycled water recharge (Activity K).
6. Identify and implement regional conveyance and treatment projects/programs to enable all stakeholders to exercise their pumping rights and minimize land subsidence and optimize the use of all water supply sources (Activity C/G).
7. Perform the appropriate amount of monitoring and reporting required to fulfill basin management and regulatory compliance (Activity L).
8. Develop a process to provide for the equitable distribution of the costs and benefits of the OBMP Update, to encourage regional partnerships for implementation to reduce costs, and to identify and pursue low-interest loans, grants, or other external funding sources to support the implementation of the OBMP Update (Activity H/I/J).

The purpose of the Scoping Report is to provide the Parties with an understanding of the work that would need to be performed to accomplish the desired outcomes of each of the 2020 OBMP Update activities. To the extent that the scopes of work described herein are already being partly or completely performed by Watermaster or others, this Scoping Report acknowledges such. The next steps in the process to prepare the 2020 OBMP Update will focus on the review and revision of the activities scoped herein and the integration of the ongoing activities with the existing OBMP. The recommended 2020 OBMP Implementation Plan, inclusive of ongoing and new activities will be documented in a subsequent report, *2020 Optimum Basin Management Program Update Report*, and will form the foundation for the Parties to develop a final implementation plan and agreements to implement the OBMP Update.

History of the OBMP

The Chino Basin Judgment gave Watermaster the discretionary authority to develop an OBMP for the Chino Basin, including both water quantity and quality considerations. Watermaster, with direction from the Court, began developing the OBMP in 1998 and completed it in July 2000. The OBMP was developed in a collaborative public process that identified the needs and wants of all stakeholders, described the physical state of the groundwater basin, defined a set of management goals, characterized impediments to those goals, and developed a series of actions that could be taken to remove the impediments and achieve the management goals. This work was documented in the *Optimum Basin Management Program – Phase I Report*.[1]

The four goals of the 2000 OBMP included:

Goal 1 – Enhance Basin Water Supplies

Goal 2 – Protect and Enhance Water Quality

Goal 3 – Enhance Management of the Basin

Goal 4 – Equitably Finance the OBMP

The actions defined by the stakeholders to remove impediments to the OBMP goals were logically grouped into sets of coordinated activities called Program Elements (PEs), each of which included a list of implementation actions and an implementation schedule. The nine PEs defined in the 2000 OBMP included:

PE 1 – Develop and Implement Comprehensive Monitoring Program. The objectives of the comprehensive monitoring program are to collect the data necessary to support the implementation of the other eight PEs and periodic updates to the *State of the Basin Report*[2].

PE 2 – Develop and Implement Comprehensive Recharge Program. The objectives of the comprehensive recharge program include increasing stormwater recharge to offset the recharge lost due to channel lining, to increase Safe Yield, and to ensure that there will be enough supplemental water recharge capacity available to Watermaster to meet its Replenishment Obligations.

PE 3 – Develop and Implement a Water Supply Plan for Impaired Areas. The objective of this program is to maintain and enhance Safe Yield with a groundwater desalting program that is designed (1) to replace declining agricultural groundwater pumping in the southern part of the basin with new pumping to meet increasing municipal water demands in the same area (2) to minimize groundwater outflow to the Santa Ana River, and (3) to increase the Santa Ana River recharge into the basin.

PE 4 – Develop and Implement Comprehensive Groundwater Management Plan for Management Zone 1. The objectives of this land subsidence management program are to characterize the

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[1] WEI. (1999). *Optimum Basin Management Program – Phase I Report*. Prepared for the Chino Basin Watermaster. August 19, 1999. http://www.cbwm.org/docs/engdocs/OBMP%20-%20Phase%20I%20(Revised%20DigDoc).pdf

[2] See for example: WEI (2019). *Optimum Basin Management Program 2018 State of the Basin Report*. Prepared for the Chino Basin Watermaster. June 2018. This document is available on Watermaster's website at http://www.cbwm.org/

spatial and temporal occurrence of land subsidence, to identify its causes, and, where appropriate, to develop and implement a program to minimize or stop land subsidence.

PE 5 – Develop and Implement Regional Supplemental Water Program. The objective of this program is to improve the regional conveyance and availability of imported and recycled waters throughout the basin.

PE 6 – Develop and Implement Cooperative Programs with the Regional Board and Other Agencies to Improve Basin Management. The objectives of this water quality management program are to identify water quality trends in the basin and the impact of the OBMP implementation on them, to determine whether point and non-point contamination sources are being addressed by water quality regulators, and to collaborate with water-quality regulators to identify and facilitate the cleanup of soil and groundwater contamination.

PE 7 – Develop and Implement Salt Management Plan. The objectives of this salinity management program are to characterize current and future salt and nutrient conditions in the basin and to develop and implement a plan to manage them.

PE 8 – Develop and Implement Groundwater Storage Management Program. The objectives of this storage program are (1) to implement, and periodically update, a storage management plan that prevents overdraft, protects water quality, and ensures equity among the Parties and (2) to periodically recalculate Safe Yield. This PE explicitly defined the storage management plan, including a "Safe Storage Capacity" for managed storage of 500,000 acre-feet (af) – inclusive of local and supplemental storage and Storage and Recovery Programs.

PE 9 – Develop and Implement Storage and Recovery Programs. The objectives of the conjunctive use program are to develop Storage and Recovery Programs that will provide broad mutual benefit to the Parties and ensure that basin water and storage capacity are put to maximum beneficial use while causing no Material Physical Injury (MPI).

The PEs and their associated implementation actions were incorporated into the OBMP Implementation Plan (OBMP IP). The Chino Basin Judgment Parties (Parties) then developed an agreement—the Peace Agreement—to implement it. The OBMP IP is Exhibit B to the Peace Agreement. The Peace Agreement was reviewed in a programmatic environmental impact report (PEIR), completed by the Inland Empire Utilities Agency (IEUA) in July 2000.

For purposes of the discussions in this report, the term OBMP refers to the collective programs implemented by Watermaster and others (e.g. IEUA, the Chino Basin Desalter Authority, etc.) pursuant to the Peace Agreements, the OBMP Implementation Plan, the PEIR, and any amendments to these documents.

2007 Supplement to the OBMP IP and the Peace II Agreement

The work to develop the OBMP determined that the groundwater pumping capacity of the Chino Basin Desalters would ultimately need to be 40,000 acre-feet per year (afy) to accomplish the goals of the OBMP; however the Peace Agreement only provided for the development of the first 20,000 afy of this capacity and the Parties committed to developing expansion and funding plans the remaining capacity within five years of approval of the Peace Agreement. The Parties developed the Peace II Agreement that included provisions to expand the desalting capacity to 40,000 afy. The Peace II agreement introduced Re-operation[3] to achieve Hydraulic Control[4] of the Chino Basin and maintain Safe Yield. Hydraulic Control is both a goal of the OBMP and a requirement of the maximum benefit salt-and-nutrient management plan (SNMP) that was developed by Watermaster and IEUA under PE 7 to enable the expansion of recycled water recharge and reuse throughout the basin under PEs 2 and 5.

The Parties executed the Peace II Agreement in 2007, which included a supplement to the OBMP Implementation Plan to expand the Chino Basin Desalters to 40,000 afy of groundwater pumping, to incorporate Re-operation and Hydraulic Control, and to resolve other issues. There were no changes to the storage management plan in the OBMP Implementation Plan to address the implications of the reduction in storage of basin water by 400,000 af as provided for by Re-operation.

The IEUA completed and adopted a supplemental environmental impact report (SEIR) for the Peace II Agreement in 2010.

2017 Addendum to the 2010 Peace II SEIR

In 2016, Watermaster identified the need to update the OBMP storage management plan because the total amount of water in managed storage accounts was projected to exceed the Safe Storage Capacity limit of 500,000 af defined in the 2000 OBMP. In 2017, the IEUA adopted an addendum to the Peace II SEIR to revise the storage management plan in the OBMP through June 30, 2021. The addendum was supported with engineering work that demonstrated that the Safe Storage Capacity could be safely increased to 600,000 af with the commitment that Watermaster would update the OBMP storage management plan by June 30, 2021.

Need for the 2020 OBMP Update

As of 2019, many of the projects and management programs envisioned in the 2000 OBMP have been implemented, while some have not. The understanding of the hydrology and hydrogeology of the Chino Basin has improved since 2000, and new water-management issues have been identified that need to be addressed to protect the collective interests of the Parties and their water supply reliability. For these reasons, the Parties are updating the OBMP to set the framework for the next 20 years of basin-management activities.

A more detailed description of the development of the 2000 OBMP and the rationale for and process to prepare the 2020 OBMP Update is included in a white paper prepared for the stakeholders: *White Paper – 2020 Update to Chino Basin Optimum Basin Management Program* (OBMP White Paper). The OBMP White Paper, and all documents relevant to the 2020 OBMP Update, are available on the Watermaster's website.[5]

[3] Re-operation is the controlled overdraft of the Basin by the managed withdrawal of groundwater pumping for the Desalters and the potential increase in the cumulative un-replenished pumping from the 200,000 acre-feet authorized by paragraph 3 of the Engineering Appendix Exhibit I to the Judgment, to 600,000 acre-feet for the express purpose of securing and maintaining Hydraulic Control as a component of the Physical Solution.

[4] Hydraulic Control is the elimination of groundwater discharge from the Chino North Management Zone to the Santa Ana River or its reduction to less than 1,000 afy.

[5] http://www.cbwm.org/OBMPU.htm

Stakeholder Process for the 2020 OBMP Update

The 2020 OBMP Update is being conducted using a collaborative stakeholder process like that employed for the development of the 2000 OBMP. A series of public listening sessions are being held by the Watermaster throughout 2019 to support the 2020 OBMP Update. The purpose of the listening sessions is to obtain information, ideas, and feedback from the stakeholders to define their issues needs and wants, their collective goals for the 2020 OBMP Update, the impediments to achieving the goals, the management actions required to remove the impediments, and an implementation plan for the management actions.

The Watermaster has established an OBMP Update Team to facilitate the stakeholder process. The OBMP Update Team is composed of Watermaster staff, Watermaster legal counsel, engineers and scientists from Wildermuth Environmental Inc. ([WEI] Watermaster's engineering consultant), and staff from the IEUA. The OBMP Update Team is providing key information prior to and during each listening session to enable the stakeholders to provide their input on each topic discussed. The objective is for the ideas and opinions of every stakeholder to be heard. Participation in the listening sessions is critical to the development of the 2020 OBMP Update.

The work documented in this Scoping Report is based on the discussions and feedback from the first four listening sessions, which were held on the following dates:

- Listening Session #1: January 15, 2019
- Listening Session #2: February 12, 2019
- Listening Session #3: March 21, 2019
- Listening Session #4: May 16, 2019

The objectives of the first four listening sessions were (1) to confirm the need to update the OBMP, (2) to identify the issues, needs, and wants of the stakeholders, (3) to define goals for the 2020 OBMP Update, and (4) to identify the new and revised activities that could be included in the 2020 OBMP Update to remove impediments to achieving the 2020 OBMP Update goals. Listening Session memorandums were prepared to document the outcomes of Listening Sessions 1, 2, and 3. The listening session memorandums are included as appendices herein. This Scoping Report summarizes and integrates the work products of the first four listening sessions and provides new information on the recommended scope of work to implement the 2020 OBMP Update activities defined by the stakeholders.

The next series of listening sessions will focus on the review and revision of the activities scoped herein and the integration of those activities with the existing OBMP. The outcomes will be integrated into a recommended implementation plan for the 2020 OBMP Update. The second TM, *2020 Optimum Basin Management Program Update Report*, will form the foundation for the Parties to develop a final implementation plan and agreements to implement the OBMP Update.

2. Development of Activities for Consideration in the 2020 OBMP Update

Drivers, Trends and Implications for Basin Management

The strategic drivers and trends that shaped the goals and activities of the OBMP in the late 1990s have since changed. There a several drivers and trends in today's water management space that will challenge the ability of the Parties to protect their collective interests in the Chino Basin and their water supply reliability. Figure 1 characterizes the drivers and trends shaping water management, and their basin management implications for the Parties. "Drivers" are external forces that cause changes in the Chino Basin water space, such as climate change, regulations, and funding. Grouped under each driver are expected trends that emanate from that driver. For example, trends associated with climate change include reduced groundwater recharge, increased evaporation, and reduced imported water supply. The relationship of the drivers/trends to the management implications are shown by arcs that connect trends to implications. For example, a management implication of reduced groundwater recharge is the reduction of the Chino Basin Safe Yield.

The drivers, trends, and implications were first identified in the OBMP White Paper and served as the initial rationale for recommending an update to the OBMP. Figure 1 represents the final characterization of the drivers, trends, and implications, based on stakeholder input. The basin management implications that form the stakeholders' rationale for the 2020 OBMP Update are:

- Reductions in Chino Basin Safe Yield
- Reduced imported water availability and increased cost
- Imported water quality degradation
- Chino Basin water quality degradation
- Inability to pump groundwater with existing infrastructure
- Increased cost of groundwater use
- Recycled water quality degradation
- Reduced recycled water availability and increased cost
- Increased cost of Basin Plan compliance

Issues, Needs, and Wants of the Chino Basin Stakeholders

The issues, needs, and wants of the stakeholders form the basis of the management goals of the 2020 OBMP Update and inform the identification of impediments to the goals as well as the action items to remove the impediments. Through the listening session process, 57 unique needs and wants were identified by the stakeholders. The classes of issues identified were effectively the same as the implications for basin management defined in Figure 1 and listed above. Table 1 is a matrix that summarizes: the needs and wants of the Parties, organized by basin management issue (rows) and attribution to stakeholders that share each need/want (columns).

2020 OBMP Goals

Through the assessment of the basin management issues, needs, and wants, the stakeholders concluded that the goals defined in the 2000 OBMP are still relevant today. The following is the statement of intent developed for each goal in the 2020 OBMP Update:

> ***Goal No. 1 - Enhance Basin Water Supplies.*** The intent of this goal is to increase the water supplies available for Chino Basin Parties and improve water supply reliability. This goal applies to Chino Basin groundwater and all other sources of water available for beneficial use.

Goal No.2 - Protect and Enhance Water Quality. The intent of this goal is to ensure the protection of the long-term beneficial uses of Chino Basin groundwater.

Goal No.3 - Enhance Management of the Basin. The intent of this goal is to encourage sustainable management of the Chino Basin to avoid Material Physical Injury, promote local control, and improve water-supply reliability for the benefit of all Chino Basin Parties.

Goal No. 4 - Equitably Finance the OBMP. The intent of this goal is to identify and use efficient and equitable methods to fund OBMP implementation.

The far right-hand column of Table 1 (issues, needs, and wants) illustrates the nexus of the goals to the needs and wants of the Parties.

Activities for Consideration in the 2020 OBMP Update

There are physical, institutional, and financial impediments to achieving the 2020 OBMP's goals. The issues, needs, and wants of the stakeholders shown in Table 1 recognize these impediments. The stakeholders identified and described 12 new and revised activities that will be considered for inclusion in the 2020 OBMP Update. The 12 activities are listed in Table 2. Table 1 illustrates which of the 12 activities (identified by the letters A through L, as characterized in Table 2) the stakeholders believe have the potential to address each of their needs and wants. 55 of the 57 needs and wants were identified as addressed by one or more of the proposed activities.

Nexus Between the 2020 OBMP Update Goals, Their Impediments, and the Activities Recommended for Consideration

Table 3 illustrates the nexus of the OBMP goals, the impediments to achieving these goals, the activities to remove the impediments, and the potential outcomes (i.e. the implications) of implementing each activity. Table 3 also shows the nexus of each activity to addressing the issues needs and wants of the stakeholders, categorized by basin management issues. In the process of developing Table 3, it was identified that some of the activities defined in Table 2 are related enough to be combined into single activities. The 12 activities were condensed into eight activities. The statements of impediments, expected outcomes, and grouping of the activities were initially proposed by the 2020 OBMP Update Team, based on stakeholder input in Listening Sessions #1 through #3, and were subsequently revised, based on the feedback obtained from stakeholders during Listening Session #4.

The eight activity groups scoped out herein are:

1. Construct new facilities and improve existing facilities to increase the capacity to store and recharge storm and supplemental water, particularly in areas of the basin that will promote the long-term balance of recharge and discharge (Activity A).
2. Develop, implement, and optimize Storage and Recovery Programs to increase water-supply reliability, to protect or enhance Safe Yield, and to improve water quality (Activity B)
3. Maximize the reuse of recycled water produced by the IEUA and others (Activity D).
4. Develop and implement a water-quality management plan to address current and future water-quality issues, protect beneficial uses, and develop strategic regulatory-compliance solutions to comply with new and evolving drinking water standards that achieve multiple benefits (Activity EF).
5. Develop a management strategy within the salt and nutrient management plan to ensure ability to comply with dilution requirements for recycled water recharge (Activity K).

6. Identify and implement regional conveyance and treatment projects/programs to enable all stakeholders to exercise their pumping rights and minimize land subsidence and to optimize the use of all water supply sources (Activity CG).
7. Perform the appropriate amount of monitoring and reporting required to fulfill basin management and regulatory compliance (Activity L).
8. Develop a process to provide for the equitable distribution of the costs and benefits of the OBMP Update, to encourage regional partnerships for implementation to reduce costs, and to identify and pursue low-interest loans, grants, or other external funding sources to support the implementation of the OBMP Update (Activity HIJ).

3. Scope of Work to Perform Proposed 2020 OBMP Update Activities

In this section, each of the eight activities identified by the stakeholders will be described in detail. The potential outcomes Table 3 provide the basis for intended scope of each activity. For each activity the following is described:

- Description of the activity
- Need and function of the activity
- Relationship to the PEs in the 2000 OBMP and OBMP IP
- Scope of work to perform the activity
- Schedule of the implementation actions
- Budget-level cost estimate to implement the initial implementation actions

Assumptions Applied in Defining the Scope of Work, Schedule, and Cost of the OBMP Activities

In order to develop the scope of work, schedule, and cost of the activities, the following assumptions were made:

Basis for scope of work and cost. The scopes of work and associated costs to perform the 2020 OBMP Update activities are based on the current understanding of the stakeholders' desired outcomes as articulated during the 2020 OBMP Update listening sessions and described in Section 2 in this TM1. The precise scopes of work and costs defined in this section are preliminary and will likely change during implementation. Each scope of work includes an introductory process to refine the objectives of the activity and to refine the scope of work, schedule, and costs, as necessary. The scopes of work will be performed by engineers hired by Watermaster, the IEUA or others responsible for implementing the OBMPU.

Estimated costs of engineering services. The estimated engineering services costs are based on 2019 WEI rates and rounded to the nearest $1,000. The estimated costs will need to be adjusted in implementation based on the final recommended scope and schedule.

Participating agency costs are not included. The staff labor costs and other direct costs incurred by agencies participating in the activities are not included in the implementation cost estimates contained herein.

Stand-alone costs. The recommended scope of work and cost for each OBMP activity were developed assuming that the activities were unrelated, or that they could be implemented independently. Once the final set of activities and scopes are selected for inclusion in the 2020 OBMP Update, the scopes will be reviewed to identify overlapping tasks among the activities and will be refined to integrate the work and reduce costs.

Existing OBMP activities. The recommended scopes of work assume that the ongoing activities of the 2000 OBMP and the 2007 supplement to the OBMP IP will continue unless otherwise specified, including, the Recharge Master Plan updates, the ongoing monitoring program under PE1, the Ground Level Monitoring Program, the maximum benefit salt and nutrient management plan, and the Prado Basin Habitat Sustainability Program.

Leveraging existing work. The recommended scopes of work and costs were assumed to leverage existing work being performed by Watermaster, such as the Safe Yield recalculation. There may be opportunities to leverage work done by other agencies to reduce the cost of implementing the recommended scope of work. In implementation, when the activity objectives and scopes of work are being refined, the ability to leverage the work of others would need to be identified and considered to eliminate redundancies and reduce cost.

Schedule. Unless otherwise stated, the schedule to implement the activities is provided in a general context (Year 1, Year 2, Year 5, etc.) and not assigned to a specific start or end date.

Activity A

Description of Activity A

Activity A defined by the stakeholders is:

> *Construct new facilities and improve existing facilities to increase the capacity to store and recharge storm and supplemental waters, particularly in areas of the basin that will promote the long-term balance of recharge and discharge.*

Activity A has the following objectives: (1) to maximize stormwater capture pursuant to Watermaster's diversion permits, (2) to promote the long-term balance of recharge and discharge, (3) to ensure sufficient supplemental water recharge capacity for future replenishment, (4) to reduce dependence on imported water by maintaining or enhancing Safe Yield, (5) to improve water quality, and (6) to ensure a supply of dilution water to comply with recycled water recharge permit requirements. For the remainder of this section, the use of the term "recharge" is inclusive of diverting, storing, and recharging storm and supplemental waters.

Through the listening session process, the stakeholders identified the following as potential outcomes of performing Activity A:

- Increase recharge of high-quality stormwater that will:
  - protect/enhance Safe Yield,
  - improve water quality,
  - reduce dependence on imported water,
  - increase pumping capacity in areas of low groundwater levels and areas of subsidence concern, and
  - provide new supply of blending water to support the recycled-water recharge program.
- Provide additional supplemental-water recharge capacity for replenishment and the implementation of Storage and Recovery Programs.
- Provide additional surface water storage capacity.

Activity A has similar objectives to those of PE 2 of the 2000 OBMP – *Develop and Implement Comprehensive Recharge Program*. PE2 was included in the 2000 OBMP to reverse the loss of yield caused by urbanization and the concrete lining of natural streams overlying the Chino Basin. The scope of work defined under PE2 was to continue the recharge master plan study initiated by Watermaster and the Chino Basin Water Conservation District (CBWCD) in 1998. The implementation plan for PE2, as defined in the Peace Agreement, requires the preparation of a recharge master plan update (RMPU) at least every five years.

The objectives and scope of each RMPU are defined at the beginning of each update and are derived from several guiding documents: the Peace Agreement, the Peace II Agreement, and the Special Referee's December 2007 Report. Pursuant to these guiding documents, the general objectives of the RMPU include:

- Ensure there is enough recharge capacity and supplemental water available to meet future replenishment requirements. Pursuant to the Judgment, there must be enough wet-water recharge capacity available to Watermaster to ensure it can replenish the basin with supplemental water to offset overproduction. The wet-water recharge capacity for replenishment must include consideration of the availability of supplemental water supplies, competing uses for the recharge facilities, and the need to balance recharge and discharge in every area and subarea.

- Maximize the recharge of recycled and storm waters where feasible. Both of these supplies are reliable: they are under local control and are less costly when compared to imported water supplies.
- Balance the recharge and discharge in every area and subarea. This provision in the Peace Agreement was included to enable Watermaster to use its discretion when conducting recharge and replenishment operations to prioritize the location and magnitude of recharge and replenishment to improve the Hydrologic Balance, to ensure pumping sustainability, and to help manage land subsidence.

To meet these objectives, the RMPUs must consider and address recharge requirement projections, the availability of storm and supplemental waters for recharge and replenishment, and the physical means to satisfy these recharge projections. To the extent that new or modified facilities are required to meet the objectives, the RMPUs include a schedule for planning, design, and construction of recharge improvements. The 2002 Recharge Master Plan and subsequent RMPUs (2010, 2013, and 2018) were developed in open and transparent planning processes that were convened by Watermaster. As part of the *2013 Amendment to the 2010 RMPU* (2013 RMPU), the RMPU Steering Committee was created to assist Watermaster and the IEUA in preparing RMPUs. The Steering Committee is open to all interested stakeholders and meets regularly through the development of RMPUs. Since the implementation of the OBMP began, Watermaster has achieved the following through the RMPU process:

- Modified seventeen existing flood retention facilities to increase diversion rates, conservation storage, and recharge, and constructed two new recharge facilities. These improvements increased average annual stormwater recharge by about 9,500 acre-feet per year (afy). The cost of these recharge improvements was about $60 million, IEUA and Watermaster paid for about half of this cost, while the other half was funded through Proposition 13 grants and other grant programs.
- Completed the design of five recharge improvement projects, expected be completed and in operation by 2021. These projects are expected to increase average annual stormwater recharge by an additional 4,700 afy.
- Ensured sufficient supplemental water recharge capacity is available to meet its Replenishment Obligations through 2050.

The next RMPU must be completed and submitted to the Court by October 2023. Based on the alignment of the objectives of Activity A with those of the RMPU, Activity A can be accomplished through the existing RMPU process. The sections below describe the limitations of the existing RMPU process to fully achieve the objectives of Activity A and the recommended scope to refine the RMPU process to accomplish the objectives.

Need and Function of Activity A

Watermaster holds three permits with the State Water Resources Control Board (State Board) for the diversion and recharge of stormwater in trust for the Parties. The San Bernardino County Flood Control District (SBCFCD) is a co-permittee for two of these permits, 19895 and 20753. Each permit defines a maximum diversion limit and the period over which diversions are allowed to occur each year (diversion season):

- Permit 19895 has a diversion limit of 15,000 acre-feet (af) from November 1 to April 30,
- Permit 20753 has a diversion limit of 27,000 af from October 1 to May 1, and
- Permit 21225 has a diversion limit of 68,500 af from January 1 to December 31.

When combined, these permits allow up to 110,500 af per year (afy) of diversion and recharge. Exhibit A-1 shows the locations where stormwater may be diverted from the stream systems (points of diversion [PODs]) as defined in Permits 19895, 20753, and 21225. The PODs for Permit 19895 are located on the Day Creek system, the PODs for Permit 20753 are located on the San Sevaine Creek system, and the PODs for Permit 21225 are located on the San Antonio/Chino Creek, Cucamonga Creek, Day Creek, and San Sevaine Creek systems. Permit 21225 includes PODs that are also listed in Permits 19895 and 20753, but expands the allowable diversion season.

From 2003 to 2005, Watermaster, working in collaboration with the IEUA, constructed the first set of recharge facilities to exercise its rights pursuant to these permits, increasing average annual stormwater recharge by about 9,500 afy. In 2013, Watermaster and the IEUA completed the 2013 RMPU, which included five new recharge facility improvement projects. As of this writing and as stated above, Watermaster and the IEUA are completing the final design/construction of the 2013 RMPU facilities, and they should be online in 2021. These facilities are expected to increase stormwater recharge by about 4,700 afy.[6] Upon completion of the 2013 RMPU facilities, the annual average stormwater recharge performed pursuant to these three permits is expected to be about 14,950 afy.[7] Exhibit A-2 shows the locations of the existing and planned facilities.

Exhibit A-3 lists the existing recharge facilities and shows the historical average stormwater recharge from 2005 to 2018, the theoretical maximum supplemental water recharge capacity, and the total theoretical maximum recharge capacity for each facility. As shown in Exhibit A-3, actual stormwater recharge has averaged about 10,150 afy which is about 10 percent of the combined diversion limit and 15 percent of the total theoretical maximum recharge capacity. The differences between the historical average stormwater recharge and the diversion limit and total theoretical maximum recharge capacity suggests lost opportunity for stormwater recharge. Because the existing diversion structures are used at their instantaneous capacities, the limitations to increasing the capture and recharge of stormwater are diversion capacity and storage capacity. Hence, Activity A has been identified to increase the capacity to divert, store, and recharge additional surface water.

Availability of Additional Stormwater for Recharge

To better understand the lost opportunity for recharge, Watermaster used its Wasteload Allocation Model (WLAM) to estimate the daily stormwater discharge available for diversion over each permit's respective diversion season, based on the historical hydrology for the 63-year period of 1950 to 2012.[8] The WLAM uses daily precipitation, evapotranspiration, evaporation, and land use data to estimate stormwater discharge entering the stream systems. The WLAM then uses hydraulic design data for channels and stormwater management facilities to computationally route the stormwater discharge through the channels, diversion works, and recharge facilities. The stormwater discharge available for diversion was determined to be the flow at the most downstream PODs on each stream system.

Exhibits A-4 and A-5 show comparisons of stormwater discharge available for diversion, model-estimated stormwater recharge, and permitted diversion limits. Exhibit A-4 presents a direct comparison of the annual time series of stormwater discharge—divided into stormwater diverted for recharge and

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[6] Note that Watermaster completed its 2018 RMPU in October 2018, but no projects were selected for implementation.

[7] 2018 Recharge Master Plan Update. WEI. September 2018.

[8] WEI. (2018). *Support for Watermaster's response to State Board request for information for petition for extensions of time.* Prepared for Chino Basin Watermaster. March 7, 2018.

stormwater not diverted for recharge—and the total annual diversion limit. Exhibit A-5 presents a cumulative frequency plot that shows: (1) the probability that stormwater discharge is equal to or greater than a specified value, (2) the probability that stormwater recharge for existing and projected 2013 RMPU facilities is equal to or greater than a specified value, and (3) the permitted diversion limit. Based on Exhibit A-5, the theoretical average annual stormwater discharge is estimated to be about 74,000 afy and the projected average annual stormwater recharge with existing and projected 2013 RMPU facilities is about 14,500 afy. The difference between these two values, 60,000 afy, is the lost opportunity for stormwater recharge.

Through the RMPU process, the Steering Committee analyzes and recommends projects that can increase stormwater diversion and storage capacity and increase stormwater recharge, up to the permit limit, for Watermaster approval. Historically, Watermaster and the IEUA have selected projects for implementation only if the melded unit cost of stormwater recharge resulting from the projects was less than the avoided unit cost of purchasing imported water from the Metropolitan Water District of Southern California (Metropolitan). Over time, more expensive stormwater recharge projects will meet the criteria as the unit cost of imported water increases in the future. The use of this economic criterion alone ignores the economic value of the greater reliability of stormwater relative to imported water.

Exhibit A-6 lists the potential new stormwater recharge projects evaluated in the 2018 RMPU. The locations of these potential projects are shown in Exhibit A-7. The projects listed in Exhibit A-6 were reviewed, and their capital and unit stormwater recharge costs were projected to 2023 costs, which is the year when the next RMPU is due to be completed. The unit cost of new stormwater recharge for the projects listed in Exhibit A-6 ranges from $2,000 to $6,000 per af, and the estimated new stormwater recharge from these projects ranges from 7 to 5,000 afy. Exhibit A-8 is a time history chart showing the historical and projected cost of imported water purchased from Metropolitan compared to the projected unit stormwater recharge cost of the projects shown in Exhibit A-6. In all cases, the projected unit cost of new stormwater recharge projects listed in Exhibit A-6 exceeds the projected cost of imported water that could be supplied by Metropolitan in 2023 (about $900 per af[9]) and through the foreseeable future. Based on Watermaster and the IEUA's historical selection process, no project in Exhibit A-6 was recommended for implementation in the 2018 RMPU. To accomplish the goals of Activity A, the economic criteria for selecting projects would have to be reevaluated.

Supplemental Recharge Capacity

As part of the RMPU process, Watermaster also needs to ensure that there is sufficient supplemental water recharge capacity in the basin to meet Replenishment Obligations. As shown in Exhibit A-3, the theoretical maximum supplemental water recharge capacity under the current IEUA maintenance operations averages about 56,000 afy.[10] For comparison, during FY 2017/18, about 47,000 af of supplemental water was recharged in spreading basins, using about 85 percent of the existing supplemental water recharge capacity. This suggests that new recharge facilities and/or improvements to existing facilities may be needed if Parties want to increase supplemental water recharge.

Balance of Recharge and Discharge

Historically, Watermaster has attempted to manage the recharge of storm and supplemental water to promote the balance of recharge and discharge. This method of managing recharge does not specifically

[9] WEI. (2018). *2018 Recharge Master Plan Update*. Prepared for the Chino Basin Watermaster. September 2018.

[10] This estimate corresponds to continuous use between maintenance periods and is less than the recharge capacity that would occur if the recharge basins were used less frequently.

address current basin management issues, such as existing land subsidence in Management Zone 1 (MZ1) and parts of MZ2 and pumping sustainability issues in the Jurupa Community Services District (JCSD) and Chino Basin Desalter Authority (CDA) well fields. There is a need to define additional criteria on how and where to conduct recharge to better address existing basin management issues.

Summary

Based on the information summarized herein, the opportunities and challenges in conducting Activity A are:

- The theoretical average annual stormwater discharge available for diversion under the existing water rights permits is about 74,000 afy ranging from 21,400 to 110,500 afy (combined permitted diversion), and existing facilities divert about 14,500 afy. The difference between these two values, about 60,000 afy, is a lost opportunity for stormwater recharge. Improvements to existing facilities and/or new facilities are required to achieve the stormwater recharge potential.
- Based on Watermaster and the IEUA's existing economic selection criteria, no new recharge projects were recommended for implementation in the 2018 RMPU. To accomplish the goals of Activity A, the economic criteria for selecting projects needs to be reevaluated.
- The criteria on how and where to conduct recharge needs to be updated to more effectively address the existing basin management issues, including: land subsidence, maintaining Hydraulic Control, and pumping sustainability.

These challenges can be addressed through the existing RMPU process. The section below describes the recommended scope for developing the 2023 RMPU, refined from past RMPU scopes, to better meet the current needs of the Parties defined for Activity A.

Scope of Work for Activity A

Activity A—*Construct new facilities and improve existing facilities to increase the capacity to store and recharge surface water, particularly in areas of the basin that will promote the long-term balance of recharge and discharge*—will be accomplished through the RMPU implementation process. The scope of work summarized below is for developing the 2023 RMPU and conducting the necessary work to achieve the objectives of Activity A. The scope of work consists of five tasks:

- Task 1 – Define objectives and refine scope of work
- Task 2 – Develop planning, screening, and evaluation criteria
- Task 3 – Describe recharge enhancement opportunities
- Task 4 – Develop reconnaissance-level engineering design and operating plan
- Task 5 – Plan, design, and construct selected recharge projects

Task 1 – Define objectives and refine scope of work. The objective of this task is to obtain consensus on the objectives of Activity A and the impediments this activity is meant to overcome. During this process, the Steering Committee will address questions raised by stakeholders during the OBMP Update, such as:

(1) Should Watermaster have a process in Activity A to identify vacant land for purchase even if there is no specified project or it becomes available outside the "call for projects" window of the RMPU process?
(2) Should Watermaster have a process to encourage developers to utilize infiltration to manage on-site runoff pursuant to the Municipal Storm (MS4) permit?

A detailed scope, cost, and schedule will be prepared to meet the defined objectives. Two meetings will be conducted (1) to define the objectives and impediments and (2) to define the scope, cost, and schedule.

Task 2 – Develop planning, screening, and evaluation criteria. The objectives of this task are to develop criteria to determine how and where new recharge capacity can be constructed and to evaluate and select a subset of projects to evaluate. The criteria developed to evaluate potential projects in Task 4 will include qualitative criteria, such as reliability, and quantitative criteria that include business case evaluations, expressed as net present value, unit cost, and others. The recharge projects with the best cost-benefit ratio at the time were constructed in earlier recharge improvement efforts in the 2000 OBMP implementation. The types of new stormwater projects required to meet the objectives described herein and subsequently refined in Task 1 will likely be more expensive than the avoided cost of purchasing imported water from Metropolitan. The Steering Committee will (1) review and refine criteria used in past RMPUs and (2) review the current projected basin management challenges to develop "smart" recharge criteria. The smart recharge criteria will ensure that project designs and operations are complementary to other Watermaster management activities, such as protecting and enhancing Safe Yield, management of land subsidence, promoting pumping sustainability, ensuring dilution supplies to comply with recycled water recharge permits, water quality improvement, maintenance of Hydraulic Control, and others.

Included in this scope is estimating future Replenishment Obligations, updating the estimated supplemental water recharge capacity, and characterizing the availability of imported and recycled water. Future Replenishment Obligations will be estimated in the 2020 Safe Yield recalculation effort and will be subsequently used as a criterion for planning supplemental water recharge. Two meetings will be scheduled to review and refine the criteria with the stakeholders.

Task 3 – Describe recharge enhancement opportunities. The objectives of this task are to identify potential projects, to screen them using the criteria developed in Task 2, and to subsequently develop a set of stormwater and supplemental water recharge projects for detailed evaluation. Two meetings will be conducted: (1) to develop a list of potential projects that can be implemented and (2) to review the screening of the projects defined during the first meeting and select projects to evaluate in Task 4.

Task 4 – Develop reconnaissance-level engineering design and operating plan. The objective of this task is to characterize the performance and costs of new recharge projects—individually and as a group/system. A reconnaissance-level engineering design and operating plan will be developed for each project. Each project design will include the approximate size, location, and alignment of major stormwater utilities, and will describe any potential implementation barriers. A cost opinion, stormwater recharge performance, and supplemental water recharge capacity will be determined for each project. The task includes evaluating the projects based on the criteria developed in Task 2 and recommending a set of projects for implementation. The deliverable of this task will be the *2023 Recharge Master Plan Update* report, summarizing the work performed under Tasks 1 through 4, and it will include an implementation plan and a plan to finance the preliminary design and CEQA documentation. Four meetings will be conducted: (1) to review the designs and estimated benefits of the projects, (2) to review the evaluation of the projects based on the criteria developed in Task 2 and the recommended list of projects for implementation, (3) to review the implementation plan, and (4) to review the 2023 RMPU report.

Task 5 – Plan, design, and construct selected recharge projects. The objective of this task is to implement the recommendations from the 2023 RMPU report. This task includes (1) developing and implementing necessary agreements between participating Parties, (2) preparing the preliminary design of the recommended recharge projects, (3) preparing the environmental documentation for the recommended recharge projects that will tier off the 2020 OBMP Update PEIR, (4) preparing a financial plan for constructing the recommended recharge projects, (5) preparing final designs of the recommended recharge projects, (6) acquiring necessary permits for constructing and operating the recommended recharge projects, and (7) constructing the recommended recharge projects.

Future Tasks – Repeat Tasks 1 through 5 every five years as required by the Court

Cooperative Efforts with Appropriate Entities to Implement Activity A

The IEUA, Watermaster, the CBWCD, and the SBCFCD are partners in conducting recharge in the Chino Basin. The four agencies have an agreement to implement the existing recharge program. They also collaborate to update the recharge master plan at least every five years with the guidance of the Steering Committee. Activity A will be achieved within the existing RMPU process and will maintain the existing institutional organization as follows:

- ***Watermaster***: Leads the stakeholder process to define the objectives in Task 1, to develop the criteria in Task 2, and to estimate the recharge benefit of the projects using the its existing modeling tools in Task 4.
- ***IEUA***: Leads the development of the list of projects for evaluation in Task 3 and preparing cost opinions for the projects in Task 4. Additionally, the IEUA will collaborate with Watermaster in leading Tasks 1 and 2.
- ***CBWCD***: Collaborates with Watermaster in leading Tasks 1 and 2. The CBWCD is responsible for reviewing and permitting all of the engineering designs developed under Task 5 for their facilities.
- ***SBCFCD***: Collaborates with Watermaster in leading Tasks 1 and 2. The SBCFCD is responsible for reviewing and permitting all of the engineering designs developed under Task 5 for their facilities.

The four Parties will continue to collaborate in the RMPU process and in conducting recharge in the Chino Basin.

Implementation Actions, Schedule, and Costs for Activity A

The recommended schedule to complete the scope of work described herein is described below:

Year one (FY 2020/21):

- Convene Steering Committee.
- Conduct a meeting regarding "current conditions" of groundwater recharge.
- Define objectives of Activity A and the RMP update (Task 1):
  - Define scope and schedule of RMP update.
- Develop criteria on how and where to conduct recharge (Task 2).
- Develop new criteria for evaluation and selection of recharge projects (Task 2).

Year two (FY 2021/22):

- Develop list of projects for evaluation (Task 3).
- Conduct a reconnaissance-level engineering study for the proposed projects (Task 4).

Year three (FY 2022/23):

- Select project(s) for implementation (Task 4).
- Prepare 2023 RMPU Report (Task 4).

Year four (FY 2023/24):

- Watermaster approves the 2023 RMPU Report by October 2023.
- Watermaster and the IEUA project implementation agreement. The objective of this agreement is to define the roles of Watermaster and the IEUA in the planning, permitting, design, and implementation of the projects, and the financing plan.

- SBCFCD and CBWCD Agreement. The Parties to this agreement include the SBCFCD, Watermaster, and the IEUA and potentially others. The objectives of this agreement are to define the terms and conditions to jointly explore and construct new conservation works on SBCFCD and IEUA properties and to conduct flood control and water conservation activities utilizing those same conservation works. The agreement will define the project sites, facility improvements, construction and maintenance cost allocations, user or license fees, operating criteria (with flood control purposes taking priority over conservation for joint use facilities), and other conditions. The SBCFCD will require Watermaster and the IEUA to fund SBCFCD engineering studies and analyses to demonstrate that all conservation improvements at flood control facilities will not negatively impact the operation and maintenance of SBCFCD facilities or reduce the level of the designed flood protection. All engineering studies and analyses shall be done and provided to SBCFCD for review and approval, and an encroachment permit shall be obtained from SBCFCD before the construction of any conservation improvements can commence. The SBCFCD will require that all applicable Environmental Agencies' permits and approvals be obtained and submitted to the SBCFCD before an encroachment permit can be issued.
- Agreement with property owners. Develop an agreement among a property owner, the IEUA, and Watermaster on the terms for use of land where land is required for a recharge project.
- In addition to these agreements, Watermaster will determine whether it is necessary to submit a Petition for Change with the State Board for selected projects that are not included in the Watermaster's current diversion permits. The duration of the Petition for Change process is unknown but would likely be more than one year.

Years five and six (FY 2024/25 and FY 2025/2026):

- Preliminary design of recommended projects. The level of design will be such that it enables the preparation of environmental documentation pursuant to CEQA, provides information for identifying and acquiring construction and related permits, and produces updated New Yield and cost estimates.
- Prepare environmental documentation for recommended projects. CEQA will cover the recommended projects at the project level and the deferred projects at a programmatic level, based on the project descriptions developed in Task 5. This documentation will tier off from the 2020 OBMP Update programmatic environmental impact report. Watermaster will conduct a MPI analysis in parallel with the CEQA process.
- Begin 2028 RMPU process (first year of the 2028 RMP update).

Years seven and eight (FY 2026/27 and FY 2027/28):

- Prepare Final Designs and Acquire Necessary Permits for the Selected Projects.

Years nine and ten (FY 2028/29 and FY 2029/30):

- Construct 2023 RMPU Selected Projects.

Exhibit A-9 shows the estimated budget-level engineering cost to complete Tasks 1 through 4, which is about $575,000. The cost of Task 5 cannot be estimated until the completion of Task 4. Exhibit A-9 also shows how Tasks 1 through 4 and their associated costs will be scheduled over the first three years of implementation. Note that because Watermaster and the IEUA are required to complete the RMPU at least every five years, the cost to perform the Activity A scope of work is not a new cost to the Parties.

Activity B

Description of Activity B

Activity B defined by the stakeholders is:

> *Develop, implement, and optimize Storage and Recovery Programs to increase water-supply reliability, protect or enhance Safe Yield, and improve water quality.*

The objective of Activity B is to develop and implement Storage and Recovery Programs in the Chino Basin that provide defined benefits to the Parties and the basin.

Through the listening session process, the stakeholders identified the following desired outcomes from Activity B:

- Storage and Recovery Programs that are optimized: to protect/enhance Safe Yield, to improve water quality, to avoid land subsidence, to ensure balance of recharge and discharge, and to maintain Hydraulic Control.
- Leverage unused storage space in the basin.
- Reduce reliance on imported water, especially during dry periods.
- Potentially provide opportunity for outside funding sources to implement the OBMP Update.

The Judgment recognized the existence of unused storage space within the Chino Basin that could be used by a person or a public entity to store water for subsequent beneficial use. The Judgment requires that the use of such storage capacity be undertaken only under Watermaster control and regulation to protect all stored water, to protect Safe Yield, and to avoid adverse impacts to groundwater pumpers. The Judgment prioritizes the use of storage space by the Parties over the use of storage space for the export of stored water.

The Peace Agreement defined a " Storage and Recovery Program" as the use of available storage capacity in the Chino Basin by any person to store supplemental water in the basin pursuant to a Groundwater Storage Agreement with Watermaster, including the right to export that water for use outside the basin.

Activity B has similar objectives and desired outcomes to those of PE 9 of the 2000 OBMP—*Develop and Implement Storage and Recovery Programs*. PE 9 was included in the 2000 OBMP to implement Storage and Recovery Programs to “benefit all Parties in the basin and ensure that basin waters and storage capacity are put to maximum beneficial use while causing no MPI to any producer or the basin.” The implementation plan for PE 9 was combined with PE 8—*Develop and Implement Groundwater Storage Management Program*—in the OBMP IP and Peace Agreement.

The OBMP IP included a storage management plan that allowed the Parties to utilize a 500,000 af band of storage space in the basin and requires them to mitigate adverse impacts from its use. In 2017, the IEUA adopted an addendum to the 2010 Peace II SEIR that provided a temporary increase in the useable storage space to 600,000 af through June 30, 2021. Pursuant to the OBMP IP, Watermaster shall: (1) prioritize its efforts to regulate and condition Storage and Recovery Programs for the mutual benefit of the Parties and (2) give first priority to proposed Storage and Recovery Programs that provide broad mutual benefits to the Parties.

In 2018, Watermaster conducted a *Storage Framework Investigation*,[11] where future projections of the use of storage were estimated and evaluated for potential MPI. The *Storage Framework Investigation* projected that MPI could occur due to the implementation of prospective Storage and Recovery Programs and described potential facilities and operating concepts that, if implemented, would minimize potential MPI. The *Storage Framework Investigation* is being used to inform the development of the *2020 Storage Management Plan*. The *2020 Storage Management Plan* is in preparation, and when completed, it will inform the development of future Storage and Recovery Programs.

Need and Function of Activity B

Activity B describes the Parties' desires to implement "optimized" Storage and Recovery Programs that avoid potential MPI and provide benefits, such as:

- *Increased water-supply reliability*. Imported water is stored in the basin during times of imported-water surplus and can be recovered during times of water-supply shortage (e.g. prolonged drought, imported water shortages/outages, etc.) to supplement local supplies.
- *Protected or enhanced Safe Yield*. The operation of Storage and Recovery Programs needs to be implemented to minimize reductions in net recharge and potentially increase net recharge to the basin.
- *Improvements to water quality.* Recovery operations could be programmed to occur in areas of impaired water quality, thereby removing groundwater contaminants. This would require groundwater treatment facilities. Supplemental water recharge may provide a slight water quality improvement.
- *Reduced cost of OBMP implementation.* Leave behind water, revenue, credits, investment in facilities, external funding, or other contributions produced by a Storage and Recovery Program can be used to offset Watermaster assessments and provide other benefits.

Watermaster, the IEUA, and the Parties have tried to develop and implement Storage and Recovery Programs since the Peace Agreement came into effect in 2000. The first attempt included the issuance of a request for proposals, declaring that the Chino Basin was ready to develop Storage and Recovery Programs with water agencies outside the basin. Very few proposals were received, and the proposals that were submitted did not provide the benefits desired by the Parties.

Metropolitan developed a program called the Dry-Year Yield Program (DYYP) and offered it to its member agencies in the Metropolitan service area. As key feature of the DYYP, Metropolitan offered funding to construct and operate new facilities that would enable Metropolitan to store imported water in a groundwater basin and recover it when needed. In 2003, Metropolitan, the IEUA, Watermaster, and the TVMWD entered into an agreement to implement a 100,000 af DYYP in the Chino Basin that was consistent with the DYYP parameters required by Metropolitan. The DYYP is the only Storage and Recovery Program that has been implemented within the Chino Basin since 2000, and the DYYP agreement expires in 2028. As part of the DYYP, the Parties received compensation from Metropolitan for the construction and operation of numerous facilities across Chino Basin that are used for recovery operations during "take" cycles of the DYYP. The Parties can use these facilities for their own purposes at all other times. In 2010, Metropolitan, the IEUA, Watermaster, and the TVMWD began discussions to expand the DYYP to 150,000 af of storage but decided against expansion. The Parties have expressed that the DYYP presented an opportunity to fund certain capital improvement projects that added groundwater

[11] WEI. (2019). *Storage Framework Investigation – Final Report*. Prepared for the Chino Basin Watermaster. October 2018, revised January 2019.

pumping capacity; however, the anticipated long-term benefits, such as improved water-supply reliability through dry periods, were not sufficiently planned for and agreed upon during the development of DYYP and ultimately were not realized by the Parties.

Currently, there are two new efforts underway to develop Storage and Recovery Programs: (1) the Chino Basin Water Bank being developed by some of the Parties and the IEUA and (2) the Chino Basin Program (CBP) being led by the IEUA. The latter is in response to a $207 million conditional funding opportunity awarded to IEUA under Proposition 1 for the construction and operation of storage programs that create environmental benefits in the Sacramento-San Joaquin Delta, while providing local water quality benefits.

Summary

What is common to all past efforts to develop and implement Storage and Recovery Programs is the belief that Chino Basin storage is a valuable resource that can and should be leveraged to benefit the Parties. What was missing in past efforts was an initial effort to clearly articulate the objectives of the Parties and the required benefits to be realized from Storage and Recovery Programs.

Activity B should follow a more deliberate planning process that will enable the Parties and their storing partners to select and implement Storage and Recovery Programs that achieve the objectives of the Parties and the desired benefits. To do this, the planning process should answer the following questions:

(1) Why do the Parties want to conduct Storage and Recovery Programs? And, what are the Parties' objectives for Storage and Recovery Programs?

(2) What were the obstacles to implementing Storage and Recovery Programs in the past? How do we avoid or overcome them in the future?

(3) What are the benefits desired by the Parties? How can such benefits be quantified?

(4) What are the potential source waters for Storage and Recovery Programs in the Chino Basin? What is the availability and what are the volumes of these potential source waters?

(5) Who are the entities that would be interested in obtaining water from a Storage and Recovery Programs? How would they take delivery of the stored water?

(6) How could put and take operations be performed to match the availability of the source waters with the demand for the stored water and be consistent with the *2020 Storage Management Plan*?

(7) How can existing infrastructure be used to perform put and take operations? Are new facilities required? What are the capital and O&M costs associated with the use of existing and new facilities?

(8) What are the practical alternatives for implementing Storage and Recovery Programs?

(9) What institutional arrangements are necessary to implement Storage and Recovery Programs?

The Watermaster should convene a Storage and Recovery Program Committee for the purposes of answering these questions and ultimately developing and implementing a *Storage and Recovery Program Master Plan*. The *Storage and Recovery Program Master Plan* will enable the Parties and other potential storing partners: (1) to reference a common set of objectives for Storage and Recovery Programs and align the objectives with requirements in grant applications and other funding opportunities, (2) to assess the potential for implementing Storage and Recovery Programs in the Chino Basin at various scales, (3) to solicit interest in participation in Storage and Recovery Programs, and (4) to develop Storage and Recovery Programs that are consistent with the *2020 Storage Management Plan*.

Scope of Work for Activity B

The scope of work to achieve the objectives of Activity B—*Develop, implement, and optimize Storage and Recovery Programs to increase water-supply reliability, protect or enhance Safe Yield, and improve water quality*—is designed to answer the questions listed above and will consist of the following four tasks:

- Task 1 – Convene the Storage and Recovery Program Committee and articulate the program objectives
- Task 2 – Develop conceptual alternatives for Storage and Recovery Programs at various scales
- Task 3 – Describe and evaluate reconnaissance-level facility plans and costs for Storage and Recovery Program alternatives
- Task 4 – Prepare *Storage and Recovery Program Master Plan*

Prior work has been performed for the *Storage Framework Investigation*, the Chino Basin Water Bank, and the Chino Basin Program. These past efforts can be leveraged after Watermaster completes Task 1. At the end of Task 4, Watermaster and the Parties will have a master plan for Storage and Recovery Programs, know what is reasonably possible, know what is a "stretch" program, and know how to subsequently implement the master plan.

The scope of work described below for Task 1 is a necessary first step. If the Parties cannot agree upon the objectives for Storage and Recovery Programs, Tasks 2 through 4 will not be executed. If the process moves beyond Task 1, the precise scope and level of effort required to perform Tasks 2 through 4 will greatly depend on the outcomes of Task 1. Tasks 2 through 4 are generally described below, but the cost to perform these tasks is not estimated herein. The precise scope of work for Tasks 2 through 4 will be developed in detail as part of Task 1.

Task 1 – Convene the Storage and Recovery Program Committee, define objectives, and refine scope of work. In this task, the Storage and Recovery Program Committee will be convened. The Committee's initial task is to obtain consensus on the objectives and desired benefits of Storage and Recovery Programs and, if consensus is achieved, scope the effort to prepare a *Storage and Recovery Program Master Plan*. To execute this task, the Committee will address the following questions:

(1) Why do the Parties want to conduct Storage and Recovery Programs and what should be their objectives?

(2) What were the obstacles to implementing Storage and Recovery Programs in the past, what are the current objectives, and how we can overcome them in the future?

(3) What are the benefits desired by the Parties and how should they be quantified?

Four Committee meetings will be conducted (1) to define the objectives and impediments, (2) to define a set of mutual benefits that are expected/required from Storage and Recovery Programs, and (3) to develop the preliminary scope, cost, and schedule for the work (Tasks 2 through 4 below) to develop the *Storage and Recovery Program Master Plan*.

Task 2 – Develop conceptual alternatives for Storage and Recovery Programs at various scales. The objective of this task is to describe a set of conceptual alternatives for Storage and Recovery Programs at various scales that will achieve the objectives defined in Task 1. The set of conceptual alternatives will be described and evaluated in greater detail in Task 3.

To execute this task, the Committee will address the following questions:

(4) What are the potential source waters for Storage and Recovery Programs in the Chino Basin? What is the availability and what are the volumes of these potential source waters?

(5) What entities are interested in obtaining water from a Storage and Recovery Program? How would they take delivery of the stored water?

(6) How could put and take operations be performed to match the availability of the source waters with the demand for the stored water and be consistent with the 2020 Storage Management Plan?

Five to six Committee meetings will be needed to answer these questions, describe various conceptual alternatives for Storage and Recovery Programs, and evaluate and select a set of these alternatives for further development, evaluation, and ranking in Task 3.

Work involved in this task will likely include: (1) collecting, compiling, and reviewing existing and new information; (2) identifying potential source waters for Storage and Recovery Programs in the Chino Basin; (3) characterizing the availability and volumes of these potential source waters; (4) identifying the entities that would be interested in obtaining water from a Storage and Recovery Programs; (5) characterizing how the entities would take delivery of the stored water; (6) identifying and characterizing institutional challenges to program implementation; (7) developing planning criteria to formulate and rank the conceptual Storage and Recovery Program alternatives; (8) describing several conceptual alternatives for Storage and Recovery Programs of various scales; and (9) selecting a set of alternatives for further development, evaluation, and ranking in Task 3.

Each alternative will describe, at a conceptual level, the operating parameters for put and take operations in the Chino Basin that match the available source waters with the demand for stored water. The alternatives must be consistent with the Watermaster's 2020 Storage Management Plan and the objectives for Storage and Recovery Programs defined in Task 1.

Task 3 – Describe and evaluate reconnaissance-level facility plans and costs for Storage and Recovery Program alternatives. The objective of this task is to describe and evaluate reconnaissance-level facility plans, operational plans, and cost opinions to implement the various Storage and Recovery Program alternatives described in Task 2.

To execute this task, the Committee will need to answer the following questions:

(7) How can existing infrastructure be used to perform put and take operations? Are new facilities required? What are the capital and O&M costs associated with the use of existing and new facilities?

(8) What are the practical alternatives for implementing Storage and Recovery Programs?

Three to four Committee meetings will be needed to answer these questions and to describe, evaluate, and rank the various Storage and Recovery Program alternatives.

For each alternative, two sub-alternatives will be developed: one alternative that uses both existing and new facilities and one that is based only on new facilities. Potential implementation barriers will be described. Capital and O&M cost opinions will be prepared for each alternative, utilizing criteria developed in Task 2.

To characterize the performance of the Storage and Recovery Program alternatives: (1) the Watermaster's groundwater model will be utilized to estimate the physical response of the basin and to assess the potential for MPI, and (2) the benefits of the Storage and Recovery Program will be quantified and assessed. Each alternative will be ranked using this and any other criteria developed in Task 2.

Task 4 – Prepare Storage and Recovery Program Master Plan. The objective of this task is to prepare a *Storage and Recovery Program Master Plan* that will enable the Parties and other potential storing partners: (1) to reference a common set of objectives for Storage and Recovery Programs and align the objectives with requirements in grant applications and other funding opportunities, (2) to assess the potential for implementing Storage and Recovery Programs in the Chino Basin at various scales, (3) to solicit interest in participation in Storage and Recovery Programs, and (4) to develop storage and recovery programs that are consistent with the *2020 Storage Management Plan*.

The plan will describe the results and recommendations of Tasks 1 through 3 and will include a discussion of the institutional arrangements required to implement Storage and Recovery Programs in the Chino Basin. Three to four Committee meetings will be needed (1) to finalize the discussion on what was learned in prior tasks, (2) to gain consensus on the recommendations, and (3) to review, revise, and finalize the *Storage and Recovery Program Master Plan*.

Cooperative Efforts with Appropriate Entities to Implement Activity B

This is a basin-wide activity that involves the Parties, IEUA, TVMWD, and WMWD. Potential storing partners located outside of the Chino Basin will need to be consulted but need not participate on the Storage and Recovery Program Committee. Watermaster's role will be to convene the Storage and Recovery Program Committee, coordinate and administer its activities and meetings, and ensure that the recommendations derived from this effort are consistent with the Judgment, Peace Agreements and other agreements, the 2020 Storage Management Plan, and the Watermaster Rules and Regulations.

Implementation Actions, Schedule, and Costs for Activity B

The recommended schedule to complete the scope of work described herein is described below:

Year one:

- Convene Storage and Recovery Program Committee and articulate the program objectives (Task 1).

Year two:

- Develop conceptual alternatives for Storage and Recovery Program s at various scales (Task 2).

Year three:

- Describe and evaluate reconnaissance-level facility plans and costs for Storage and Recovery Program alternatives (Task 3).
- Prepare *Storage and Recovery Program Master Plan* (Task 4).

Year four and thereafter:

- Develop and implement Storage and Recovery Program with guidance and assistance from the *Storage and Recovery Program Master Plan*.
- Update the *Storage and Recovery Program Master Plan* as needed to be consistent with periodic updates to the Storage Management Plan.

Exhibit B-1 shows the estimated budget-level cost opinion to complete Task 1, which is about $105,000. The cost of Tasks 2 through 4 cannot be estimated until the completion of Task 1. Exhibit B-1 also shows how Tasks 1 through 4 will be scheduled over the first three years of implementation.

Activity D

Description of Activity D

Activity D defined by the stakeholders is:

Maximize the reuse of recycled water produced by IEUA and others.

The objective of Activity D is to maximize the reuse of recycled water produced by the IEUA and other publicly owned treatment works (POTWs) in proximity to the Chino Basin to meet future demands and improve local water-supply reliability, especially during dry periods. Expanded reuse activities could include direct non-potable reuse (landscape irrigation or industrial uses), artificial recharge by spreading or injection (indirect potable reuse), and direct potable reuse. Increasing recycled water reuse is an integral part of the OBMP's goal to enhance water supplies, and, the Judgment states that Watermaster shall give high priority to maximizing the beneficial use of recycled water for replenishment purposes (Judgment ¶ 49(a)). The direct use of recycled water increases the availability of native and imported waters for higher-priority beneficial uses.

Through the listening session process, the stakeholders identified the following as potential outcomes of performing Activity D:

- Provide a new, reliable volume of in-lieu and/or wet water recharge that could:
    - Protect or enhance Safe Yield,
    - reduce dependence on imported water,
    - improve water-supply reliability, especially during dry periods, and
    - increase pumping capacity in areas of low groundwater levels and areas of subsidence concern.
- Provide for alternative sources of recycled water that can be used to satisfy the IEUA's requirement to discharge a minimum of 17,000 afy of water to the Santa Ana River pursuant to the Santa Ana River Judgment and associated agreements with the Western Municipal Water District (WMWD).

Activity D has similar objectives to those of PE 5 of the 2000 OBMP—*Develop and Implement Regional Supplemental Water Program*. Recognizing that growth in the Chino Basin was going to result in a more than 30 percent increase in then-current water demands, PE 5 was included in the 2000 OBMP to improve regional conveyance and availability of imported and recycled waters throughout the basin. Recycled water is more reliable than imported water, and using it in lieu of imported water improves the sustainability of Chino Basin and water supply reliability. The implementation plan for PE 5 was combined with PE 3—*Develop and Implement Water Supply Plan for the Impaired Areas of the Basin* in the OBMP and Peace Agreement.

The PE 3/PE 5 implementation action defined in the Peace Agreement related to recycled water reuse was for the IEUA to construct recycled water facilities to meet recycled water demands for direct use and for groundwater recharge. Since 2000, the IEUA has constructed and operated a recycled water conveyance system throughout the basin, enabling it to provide recycled water to its member agencies. Recycled water deliveries grew from about 3,400 afy in 2000 to about 34,000 afy in 2017 and have replaced a like amount of groundwater and imported water that would have otherwise been used for non-potable purposes.

The expansion of the recycled water reuse program was made possible—and economically feasible—through the SNMP activities performed pursuant to PE 7—*Develop and Implement Salt Management Plan*.

The SNMP, discussed as part of Activity K, will be an integral management tool to enable the maximization of recycled water reuse pursuant to Activity D.

Need and Function of Activity D

History of Recycled Water Discharge and Reuse in the Chino Basin

The IEUA owns and operates four wastewater treatment facilities: Regional Plant No. 1 (RP-1), Regional Plant No. 4 (RP-4), Regional Plant No. 5 (RP-5), and the Carbon Canyon Water Reclamation Facility (CCWRF). Recycled water produced by these plants is reused for direct uses, groundwater recharge, and discharged to Chino Creek or Cucamonga Creek, which are tributaries to the Santa Ana River. Exhibit D-1 shows the location of the IEUA's treatment plants, discharge points to surface water, recharge facilities receiving recycled water, and recycled water distribution pipelines for direct use deliveries. Historically, the IEUA's operating plan has prioritized the use of recycled water as follows: (1) to meet the IEUA's discharge obligation to the Santa Ana River (17,000 afy), (2) to meet direct reuse demands for recycled water, and (3) to recharge the remaining recycled water.

Exhibit D-2 shows the time history of the IEUA's annual discharges to the Santa Ana River since FY 1977/78. The increase in recycled water discharges from 20,000 afy in FY 1977/78 to about 60,000 afy by FY 1996/97 is illustrative of the population growth in the Chino Basin over this period. Although recycled water had been reused since the 1970s, the growth of IEUA's recycled water reuse programs started in 1997. Total recycled water discharge remained at 60,000 afy through 2005 after which it declined as a result of OBMP implementation. Specifically, the incorporation of Watermaster and the IEUA's maximum benefit SNMP into the Water Quality Control Plan for the Santa Ana River Basin (Basin Plan) in 2004, triggered the ability to rapidly increase recycled water reuse. Since 2014, recycled water discharge has been less than 20,000 afy and has averaged about 18,600 afy over the last five years.

Exhibit D-3 characterizes the total reuse of recycled water for direct use and recharge in the Chino Basin from FY 1996/97 through FY 2017/18. When the OBMP was completed in 2000, the IEUA was recharging about 500 afy of recycled water and utilizing about 3,200 afy for non-potable direct uses. Recycled water reuse peaked at about 38,200 af in FY 2013/14. Total recycled water reuse in the Chino Basin declined about 5,600 to 32,700 af in FY 2017/18.

Direct Reuse. Recycled water from the IEUA's facilities is reused directly for: irrigation of crops, animal pastures, freeway landscape, parks, schools, and golf courses; commercial laundry and car washes; outdoor cleaning and construction; toilet plumbing; and industrial processes. The direct use of recycled water increased from about 3,500 af in FY 1999/00 to about 24,600 af in FY 2013/2014 and has since declined to about 19,400 af as of FY 2017/18. The recent decline is due to the mindful reduction in use by the City of Chino to accommodate changes in IEUA policy related to the use of recycled water base entitlements and conversions of land from agricultural to urban uses. Exhibit D-4 is a map of IEUA's recycled water deliveries for direct use in FY 2017/18.

Recharge. In 2005, the IEUA initiated its recycled water recharge program and recycled water has since become an important component of annual recharge to the Chino Basin. In FY 2017/18, recycled water recharge was 13,200 af and has averaged about 13,000 afy over the past five years. The locations of the recharge facilities receiving recycled water are shown in Exhibit D-4.

Recycled Water Reuse Projections and the Availability of Additional Recycled Water for Reuse

The IEUA is continuing to expand its recycled-water distribution system and recharge facilities throughout the Chino Basin for direct non-potable uses and recharge. Growth is still occurring in the Chino Basin and will result in additional wastewater flows to the IEUA's treatment plants. Much of this supply will be used to meet increasing non-potable demands as the currently remaining agricultural land uses convert to urban uses. The increasing demand for recycled water reuse will constrain the IEUA's ability to continue to use recycled water to meet its discharge obligations pursuant to the Santa Ana River Judgment.

Projected Recycled Water Supplies and Demands. Exhibit D-5 shows the IEUA's latest projections of recycled water production, expressed as a range (low and high) and projections of direct reuse and recharge through 2040.[12] Also shown in Exhibit D-5 is the calculation of surplus supply available for expanded reuse and/or discharge. Under the "high" recycled water production projections, there is sufficient surplus supply to meet the Santa Ana River discharge obligations and expand recycled water reuse. Under the "low" recycled water production projections, there is insufficient supply to meet the Santa Ana River discharge obligations through at least 2025, suggesting that the IEUA may need to find supplemental supplies to meet both recycled water demands and its discharge obligations.

Supplemental recycled water supply. In addition to the recycled water available from the IEUA, other nearby POTWs are not currently reusing recycled water and may have surplus recycled water that could be acquired and conveyed to the Chino Basin. The surplus recycled water from these POTWs could be utilized to increase reuse in the Chino Basin if it is economical to convey the water to the desired end uses or used to meet discharge obligations. The nearby POTWs with potential surplus supply include the Pomona Water Reclamation Facility (WRF), the Western Riverside County Regional Wastewater Authority (WRCRWA), the City of Rialto, RIX, and the City of Riverside. The locations of these facilities are shown in Exhibit D-1. Currently, the availability of recycled water from these or other POTWs is not precisely known.

Capacity for Expanded Recycled Water Recharge at Existing Facilities. As described for Activity A, Watermaster and the IEUA operate a set of recharge facilities in the Chino Basin to conduct storm, recycled, and imported water recharge. The IEUA and Watermaster prioritize[13] the use of these facilities as follows: (1) maximize stormwater capture and recharge, (2) meet Watermaster's replenishment and recharge obligations as required by the Judgment and Peace Agreements, and (3) recharge other supplemental water for groundwater storage and management. Exhibit D-6 shows the theoretical maximum supplemental water recharge capacity[14] that can be used for recycled water recharge, subject to Watermaster's priority need for recharge and replenishment.[15] The table also shows actual FY 2017/18 recycled water recharge (13,200 af) and planned recycled water recharge for FY 2019/20 through FY 2029/30.[16] As the table shows, the planned volume of recycled water recharge of 16,400 af is less than one-half of the theoretical maximum supplemental water recharge capacity. This suggests that there is sufficient capacity to recharge future surplus recycled water supply that will not be used for direct non-potable uses, subject to Watermaster's need for recharge and replenishment and the ability to comply with the dilution requirements defined in Watermaster and the IEUA's maximum benefit SNMP.

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[12] These projections are based on information published by the IEUA to support the development of the Chino Basin Program: *Sources of Water Supply for the Chino Basin Program.* Memo to Member Agencies. February 20, 2019. These projections differ slightly from the latest water supply planning projections published in Watermaster's *Storage Framework Investigation* and the *2018 RMPU*, both of which were published in 2018.

[13] Note that the primary goal of multipurpose facilities is to attenuate flood peak discharge.

[14] There are two estimates of theoretical supplemental water recharge capacity. The first is corresponds to the 10-month period directly after a cleaning. The second corresponds to continuous use between maintenance periods and is less than the recharge capacity that would occur if the recharge basins are used less frequently.

[15] WEI, (2019). *2018 Recharge Master Plan Update*. Prepared for the Chino Basin Watermaster. September 2018.

[16] The projection cited here is based on the recycled water projection included in the 2018 RMPU, which was published before the CBP planning memo projection of 18,700 afy.

Considerations and Challenges for Maximizing Recycled Water Reuse

There are various factors that should be considered in determining how to maximize the reuse of recycled water produced by the IEUA and other POTWs. These are summarized as follows.

Existing Planning Efforts. The IEUA is currently performing planning efforts for the CBP, which is a large Storage and Recovery Program to provide for regional, dry-year water supplies and associated infrastructure. The CBP was conditionally awarded approximately $207 million of Proposition 1 Water Storage Investment Program funding. Over its 25-year project life, the CBP would increase recycled water recharge in the Chino Basin by 15,000 afy, and during dry years, the water in storage would subsequently be recovered and pumped into Metropolitan's system for use in Southern California in lieu of imported water from the State Water Project. The planned sources of recycled water for the CBP are currently being evaluated by the IEUA, but it is certain additional supplies beyond those produced by the IEUA will be needed. The CBP is still undergoing planning and evaluation, and its implementation is not certain. Regardless of whether the CBP is implemented, the significant body of work being led by the IEUA together with regional agencies can be leveraged to accomplish Activity D.

Timing of Recycled Water Availability. A common challenge with maximizing recycled water reuse is the mismatch in the timing of non-potable water demands and recycled water supply availability. It will be important to characterize in detail the seasonality of outdoor water demands and availability of recharge capacity given that surplus recycled water may only be available in winter months when outdoor demand is low and recharge capacity is otherwise being utilized for stormwater recharge. These relationships will also vary based on climate conditions (wet versus dry periods). Fully maximizing recycled water supplies will require an understanding of these complex relationships to optimize the design and operation of projects. Fully maximizing recycled water reuse may require storage facilities.

Salt and Nutrient Management. Watermaster and the IEUA have an existing maximum benefit SNMP that enables the reuse and recharge of IEUA recycled water in the Chino Basin (refer to Activity K for more details). This SNMP, which is incorporated into the Basin Plan for the Santa Ana Region, did not contemplate the use of non-IEUA sources of recycled water in the Chino Basin. Some of the available recycled water sources have TDS and/or nitrate concentrations that are numerically higher than those of IEUA's current or permitted TDS and nitrate limits, which could impact compliance with the SNMP or trigger additional mitigation measures to protect beneficial uses. Detailed water quality projections would be required to demonstrate the impacts of reuse of non-IEUA sources of recycled water in the Chino Basin. The existing SNMP contains provisions for mitigation at such time that the TDS and/or nitrate concentration of recycled water or groundwater exceeds the regulatory limits defined in the Basin Plan.

Water Quality. Water quality regulations are constantly evolving as new contaminants of potential concern are identified and studied. In recent years, the presence of pharmaceutical and personal care products (PPCPs) in recycled water has been an area of focused research to determine potential health impacts that could result from reuse of recycled water for recharge in groundwater basins. A new set of emerging contaminants of concern is a group of chemicals known as poly- and per-fluorinated compounds (PFAS). PFAS are known to be present in recycled water, and any new regulatory standards for PFAS in drinking water could impact the ability to reuse recycled water without treatment (see discussion in Activity EF for additional details on PFAS).

Direct Potable Reuse (DPR). The direct potable reuse of recycled water, although only currently being done at a very limited pilot scale in California, is emerging as a potential future municipal water supply. The State Board has released a framework for regulating DPR through reservoir and raw water augmentation, but regulatory criteria for DPR projects will not be adopted for many years. The State Board will prioritize developing regulations for reservoir augmentation and will follow with raw water augmentation in the future after more research is completed to determine the criteria necessary to ensure protection of public health. DPR will require advanced treatment of any recycled water source used.

Santa Ana River Judgment. Historically the IEUA has used recycled water to meet its obligations under the Santa Ana River Judgment. As demand for recycled water increases, the IEUA will have to rely on other sources of water to meet this obligation. If the IEUA were able to obtain access to additional water supplies (recycled or other supplemental), alternative plans should be evaluated to optimize which sources are used to ensure that the IEUA meets its annual discharge volume and water quality requirements pursuant to the Judgment.

Summary

The process to achieve the objective of Activity D to maximize the reuse of recycled water produced by IEUA and others should include: (1) a characterization of the availability of all recycled water supplies, (2) a characterization of the direct recycled water demands of the Parties, (3) identification of project opportunities and the planning and screening criteria to evaluate them, and (4) development of reconnaissance-level engineering design and operating plans. This information could then be used to evaluate, prioritize, and select projects for implementation. To optimize the expansion of recycled water reuse, the Parties should convene a Recycled Water Projects Committee for the purposes of evaluating project opportunities and developing a plan to implement them. The Committee could be comprised of representatives from all interested stakeholders and could be led by IEUA, Watermaster, and/or others. The scope of work to implement such a process is described below.

Scope of Work for Activity D

The scope of work to achieve the objectives of Activity D—*Maximize the reuse of recycled water produced by IEUA and others*—consists of six tasks:

- Task 1 – Convene Recycled Water Projects Committee, define objectives and refine scope of work
- Task 2 – Characterize the availability of all recycled water supplies and demands
- Task 3 – Develop planning, screening, and evaluation criteria
- Task 4 – Describe recycled water reuse project opportunities
- Task 5 – Develop reconnaissance-level engineering design and operating plan
- Task 6 – Plan, design, and construct selected recycled water projects

The IEUA already performs various efforts to characterize recycled water supply and demand within its service area, including the periodic update of its Integrated Resources Plan (IRP). And, as previously noted, the IEUA is performing a significant amount of work to evaluate opportunities to acquire surplus recycled water supplies for recharge as part of the CBP, and this work could be leveraged to reduce the effort required to implement the scope of work for Activity D.

Task 1 – Convene Recycled Water Projects Committee, define objectives and refine scope of work. In this task, a Recycled Water Projects Committee will be convened. The Committee's initial tasks are (1) to obtain consensus on the objectives for maximizing recycled water reuse, (2) to refine the preliminary scope of work defined in the 2020 OBMP Update (Tasks 2-7 below), and (3) to update the schedule and cost to perform the work. Two Committee meetings will be conducted to accomplish these tasks.

Task 2 – Characterize the availability of all recycled water supplies and demands. The objectives of this task are: (1) to characterize the future water demands of the Parties to estimate the IEUA's recycled water production, (2) to prepare updated projections of the direct recycled water reuse demands of the Parties, (3) to identify other available sources of recycled water, (4) to characterize the use and potential availability of each recycled water supply (IEUA and others), and (5) to identify the institutional and physical challenges for acquiring each source of surplus supply. The recycled water availability and direct reuse demands will be characterized on a monthly basis for various climate conditions to enable the characterization of potential storage needs to fully maximize recycled water reuse. One meeting will be conducted to review the characterization of recycled water availability.

Task 3 – Develop planning, screening, and evaluation criteria. The objective of this task is to develop the criteria that will be used to evaluate recycled water reuse projects in Tasks 4 and 5. The types of criteria developed to evaluate potential projects will include:

- Watermaster criteria that include no potential MPI, balance of recharge and discharge; and others;
- regulatory criteria that include compliance with salt and nutrient management plans, DDW regulations, and others;
- qualitative criteria that include institutional complexity, reliability of non-IEUA recycled water sources, overall water supply reliability and others; and
- quantitative criteria that include business case evaluations expressed as net present value, unit cost, and others.

Two meetings will be conducted to review and refine the criteria with the Recycled Water Projects Committee.

Task 4 – Describe recycled water reuse project opportunities. The objectives of this task include identifying potential recycled water project alternatives, screening them using the criteria developed in Task 3, and selecting a set of projects for detailed evaluation. Three meetings will be conducted to develop the list of potential projects that can be implemented, to review the screening of the projects, and to select the projects to evaluate in Task 5.

Task 5 – Develop reconnaissance-level engineering design and operating plan. The objective of this task is to characterize the performance and costs of new recycled water projects for reuse, individually and as a group/system. A reconnaissance-level engineering design and operating plan will be developed for each project. Each project design will include the approximate size, location, and alignment of major recycled water utilities, and will describe any potential implementation barriers for the project. A cost opinion will be determined for each project. This task includes evaluating projects based on the criteria developed in Task 2 and recommending a set of projects for implementation. The deliverable of this task will be a technical report that summarizes the work performed under Tasks 1 through 4, and it will include an implementation plan as well as a plan to finance the preliminary design and CEQA documentation. Five meetings will be conducted to review the design and estimated benefit of the projects; review the evaluation of the projects, based on the criteria developed in Task 2, and review the recommended list of projects for implementation; review the implementation plan; and review the technical report.

Task 6 – Plan, design, and construct selected recycled water projects. The objective of this task is to implement the recommendations of the technical report. This task includes (1) developing and implementing necessary agreements between participating Parties, (2) preparing the preliminary design of the recommended projects, (3) preparing the environmental documentation for the recommended projects that will tier-off the 2020 OBMP Update PEIR, (4) preparing a financial plan for constructing the recommended projects, (5) preparing final designs of the recommended projects, (6) acquiring necessary permits for constructing and operating the recommended projects, and (7) constructing the recommended projects.

Task 7 – Periodically re-evaluate availability of recycled water supplies for reuse. As agencies update water supply and demand projections, project economics change, and other changes occur in the Basin, the ability to maximize the reuse of recycled water may also change. As such, Task 2 should be updated periodically. A first step in this task would be to scope out a process to periodically update the characterization of recycled water supply and demands. Following each future assessment, the Recycled Water Projects Committee would determine the need to perform the steps in Tasks 3 through 6 again.

Cooperative Efforts with Appropriate Entities to Implement Activity D

This is a basin-wide activity that involves the Parties in the IEUA, TVMWD, and WMWD service areas. Given its current efforts, the IEUA would be the logical entity to lead the implementation of Activity D on behalf of all Parties in these service areas, but the process could be led by others. In this role, the agency leading the project on behalf of the Parties would: convene the Recycled Water Projects Committee, characterize recycled water demands, identify additional recycled water supplies and conduct discussions with the owners of those supplies, and contract for planning and engineering services as required. Watermaster's role would be to work with project lead, on the implementation of Activity D (1) to review and evaluate the basin management implications of the recycled water projects, including but not limited to compliance with the maximum benefit SNMP and (2) to ensure that its implementation is consistent with the Judgment, Peace Agreements and other agreements, and the Watermaster Rules and Regulations.

Implementation Actions, Schedule, and Costs for Activity D

The recommended schedule to complete the scope of work described herein is described below:

Year one:

- Convene Recycled Water Projects Committee and refine scope of work, schedule and budget (Task 1).
- Characterize the availability of all recycled water supplies (Task 2).
- Develop planning, screening, and evaluation criteria for recycled water projects (Task 3).
- Conduct five committee meetings to review and refine the work products of Tasks 1 through 3.

Year two:

- Develop list of recycled water projects for evaluation (Task 4).
- Begin reconnaissance-level engineering study for the proposed projects (Task 5).
- Conduct four workshops to review and refine work products of Tasks 4 and 5.

Year three:

- Complete reconnaissance-level engineering study for the proposed projects (Task 5).
- Select project(s) for implementation.
- Prepare final report documenting work performed in Tasks 1 through 5.

Years four through six:

- Watermaster, the IEUA, and other potential partners develop a project implementation agreement. The objective of this agreement is to define the roles of each partner in the planning, permitting, design, and implementation of the projects, and the cost allocations.
- Preliminary design of recommended projects. The level of design will be such that it enables the preparation of environmental documentation pursuant to CEQA, provides information for identifying and acquiring construction and related permits, and produces an updated recycled water capacity benefit.

- Prepare environmental documentation for projects. CEQA will cover the recommended projects at the project level and the deferred projects at a programmatic level (PEIR), based on the project descriptions developed in Task 5. This documentation will tier-off from the 2020 OBMP Update PEIR. Watermaster will conduct an MPI analysis in parallel with the CEQA process.

Years seven and eight:

- Prepare final designs and acquire necessary permits for the selected projects.

Years nine and beyond:

- Construct selected Projects.

Exhibit D-7 shows the estimated budget-level engineering cost to complete Tasks 1 through 5, which is about $620,000. The cost of Tasks 6 and 7 cannot be estimated until the completion of Task 5. Exhibit D-7 also shows how Tasks 1 through 5 and their associated costs will be scheduled over the first three years of implementation.

As previously discussed, because the IEUA performs various efforts to estimate the recycled water supply and demands of its member agencies and is currently developing estimates of recycled water availability in the region and developing a list of project concepts for recycled water reuse as part of the CBP, the cost to perform Activity D may be lower than estimated herein.

Activity EF

Description of Activity EF

Activities E and F defined by the stakeholders are both are intended to address impediments to groundwater management that are related to groundwater quality, specifically contaminants of emerging concern. Activity E of the OBMP Update is:

> *Develop and implement a water-quality management plan to address current and future water-quality issues and protect beneficial uses.*

Activity F of the OBMP Update is:

> *Develop strategic regulatory-compliance solutions that achieve multiple benefits in managing water quality.*

The objective of the management plan envisioned for Activity E is to collect and analyze the data and information needed to characterize and proactively plan for the water quality challenges to pumping groundwater for municipal supply in a constantly evolving regulatory environment. The objective of Activity F is to evaluate the treatment and related infrastructure improvements, including the potential for multi-benefit collaborative projects, that can be implemented to ensure groundwater can be pumped for beneficial use as new drinking water regulations are adopted by the State Board's Division of Drinking Water (DDW[17]).

Through the listening session process, the stakeholders identified the following as potential outcomes of performing Activities E and F:

- Proactively address challenges and solutions to comply with new and potential future drinking water regulations.
- Enable the Parties to make informed decisions on infrastructure improvements for water-quality management and regulatory compliance.
- Remove groundwater contaminants from the Chino Basin and thereby improve groundwater quality.
- Enable the Parties to produce or leverage their water rights that may be constrained by water quality.
- Ensure that groundwater is pumped and thereby protect/enhance Safe Yield.

The 2000 OBMP included multiple PEs to protect and enhance water quality. PE 6—*Develop and Implement Cooperative Programs with the Regional Board and Other Agencies to Improve Basin Management*—was included to assess water quality trends in the basin, to evaluate the impact of OBMP implementation on water quality, to determine whether point and non-point contamination sources are being addressed by water quality regulators, and to collaborate with water quality regulators to identify and facilitate the cleanup of soil and groundwater contamination. PE 7—*Develop and Implement Salt Management Plan*—was included to characterize current and future salt and nutrient conditions in the basin and to subsequently develop and implement a plan to manage them. PE 3—*Develop and Implement a Water Supply Plan for Impaired Areas*—provided for the construction and operation of regional groundwater desalters, the Chino Basin Desalters (Desalters), to pump and treat high-salinity

[17] The DDW regulates public drinking water systems in California; prior to June 2014 it was the California Department of Public Health which was formally known as the Department of Health Services. All references to the actions of DDW herein include its predecessors.

groundwater in the southern part of the basin to maintain and enhance Safe Yield and meet increasing municipal water demands. The 2000 OBMP also recognized that the Desalters would intercept VOC contaminants associated with the Chino Airport and South Archibald plumes and that the Desalters could be used in the future to treat these contaminants (at some additional cost).

Since 2000, under PE 6, Watermaster has assessed groundwater quality in the Chino Basin using data compiled through their own monitoring activities and the efforts of other cooperating entities, reported on the water quality trends and findings, and collaborated with the Regional Board in its efforts to work with dischargers to facilitate the cleanup of groundwater contamination. Watermaster formed the Water Quality Committee to coordinate many of these activities. The Water Quality Committee convened from 2003 through 2010 and reported on its findings, work products, and recommendations to the Watermaster Pools, Advisory Committee, and Board. Since 2009, Watermaster has continued to perform ad-hoc monitoring for contaminants of emerging concern at its monitoring wells and some private agricultural wells and prepares annual or more frequent reports on the status of monitoring and remediation of point-source contamination sites. The opportunities to use the Desalters to assist in the remediation of the Chino Airport and South Archibald plumes envisioned in the 2000 OBMP IP are coming to fruition.

The objectives of Activity E and PE 6 are similar in that they address the management of groundwater quality contaminants from point and non-point sources that threaten the use of groundwater for drinking water supply. Activity E is a refinement on PE 6 in that it seeks a more proactive and basin-wide approach to address contaminants of emerging concern to better prepare the Parties for addressing compliance with new and increasingly stringent drinking water regulations defined by the DDW.

The objective of Activity F is similar to PE 3 in that it seeks to evaluate the feasibility of regional solutions for the treatment of impaired areas that can provide multiple benefits in the management of the basin to achieve the goals of the OBMP. The areas and contaminants that need to and can be addressed with regional, multi-benefit solutions can be determined as part of the process to develop and implement the groundwater quality management plan envisioned in Activity E.

The scope of work defined herein for developing and implementing a *Groundwater Quality Management Plan* will address both Activities E and F and, when implemented, will provide information that will enable municipal water agencies to make informed decisions on how to manage groundwater quality for beneficial uses. The scope of the *Groundwater Quality Management Plan* does not address salinity, which is managed separately under Watermaster and IEUA maximum benefit SNMP.

Need and Function of Activity EF

Throughout most of the Chino Basin, there are contaminants in groundwater that can limit its direct use for drinking water supply if treatment is not implemented. Drinking water is regulated by the DDW. The enforceable drinking water standards to protect the public from potential negative health effects are Primary Maximum Contaminant Levels (MCLs) set by the DDW. Water supplies that exceed MCLs cannot be used for drinking water without treatment (blending is the most common treatment). In addition, the DDW sets Notification Levels (NLs), which are health-based advisory levels for potential contaminants of concern that do not have MCLs established. The level at which DDW recommends removal of a drinking water source from service is called the "Response Level," where the Response Level ranges between ten to 100 times the NL, depending on the toxicological endpoint that is the basis for establishing the NL. Since the 1980s, the DDW has established NLs for 93 contaminants, 40 of which now have MCLs.

Since the implementation of the 2000 OBMP, the DDW has adopted new Primary MCLs that have changed or restricted how and where groundwater is pumped by municipal water agencies. As laboratory analytical technologies to detect contaminants in water advance over time, it can be expected that new contaminants of concern will be identified, and some will ultimately become regulated. In response, municipal water agencies will need to construct treatment facilities or implement changes in existing pumping operations to address the newly regulated contaminants. With each new regulation there are increasing constraints on existing water supply infrastructure that can limit a Parties' ability to pump their groundwater rights and stored water and conflict with other basin management issues that include, but are not limited to, groundwater recharge, maintaining Safe Yield, and maintaining Hydraulic Control.

Occurrence of Contaminants in the Chino Basin

Exhibit EF-1 summarizes the occurrence of drinking water contaminants with a Primary MCL in groundwater pumped from active municipal supply wells in the Chino Basin for the five-year period of 2014 to 2018. For this discussion, "active municipal supply wells" includes the 141 municipal supply wells that pumped groundwater anytime within the two-year period of 2017 to 2018. For comparison, this table also summarizes the number of wells with exceedances of the MCL for: all existing municipal supply wells whether they are recently active or not and all existing wells in the basin, including private agricultural, non-agricultural, municipal supply, and monitoring wells, whether they are recently active or not. The three most common contaminants that exceed a primary MCL in the Chino Basin at active municipal supply wells are nitrate (71 wells), 1,2,3-trichloropropane (1,2,3-TCP) (33 wells), and perchlorate (27 wells).

Exhibit EF-2 shows the locations of active municipal supply wells and symbolizes them based on the number of regulated drinking water contaminants that have been detected in exceedance of their respective primary MCLs. Of the 141 recently active municipal supply wells, 45 have at least one drinking water contaminant, 17 wells have two contaminants, 14 have three contaminants, five have four contaminants, and five have five contaminants. The wells with regulated drinking water contaminants are primarily located in the southern (south of the 60 freeway) and western (west of Euclid Avenue) areas of the Basin. Exhibits EF-3, EF-4, and EF-5 show the spatial distribution of the maximum observed nitrate, 1,2,3-TCP, and perchlorate concentrations at all wells in the Chino Basin for the five-year period of 2014 to 2018.

The occurrence of 1,2,3-TCP in nearly 25 percent of active municipal supply wells is noteworthy. The MCL for 1,2,3-TCP is 0.005 micrograms per liter (µgl), which is 5 parts per trillion (ppt). This is the lowest numerical value for a MCL established to date in the State of California. And, unlike past newly adopted MCLs, the MCL for 1,2,3-TCP became immediately effective upon its adoption in December 2017. As a result, municipal water agencies were immediately required to either cease using active wells that pump groundwater with 1,2,3-TCP concentrations in excess of the new MCL or implement treatment (typically blending) to ensure their water supplies have a 1,2,3-TCP concentration below the MCL. Prior to 2018, municipal water supplies were not routinely tested for 1,2,3-TCP even though there was an existing NL for 1,2,3-TCP of 0.005 µgl. And, when testing occurred it was not always done using the lowest available detection limit that was equal to the NL. For this reason, upon adoption of the MCL, the DDW also required municipal water agencies to perform quarterly compliance monitoring in 2018 using laboratory detection limits low enough to test for concentrations equivalent to the MCL of 0.005 µgl. Exhibit EF-4 includes the quarterly monitoring results from 2018 and represents the most comprehensive characterization of the occurrence of 1,2,3-TCP in the Chino Basin to date. The wells producing groundwater with 1,2,3-TCP concentrations equal to or greater than the MCL are primarily located in the western half of the Basin. The following agencies have had to shut down supply wells or modify operations as a result of the new MCL: the City of Chino Hills, CDA, City of Chino, City of Pomona, Monte Vista Water District (MVWD), and JCSD.

Exhibit EF-6 summarizes the occurrence of drinking water contaminants with a California NL in groundwater pumped from active municipal supply wells in the Chino Basin for the five-year period of 2014 to 2018. For comparison, this table also summarizes the number of wells with exceedances of the NLs for: all existing municipal supply wells whether recently active or not and all existing wells in the basin, including private agricultural, non-agricultural, municipal supply, and monitoring wells whether they are recently active or not. Exhibit EF-7 shows the location of the active municipal supply wells and symbolizes them based on the number of contaminants that have been detected in exceedance of a NL. Of the 141 recently active municipal supply wells, only two wells show an exceedance of an NL for one contaminant: groundwater sampled from both wells exceed the NL for 1,4-dioxane. It is likely there are more occurrences of NL exceedances for 1,4- dioxane and other contaminants in the Chino Basin, but because the DDW does not require monitoring for contaminants with an NL and/or testing is not performed using analytical methods with the numerically lowest detection limits that are equal to or lower than the NLs, the potential impact to the Parties posed by the adoption of MCLs based on existing NLs cannot be characterized.

Readiness to Address Future Drinking Water Regulations

Since the implementation of the 2000 OBMP, the DDW has adopted three new Primary MCLs that have impacted municipal water agencies the Chino Basin, including perchlorate, hexavalent chromium, and 1,2,3-TCP. And, as demonstrated by the newest MCL for 1,2,3-TCP, the timeline for complying with new drinking water quality regulations is becoming more restrictive. To prepare for the challenges of complying with potential future MCLs, it will be increasingly important for municipal supply agencies to understand which emerging contaminants of concern are candidates for regulation, potential regulatory limits, and the occurrence of those contaminants in local and regional water supplies. Tracking emerging contaminants that are being considered for regulation and performing monitoring to characterize their occurrence in the Chino Basin will help to identify and plan for optimal solutions to manage groundwater quality for drinking water supply.

Since 2000, under PE 6, Watermaster has assessed groundwater quality in the Chino Basin using data compiled through its own monitoring activities and the efforts of other cooperating entities, and has reported on the water quality trends and findings related to regulated contaminants and contaminants of emerging concern in its biannual State of the Basin reports. For the municipal water agencies, monitoring groundwater for emerging contaminants is, for the most part, a voluntary activity. There are periodic monitoring requirements under the Federal Environmental Protection Agency's (EPA) Unregulated Contaminant Monitoring Rule (UCMR), which is implemented to collect occurrence data for selected contaminants of emerging concern that have documented potential public health effects. Monitoring under the UCMR program is performed every five years and the results are used, in part, to support determinations of whether or not to regulate a contaminant in drinking water to protect public health. For each UCMR cycle, the EPA defines the municipal water agencies that must perform monitoring and the analytical methods and detection limits that should be used for each contaminant on the UCMR list. Generally, the UCMR does not require municipal water agencies to test all of their water supply sources and, as to groundwater, may only require a subset of wells be sampled. And, the UCMR does not always require the use of analytical methods with the numerically lowest detection limits, which in some cases means that analysis is done using detection limits for reporting (DLR) that are above potential regulatory limits, as was the case for UCMR monitoring of 1,2,3-TCP. Once a UCMR monitoring event is over, no additional requirements for testing for the contaminants of emerging concern are required. In the State of California, the monitoring of unregulated contaminants with established NLs is recommended but not required. And as with UCMR monitoring, the use of analytical methods with the numerically lowest detection limits are often not used. Because monitoring for unregulated contaminants is voluntary and there are various analytical methods used, it is generally difficult to characterize the basin-wide occurrence of contaminants of emerging concern.

The occurrence of three contaminants in the Chino Basin that are subject to revised or new drinking water regulations are discussed below.

Perchlorate and Hexavalent Chromium

Currently, in the State of California, there are two drinking water contaminants with primary MCLs that are well characterized in the Chino Basin that are undergoing review and consideration by the DDW for an MCL revision: perchlorate and hexavalent chromium.

Perchlorate. As previously described, perchlorate is one of the top three drinking water contaminants in the Chino Basin. An MCL of 6 µgl was established in 2007. In 2015, the Office of Environmental Health Hazard Assessment (OEHHA) revised the Public Health Goal (PHG[18]) for perchlorate from 6 µgl to 1 µgl, based on new scientific literature that indicates possible health effects to infants from exposure to perchlorate in drinking water. This revision prompted the DDW to review the current MCL and determine if it should be lowered to a value closer to the revised PHG. To support its review and decision, the DDW has recommended that the required DLR for analysis of municipal drinking water supplies be lowered from the current DLR of 4 µgl to equal to or less than 1 µgl and occurrence data be collected across the state.

Exhibit EF-8 shows the spatial distribution of the maximum observed perchlorate concentration for all wells in the Chino Basin for the five-year period of 2014 through 2018 along with the locations of the 141 active municipal supply wells. Exhibit EF-8 differs from Exhibit EF-5 in that the symbology of the perchlorate concentration at wells is based on the PHG of 1 µgl and not the MCL of 6 µgl. Exhibit EF-8 also indicates which of the wells in the basin characterized as having "non-detect" concentrations have not been tested using detection limits that are less than or equal to the PHG of 1 µgl (DLR = 4 µgl). Most of the wells that have not been tested at the lower DLR are private wells south of the 60 freeway. Exhibit EF-8 shows that 95 percent of the of the detectable concentrations of perchlorate in the basin are above the PHG of 1 µgl and that perchlorate is prevalent throughout the entire Chino Basin. As such, compliance with the drinking water standard could require treatment facilities across most of the Chino Basin if the MCL is lowered from 6 µgl.

Hexavalent Chromium. The PHG for hexavalent chromium is 0.02 µgl. In 2014, the DDW established an MCL of 10 µgl, which was subsequently challenged in court. In 2017, the Superior Court of Sacramento County issued a judgment invalidating the Primary MCL for drinking water because the DDW failed to properly consider the economic feasibility of complying with it. The court ordered the DDW to conduct an economic evaluation and establish and adopt a new MCL, which could be the same or different from the prior and now invalidated MCL of 10 µgl. Exhibit EF-9 shows the spatial distribution of the maximum observed hexavalent chromium concentration for all wells in the Chino Basin for the five-year period of 2014 through 2018. The symbology of the observed hexavalent chromium concentrations is based on the prior MCL of 10 µgl. Seven percent of all wells sampled have a concentration above 10 µgl: 127 of the 141 active municipal supply wells have a detectable concentration of hexavalent chromium, and nine of the 141 active municipal wells exceeded 10 µgl. Hexavalent chromium is not a widespread compliance issue

[18] A PHG is the level of a chemical contaminant in drinking water that does not pose a significant risk to health. PHGs are not regulatory standards, but State of California law requires the DDW to set MCLs for a contaminant as close as technologically and economically possible to the PHG.

based on the old 10 µgl MCL, but compliance could be problematic in the future if the DDW establishes a new MCL less than 10 µgl.

Poly- and Per-fluorinated Compounds. An example of emerging contaminants that were part of the UCMR and are currently receiving notable regulatory attention on both State and Federal levels include two PFAS compounds: — perfluorooctanoic acid (PFOA) and perfluorooctane sulfonate (PFOS). In 2009, the EPA published provisional Health Advisory Levels (HAL) for PFOA and PFOS of 400 nanograms per liter (ngl) and 200 ngl, respectively (or 400 and 200 parts per trillion [ppt]). The 2012 UCMR 3 contaminant monitoring list included six PFAS, including PFOA and PFOS. The required DLRs for PFOA and PFOS were 20 and 40 ngl, respectively. In 2016, following the UCMR 3 monitoring, the EPA significantly lowered the HAL for PFOA and PFOS to a combined 70 ngl, a 90 percent reduction. And, in 2018, the DDW established NLs for PFOA and PFOS of 14 and 13 ngl, respectively. That same year, laboratory methods with detection limits numerically less than these NLs became available. As part of the NL guidelines, the DDW established an interim Response Level of 70 ngl for PFOA and PFOS combined, consistent with the EPA's interim HAL. If the DDW recommends that the water source be removed from service or that treatment be implemented to get levels below the Response Level. The PFOA and PFOS Response Level is five times the NL for one of them individually; this is more stringent than other Response Levels established by the DDW, which as previously noted are typically ten to 100 times the NL.

Exhibit EF-10 shows the occurrence of PFOA and PFOS in groundwater and some blending sources for the recycled water recharge in the Chino Basin as of March 2019, based on all monitoring performed since 1998. The exhibit shows that the majority of wells in the Chino Basin have not been sampled for PFOA and/or PFOS. The 30 wells in the Chino Basin that have been sampled for PFOA and PFOS were tested during UCMR 3 using the laboratory detection limits of 20 and 40 ngl, which are higher than the current NLs. Monitoring of recycled water recharge blending sources shows that many of the sources sampled have detectable concentrations of PFOA and PFOS, and some are above the NLs. The EPA and the DDW have both indicated that they are moving forward with the process to adopt MCLs for PFOA and PFOS in the near future. The occurrence of PFOA and PFOS in Chino Basin groundwater as of March 2019 is not well characterized at concentrations equivalent to or below the current NLs, and there are recharge water sources with concentrations of PFOA and PFOS above the NLs. Widespread monitoring for PFOA and PFOS using lower-detection limit laboratory methods is necessary to understand the occurrence of PFOA and PFOS in the basin in order to plan for compliance with potential new drinking water regulations.

Basin Management and Water Rights Implications of More Stringent Water Quality Regulations

To maintain yield and limit losses to the Santa Ana River, the Chino Basin is managed as hydrologically closed: the primary discharge of groundwater from the Chino Basin is groundwater pumping. Maintaining Hydraulic Control in this way is also a requirement of the maximum benefit SNMP. Operating the Chino Basin as a closed system contributes to the accumulation of salts, nutrients, and other contaminants in groundwater, which are primarily removed by groundwater pumping. The constantly evolving regulatory environment described above threatens the ability of the Parties to pump groundwater, and some Parties are not or will not be able to pump their groundwater rights due to the presence of contaminants and the lack of treatment facilities to comply with drinking water quality standards.

As is currently occurring in response to the immediate enforcement of the new MCL for 1,2,3-TCP, it is likely that the initial response actions for compliance with new MCLs will be to shut-down pumping at wells with concentrations that exceed the MCL until a treatment plan is developed and implemented, which for some agencies could take years. Prolonged reductions in groundwater pumping due to groundwater contamination have the effect of reducing Safe Yield and potentially contributing to the loss of Hydraulic Control and the spread of contamination. Therefore, it will become increasingly necessary to pump and treat groundwater to comply with drinking water standards and maintain Safe Yield and Hydraulic Control of the Chino Basin.

With the exception of the Desalters, groundwater treatment facilities in the Chino Basin have been constructed and operated by individual municipal water supply agencies, and the construction and operations and maintenance costs are borne by the agency alone. There is potential for cost savings and other benefits to basin management, such as protecting Safe Yield, and maintaining Hydraulic Control, if regional groundwater treatment and conveyance systems are implemented to address groundwater contamination.

Summary

In order to achieve the objectives of Activities E and F to effectively plan for compliance with future water quality regulations, a *Groundwater Quality Management Plan* should be developed (1) to continually track the UCMR monitoring program, DDW regulatory activities, and others to stay informed of which groundwater contaminants are potential candidates for future MCLs; (2) to implement a long-term basin-wide monitoring plan—including protocols for the use of consistent laboratory methods by all agencies—to collect data on the occurrence of the contaminants of emerging concern; (3) to periodically characterize the potential for compliance challenges on a basin-wide scale; and (4) to develop and evaluate individual and regional compliance solutions to address these challenges. Such a process will enable the Parties to prioritize the most cost-effective compliance solutions that provide for multiple benefits in achieving the goals of the OBMP. The *Groundwater Quality Management Plan* could be developed and implemented by reconvening the Water Quality Committee. The scope of work to develop the *Groundwater Quality Management Plan* is described below.

Scope of Work for Activity EF

The scope of work to develop and implement a *Groundwater Quality Management Plan* consistent with the objectives of Activity EF consists of eight tasks.

- Task 1 – Convene the Water Quality Committee, define objectives, and refine scope of work
- Task 2 – Develop and implement an initial emerging-contaminants monitoring plan
- Task 3 – Perform a water quality assessment and prepare a scope to develop and implement a Groundwater Quality Management Plan
- Task 4 – Develop planning, screening, and evaluation criteria
- Task 5 – Identify and describe potential projects for evaluation
- Task 6 – Conduct a reconnaissance-level study for the proposed projects
- Task 7 – Prepare the *Groundwater Quality Management Plan*
- Task 8 – Plan, design, and build water quality management projects

Task 1 will develop the administrative and stakeholder process and refine the objectives and scope for developing the *Groundwater Quality Management Plan*. Tasks 2 and 3 will include an initial monitoring program and the characterization of current water quality conditions to determine the appropriate long-term monitoring and assessment program and to support the development and implementation of the groundwater quality management plan. Tasks 4 through 8 contain the efforts to fully develop and implement a groundwater quality management plan. The precise scope and level of effort required to perform Tasks 4 through 8 will greatly depend on the assessment in Task 3. At present, there is not enough information to fully scope out these later tasks. The activities for Tasks 4 through 8 are generally described below, but the cost estimate to perform these tasks is not estimated herein. For completeness, a scoping effort to perform Tasks 4 through 7 will be included as a work-product of Task 3. The scoping effort for Task 8 cannot be completed until Task 7 is completed.

Task 1 – Convene the Water Quality Committee, define objectives, and refine scope of work. The objective of this task is to reestablish the Water Quality Committee, which will be comprised of representatives from all interested stakeholders for the purposes of developing and implementing a groundwater quality management plan. The Committee will precisely articulate the objectives of a groundwater quality management plan and refine the scope of work described below in Tasks 2 and 3 to develop and implement an initial monitoring plan, to perform an assessment of the current water quality condition, and to scope the remaining tasks to develop a groundwater quality management plan. After the scope of work has been refined, the cost and implementation schedule will be updated. Four Committee meetings will be conducted to obtain consensus on the objectives and scope of work.

Task 2 – Develop and implement an initial emerging-contaminants monitoring plan. The objective of this task is to develop a monitoring plan to support the initial assessment of water quality conditions related to contaminants of emerging concern in the Chino Basin. The intent is to conduct monitoring using consistent laboratory methods and detection limits at all wells (including those sampled by Watermaster and municipal water agencies) and to use methods with detection limits that are capable of quantifying concentrations at levels equal to relevant regulatory criteria such as PHGs, NLs, or MCLs.

The initial emerging contaminants monitoring plan will include: a list of wells to be sampled, the list of contaminants to analyze, and a quality assurance project plan (QAPP) that defines the monitoring procedures, quality assurance and quality control (QAQC) protocols for data collection and review, and other requirements. The list of wells will include all municipal supply wells and all monitoring and private wells that are in the capture zone of the municipal supply wells. The QAPP will ensure that Watermaster and each municipal water agency that tests its own wells will collect and analyze samples in a consistent manner. The monitoring plan may include the collection and analysis of groundwater in adjacent groundwater basins that are tributary to the Chino Basin and other sources of recharge to the groundwater basin. At a minimum, the initial emerging contaminants monitoring plan should consist of a one-time sampling event at each well identified in the plan. Two Committee meetings will be conducted to obtain consensus on the scope, cost, and schedule to perform the initial monitoring.

Once consensus is achieved, the initial emerging contaminants monitoring plan will be executed by Watermaster and all participating agencies at the selected wells. The labor and laboratory costs to conduct the initial monitoring at municipal wells will be incurred by the well owners. The labor and laboratory cost to conduct the initial monitoring at monitoring wells or private wells in the capture zone of municipal supply wells will be incurred by Watermaster.[19] All monitoring data will be collected, processed, reviewed for QA/QC, and uploaded to a centralized database maintained by Watermaster for the Chino Basin. The Committee will use the data collected for the initial emerging contaminants monitoring plan, along with other groundwater quality data collected and maintained by Watermaster for the basin-wide groundwater quality monitoring program, to perform the initial water quality assessment in Task 3.

Task 3 – Perform a water quality assessment and prepare a scope to develop and implement a Groundwater Quality Management Plan. The objectives of this task are to prepare a comprehensive assessment of current water quality conditions related to contaminants of emerging concern in the Chino Basin and perform a scoping effort to develop and implement a groundwater quality management plan. Task 3 will begin once the initial emerging contaminants monitoring plan developed in Task 2 has been completed.

The water quality assessment will characterize:

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[19] This scope of work assumes 40 monitoring and private wells will be sampled by Watermaster.

- basin-wide concentrations of constituents analyzed pursuant to the initial emerging contaminants monitoring plan;
- current and foreseeable challenges to pumping groundwater for municipal supply based on the results of initial monitoring and other data;
- actions currently being implemented by the Parties to mitigate and/or adapt to current or foreseeable water quality challenges; and
- areas where there are no actions being implemented or planned to mitigate and/or adapt to current or foreseeable water quality challenges.

The water quality assessment will support the scoping effort (1) to implement a long-term monitoring and assessment program and (2) to complete the *Groundwater Quality Management Plan* (e.g. perform Tasks 4 through 7 to identify, evaluate, and select projects to address groundwater quality).

The long-term monitoring and assessment program should be adaptive and include a process to update it at a selected frequency and/or when triggered, based on the needs of the Water Quality Committee, observed trends in water quality, or new or potential regulations.

The deliverable of this task will be a technical report that documents the initial monitoring program, the basin-wide characterization of water quality, the recommended scope of work, schedule and cost to implement a long-term monitoring and assessment program, and the scope of work, schedule, and cost to complete the groundwater quality management plan (Tasks 4 through 7). Four Committee meetings will be conducted to complete the work necessary for Task 3.

Task 4 – Develop planning, screening, and evaluation criteria. The objectives of this task are to develop criteria to evaluate water quality improvement projects. The types of criteria developed to evaluate potential projects in Task 4 will include:

- Watermaster criteria that include no potential MPI, balance of recharge and discharge, and others;
- regulatory criteria that include compliance with DDW regulations and others;
- qualitative criteria that include institutional complexity, overall water supply reliability, and others; and
- quantitative criteria that include business case evaluations expressed as net present value, unit cost, and others.

Task 5 – Identify and describe potential projects for evaluation. The objectives of this task are to identify groundwater quality treatment projects using existing and new facilities, to screen them using the criteria developed in Task 4, and to select a final list of projects for detailed evaluation in Task 6. The list of potential projects should include concepts using existing infrastructure and new infrastructure, solutions for individual agencies, and collaborative solutions.

Task 6 – Conduct a reconnaissance-level study for the proposed projects. The objective of this task is to characterize the performance and the groundwater treatment projects selected for evaluation in Task 5, individually and as a group/system. A reconnaissance-level engineering design and operating plan will be developed for each project. Each project design will include the approximate location, target contaminants, treated volumes, and conveyance systems, and will describe any potential implementation barriers. A cost opinion will be determined for each project. The cost opinion will include a comparison of the cost to implement treatment projects by individual municipal agencies to those of collaborative projects. This task will include a recommended set of projects for implementation, based on the criteria developed under Task 4. The final deliverable of this task will be an implementation plan that includes a schedule and plan to finance preliminary design and CEQA documentation of the projects selected for implementation.

Task 7 – Prepare the Groundwater Quality Management Plan. The objective of this task is to prepare the *Groundwater Quality Management Plan*, which will document the most current water quality assessment, the long-term monitoring and analysis plan, the reconnaissance-level engineering design plan, the selected projects for implementation, and an implementation plan. New regulatory requirements and the compliance challenges that result can occur at random, so the groundwater quality management plan should include a strategy to trigger an update to address pending or newly adopted regulations. Water quality results reported out of the long-term monitoring and assessment program could also trigger the need to update the management plan. The implementation plan will include a process to initiate the development and implementation of an update to the *Groundwater Quality Management Plan*.

Task 8 – Plan, design, and build water quality management projects. The objective of this task is to implement the recommended projects in the *Groundwater Quality Management Plan*. This task includes (1) developing and implementing necessary agreements between participating Parties, (2) preparing preliminary designs of the recommended projects, (3) preparing the environmental documentation for the recommended projects (this will tier-off from the 2020 OBMP Update PEIR), (4) preparing financial plans to construct the recommended projects, (5) preparing final designs of the recommended projects, (6) acquiring necessary permits for constructing and operating the recommended projects, and (7) constructing the recommended projects.

Cooperative Efforts with Appropriate Entities to Implement Activity EF

Watermaster and the IEUA will collaborate to support the development of the *Groundwater Quality Management Plan*. Based on the scope of work described above, the following is a description of the recommended roles of each agency:

- ***Watermaster.*** Convenes the Water Quality Committee, leads the stakeholder process to define the initial emerging contaminants monitoring plan, performs monitoring at Watermaster monitoring wells and private wells pursuant to the initial and long-term monitoring plans, collects and maintains the data collected by the municipal agencies and other stakeholders as part of the initial and long-term monitoring plans, performs water quality assessments of the Chino Basin, and prepares the final groundwater quality management plan.
- ***IEUA.*** Leads stakeholders in the process of identifying and describing potential projects, conducting a reconnaissance-level engineering study for the proposed projects, and project implementation.

Implementation Actions, Schedule, and Costs for Activity EF

The recommended schedule to complete the scope of work described herein is described below:

Year one:

- Convene the Water Quality Committee, define objectives, and refine scope of work for Tasks 2 and 3 (Task 1).
- Develop initial emerging contaminants monitoring plan (Task 2).

Year two:

- Implement initial emerging contaminants monitoring plan (Task 2).
- Begin preparing the water quality assessment of the Chino Basin (Task 3).

Year three:

- Complete the water quality assessment of the Chino Basin, recommendations for a long-term monitoring and assessment program, and the scoping effort for Tasks 4 through 7 (Task 3).

Year four:

- Implement long-term monitoring and assessment program (continues every year thereafter, subject to periodic modifications).
- Develop planning, screening, and evaluation criteria to review potential projects (Task 4).
- Identify and describe potential projects for evaluation (Task 5).
- Begin the reconnaissance-level study of selected projects (Task 6).

Year five:

- Complete the reconnaissance-level study of selected projects (Task 6).
- Select project/s for implementation (Task 6).
- Begin to prepare the *Groundwater Quality Management Plan* (Task 7).
- Conduct the long-term monitoring and assessment plan as defined in Task 3.

Years six and seven:

- Complete the final *Groundwater Quality Management Plan* (Task 7).
- Prepare necessary agreements to implement selected projects.
- Prepare preliminary design reports for the recommended projects. The level of design will be such that it enables the preparation of environmental documentation pursuant to CEQA, provides information for identifying and acquiring construction and related permits, and produces updated cost estimates (Task 8).
- Conduct the long-term monitoring and assessment plan as defined in Task 3.

Years eight to ten:

- Prepare final designs and acquire necessary permits for the selected projects (Task 8).
- Construct selected projects.
- Conduct the long-term monitoring and assessment plan as defined in Task 3.

Exhibit EF-11 shows the estimated budget-level engineering cost to complete Tasks 1 through 3, which is about $295,000. The cost of Tasks 4 through 7 cannot be estimated until the completion of Task 3, and the cost of Task 8 cannot be estimated until the completion of Task 7. Exhibit EF-11 also shows how Tasks 1 through 3 and their associated costs will be scheduled over the first three years of implementation.

Activity CG

Description of Activity CG

Activities C and G, defined by the stakeholders, are both intended to address the need for infrastructure to optimize the use of water supplies. Activity C defined by the stakeholders is:

> *Identify and implement regional conveyance and treatment projects/programs to enable all stakeholders to exercise their pumping rights and minimize land subsidence.*

Activity G defined by the stakeholders is:

> *Optimize the use of all sources of water supply by improving the ability to move water across the basin and amongst stakeholders, prioritizing the use of existing infrastructure.*

The two activities were combined into Activity CG.

The Parties have identified that there are basin management challenges, such as land subsidence and poor water quality, that could limit the ability to fully exercise their pumping rights using existing infrastructure. The intent of Activity CG is to optimize the use of all sources of water available to the Parties to meet their demands despite these basin management challenges and potentially help to mitigate them.

Through the listening session process, the stakeholders identified the following as potential outcomes of performing Activity CG:

- Enable producers with infrastructure in MZ1 and MZ2 to obtain water through regional conveyance, which supports the management of groundwater levels to reduce the potential for land subsidence and ground fissuring.
- Enable the Parties to increase pumping in areas currently constrained by poor water quality.
- Remove groundwater contaminants from the Chino Basin and thereby improve water quality.
- Protect and/or enhance Safe Yield.
- Maximize the use of existing infrastructure, which will minimize investments in new facilities.
- Provide infrastructure that can also be used to implement Storage and Recovery Programs.

Activity CG has similar objectives to those of PE 5 of the 2000 OBMP – *Develop and Implement Regional Supplemental Water Program*. Recognizing that growth in the Chino Basin was going to result in a more than 30 percent increase in then-current water demands, PE 5 was included in the 2000 OBMP to improve regional conveyance and the availability of imported and recycled waters throughout the basin. The implementation plan for PE 5 was combined with PE 3 – *Develop and Implement Water Supply Plan for the Impaired Areas of the Basin* in the OBMP and Peace Agreement.

Early in the development of the PE 3/5 implementation plan, the stakeholders discussed the development of a regional water facilities plan that, when implemented, would enable the Parties to maximize the use of imported water in years when Metropolitan has surplus water and to be able to rely completely on local supplies during years when Metropolitan supplies are low or completely interrupted due to planned or catastrophic outages. This plan involved the construction of new wells and groundwater treatment and regional conveyance improvements; the water produced in this plan would be used exclusively by the Parties. The stakeholders ultimately did not include this plan in the 2000 OBMP IP, preferring at that time to focus on expanding groundwater desalting in the lower Chino Basin, increasing stormwater recharge, and implementing a large-scale recycled water program to maximize its reuse.

The IEUA and its member agencies are currently preparing the *2020 Integrated Water Resources Plan* (IRP), which will serve as a regional implementation strategy for long-term water resources management within IEUA's service area. The objective of the IRP is to ensure that the IEUA's water supplies over the next 25 years are reliable, cost-effective, and environmentally responsible. The 2020 IRP is in development, and there is a significant body of engineering planning being performed that can be leveraged to accomplish the objectives of Activity CG for all Chino Basin Parties.

Need and Function of Activity CG

In addition to Chino Basin groundwater, the sources of water available to the Parties include:

- Imported water purchased from Metropolitan (through the IEUA and TVMWD) and the San Bernardino Valley Municipal Water District (Valley District).
- Non-Chino Basin groundwater from adjacent groundwater basins, including the Six, Spadra, Cucamonga, Rialto, Lytle, and Riverside Basins.
- Local surface water from San Antonio, Cucamonga, Day, Etiwanda, East Canyon, and Lytle Creeks, and some tunnels and springs located in the San Gabriel Mountains.
- Recycled water from the IEUA and the Los Angeles Sanitation District.

Watermaster periodically compiles the Parties' future water supply plans. The data collected as part of that process represent the Parties' best estimates of their demands and associated water supply plans. The most recent effort by Watermaster to characterize the water supply plans was during the development of the *Storage Framework Investigation.*[20,21] Exhibit CG-1 shows the historical (2015) and projected aggregate water demand and supply plan for all Parties. Total water demand is projected to grow from about 290,000 afy in 2015 to about 420,000 afy by 2040, and increase of about 130,000 afy. The projected growth in water demand by the Appropriative Pool Parties drives the increase in aggregate water demand as some Appropriative Pool Parties are projected to serve new urban water demands created by the conversion of agricultural and vacant land uses to urban uses. Chino Basin groundwater and imported water together make up about 70 percent of the aggregate water supplies of the Parties.

Each of the water sources shown in Exhibit CG-1 has its limitations; they are described below.

Chino Basin groundwater and basin management issues

Chino Basin groundwater is the largest source of supply used to meet the demands of the Watermaster Parties. Exhibit CG-1 shows that Chino Basin groundwater makes up about 40 to 50 percent of the total aggregate supply. Groundwater pumping was about 147,000 afy in 2015 and is projected to increase to about 177,000 afy by 2040, an increase of about 30,000 afy. The ability to produce groundwater from the Chino Basin is limited by current basin management issues, such as ongoing land subsidence in MZ1 and parts of MZ2, pumping sustainability issues in the JCSD and CDA well field areas, and water quality.

Land subsidence. One of the earliest indications of land subsidence in the Chino Basin was the appearance of ground fissures within the City of Chino in MZ1. These fissures appeared as early as 1973, but an accelerated occurrence of ground fissuring ensued after 1991 and resulted in damage to existing infrastructure. The OBMP IP called for a management plan to reduce or abate the subsidence and fissuring problems to the extent that it may be caused by pumping in MZ1. Watermaster has been conducting land

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[20] The water demand and supply plans developed in 2017 were based in part on 2015 Urban Water Management Plans and updated to 2017 conditions. The Storage Framework Investigation can be found on Watermaster's website. This document is available on Watermaster's FTP site at http://www.cbwm.org/

[21] Watermaster is currently compiling future water supply plans for the Safe Yield Recalculation.

subsidence investigations in the Chino Basin since September 2000 to implement PE 4 of the OBMP IP.[22] The results of the investigations have indicated that the potential occurrence of pumping-induced land subsidence and ground fissuring is confined to MZ1 and MZ2. Watermaster has defined five specific Areas of Subsidence Concern within MZ1 and MZ2: the Managed Area, Northwest MZ1, Central MZ1, the Northeast Area, and the Southeast Area. Exhibit CG-2 shows the locations of the Areas of Subsidence Concern and recent measurements of land subsidence from 2011 to 2019.

For the Managed Area, Watermaster utilized the results of the land subsidence investigations to develop and implement a Subsidence Management Plan (SMP)[23] to minimize the potential for future subsidence and ground fissuring. The SMP established a specific groundwater level at a monitoring well in the Managed Area (the "Guidance Level" at well PA-7 at the Ayala Park Extensometer facility) and recommended that the pumpers with wells in the Managed Area manage their groundwater production such that the groundwater levels at PA-7 remain above the Guidance Level. The main pumpers in the Managed Area are the City of Chino Hills, City of Chino, and State of California. They have voluntarily managed their pumping as recommended in the SMP, and as a result, the rate of land subsidence has declined to de minimis levels within the Managed Area.

Exhibit CG-2 shows that the maximum rate of recent land subsidence from 2011-2019 has occurred in Northwest MZ1. Of particular concern is that the subsidence in Northwest MZ1 has occurred in a pattern of concentrated differential subsidence across the San Jose Fault—the same pattern of differential subsidence that occurred in the Managed Area during the time of ground fissuring in the 1990s. Ground fissuring is the main subsidence-related threat to infrastructure. Exhibit CG-2 also shows the occurrence of subsidence across broad areas in Central MZ1 and the Northeast Area during 2011-2019. Watermaster is monitoring and investigating the relationships between pumping, recharge, groundwater levels and land subsidence in Northwest MZ1, and investigating pumping and recharge strategies to minimize or abate the occurrence of the differential land subsidence. These efforts are being implemented pursuant to the *Work Plan to Develop a Subsidence-Management Plan for the Northwest MZ-1 Area*,[24] which is an appendix to the SMP.

The main groundwater producers in Northwest MZ1, Central MZ1, and the Northeast Area are the City of Pomona, the MVWD, Golden State Water Company (GSWC), the City of Chino, and the City of Ontario. Interim work performed in Northwest MZ1 to support the development of a subsidence management plan for this area suggests that land subsidence could be reduced or abated if recharge in Northwest MZ1 is increased by at least 20,000 afy, pumping is decreased by at least 20,000 afy, or some combination of both totaling about 20,000 afy.[25] Exhibit CG-3 is a time-series chart of groundwater pumping, wet-water recharge, and land subsidence (represented as negative vertical ground motion) in Northwest MZ1 from

[2] Detailed information on Watermaster's land subsidence investigations, the causes of subsidence and ground fissuring, Watermaster's subsidence management plan for the so-called "Managed Area" in the City of Chino, annual monitoring reports, and ongoing investigations to develop a subsidence management plan for Northwest MZ1 can be found on Watermaster's website at: http://www.cbwm.org/

[23] Chino Basin Watermaster. 2015. *Chino Basin Subsidence Management Plan*. July 2015. This document is available on Watermaster's FTP site at http://www.cbwm.org/

[24] Chino Basin Watermaster. 2015. *Work Plan to Develop a Subsidence Management Plan for the Northwest MZ-1 Area*. This document is available on Watermaster's FTP site at http://www.cbwm.org/

[25] Chino Basin Watermaster. 2017. *Task 3 and Task 4 of the Work Plan to Develop a Subsidence Management Plan for the Northwest MZ-1 Area: Development and Evaluation of Baseline and Initial Subsidence-Management Alternatives*.

1978-2019. Recent pumping in Northwest MZ1 has decreased significantly: 2017-2019 pumping averaged about 12,000 afy compared to about 19,000 afy since the implementation of the OBMP (2001-2016), a reduction of about 7,000 afy. The reduced pumping is mainly due to water quality issues. Additionally, recent wet-water recharge in Northwest MZ1 has increased: 2017-2019 recharge averaged about 15,000 afy compared to about 9,000 afy since the implementation of the OBMP (2001-2016), an increase of about 6,000 afy. Exhibit CG-3 shows that these recent decreases in pumping and increases in recharge, totaling about 13,000 afy, appear to coincide with reduced rates of land subsidence in Northwest MZ1. This suggests that reduced pumping and/or increased recharge can abate land subsidence in Northwest MZ1. If the subsidence management plan for the Northwest MZ1 area recommends a combination of reduced pumping and wet-water recharge to minimize and abate the ongoing land subsidence, the pumpers in this area who elect to reduce pumping in accordance with the plan may have difficulty in fully utilizing their water rights with existing infrastructure.

Pursuant to the Peace Agreement, new land subsidence is considered MPI and would require mitigation. New land subsidence refers to additional land subsidence caused by the reduction of pressure head in the coarse-grain sediments to levels lower than historical lows. Through the Watermaster's recent *Storage Framework Investigation*, a groundwater-elevation metric was defined as a minimum threshold for the occurrence of new land subsidence in MZ1.[26] Based on the modeling results of the *Storage Framework Investigation*, new land subsidence is not projected to occur through 2050 in MZ1 under Scenario 1A, which is based on the Parties' best estimates of how future supplies would be used to meet demands. However, the investigation is limited to new land subsidence and does not address ongoing land subsidence in Northwest MZ1.

Pumping sustainability. The term *pumping sustainability*, as used herein, refers specifically to the ability to pump water from a specific well at a desired pumping rate, given the groundwater level at that well and its specific well construction and equipment details. The pumping sustainability metrics for all Appropriator wells were recently updated as part of the *Storage Framework Investigation*. Groundwater pumping at a well is presumed to be sustainable if the groundwater level at that well is greater than the sustainability metric. If the groundwater level falls below the sustainability metric, the owner will either need to lower the pumping equipment in their well or reduce the well's pumping rate. Groundwater levels at wells in the JCSD and CDA well fields and a part of the FWC service area are currently below the pumping sustainability metric and therefore have limited pumping capacity. Exhibit CG-4 shows the projected difference between the groundwater levels and the pumping sustainability metric in FY 2030 for Scenario 1A. Groundwater levels in Scenario 1A are projected to be above the pumping sustainability metric in 2030 over the entire basin except for the areas with existing pumping sustainability issues, identified by the red circles in Exhibit CG-4. This suggests that projected basin operations will not improve nor exacerbate pumping sustainability issues that currently exist in these areas and that the JCSD and CDA well fields and one well in the FWC service area will continue to have limitations on pumping due to groundwater levels.

Water quality. As described for Activity EF, throughout most of the Chino Basin, there are contaminants in groundwater that can limit its direct use for drinking water supply in the absence of treatment. The constantly evolving regulatory environment described under Activity EF, threatens the ability of the

[26] The metric is based on historical groundwater levels and is represented as a groundwater level control surface throughout MZ1 that defines the likelihood of initiating new subsidence: if groundwater levels are higher than the metric, then new land subsidence would not occur; if groundwater levels fall below the metric, then new land subsidence could occur and cause MPI.

Parties to pump groundwater. Some Parties are not, or will not be, able to pump their groundwater rights due to the presence of contaminants and the lack of treatment facilities to comply with drinking water standards. For example, the regulatory-required response action for compliance with the new MCL for 1,2,3-TCP is to shut-down pumping at wells with concentrations that exceed the MCL until a treatment plan is implemented.

Exhibit EF-2 shows the locations of active municipal supply wells, symbolized by the number of regulated drinking water contaminants that have been detected in exceedance of their respective primary MCLs. A subset of these wells is currently offline due to these exceedances. According to the interim results from Based on the 2020 IRP, the Parties in the IEUA service area that are impacted by water quality such that some of their production capacity is offline or requires blending are the Cities of Chino, Chino Hills, Upland, and Ontario; the CVWD; the MWVD; and Fontana Water Company. Based on Exhibit EF-2, other Parties that are impacted by water quality and have wells with one or more constituents that exceed an MCL are the City of Pomona, GSWC, JCSD, and Marygold Mutual Water Company. As new drinking water regulations come into effect, additional wells and/or Parties will be impacted if there is no plan to address the contaminants.

Imported water.

Imported water is projected to account for about 20 to 30 percent of the aggregate water supplies of the Parties, as shown in Exhibit CG-1. Imported water demand was about 63,000 afy in 2015 and is projected to increase to about 120,000 afy by 2040, an increase of about 58,000 af. The challenges to imported water include reliability of its supply and infrastructure and the local capacity to treat it for municipal supply.

Supply reliability. In January 2016, Metropolitan completed its *2015 Integrated Resources Plan Update* (2015 IRP)[27], which reported that, if the plan is fully implemented, shortages of imported water supplies will occur about nine percent of the time under 2020 conditions, four percent of the time under 2025 conditions, and zero percent under 2030 conditions. "Shortage" is defined herein as Metropolitan's inability to fully meet its demands. If Metropolitan does not fully implement its 2015 IRP, shortages in Metropolitan supplies are projected to occur about 12 percent of the time under 2020 conditions, and the occurrence of a shortage is projected to increase to 80 percent under 2040 conditions. Therefore, by 2040, Metropolitan is assumed to be able to fully meet its demands 90 percent of the time (nine out of ten years) with the full implementation of its 2015 IRP and 20 percent of the time (one out five years) without it. As of this writing, the implementation of some projects identified in the 2015 IRP, such as the California WaterFix tunnel project, are uncertain. Failure to fully implement the 2015 IRP in a timely manner will result in less imported water available to the Parties.

Infrastructure reliability. Metropolitan is planning to rehabilitate the Rialto Feeder pipeline, and according to its draft schedule, construction will occur from 2029 to 2033. During construction, continuous six- to nine-month shutdowns are planned to occur. Because the Rialto Feeder pipeline is the main source of imported water deliveries to the IEUA and TVMWD, long-term shutdowns will cause significant reductions in water supplies to the Parties and will require them to rely more heavily on Chino Basin groundwater or other supplies during this period.

In addition to planned infrastructure shutdowns, catastrophic events, such as earthquakes, can cause unplanned outages. Metropolitan recently published its three primary goals to contribute to seismic

[27] Metropolitan. (2016). *Integrated Water Resources Plan: 2015 Update*. January 2016.

resilience: (1) conducting a Rialto Feeder pipeline alternative supply needs study, (2) completing a re-evaluation of its emergency storage needs, and (3) completing a comprehensive evaluation of its storage programs.[28] According to Metropolitan, the latest projections for the worst case scenario under a seismic catastrophic event suggest that the Metropolitan's East Branch of the SWP, which includes the Rialto Feeder pipeline, can be repaired within 12 to 24 months. This means, that under such an event, the Parties would be required to find alternative sources of water to meet 20 to 30 percent of their total demands for up to two consecutive years.

Capacity limitations. The capacity to treat imported water to meet future municipal supply demands is limited for some Parties in the Chino Basin. The Water Facilities Authority (WFA) treats imported water purchased from the IEUA at the Agua de Lejos treatment plant (WFA plant) and delivers it to the Cities of Chino, Chino Hills, Ontario, and Upland, and the MVWD. Each of these WFA member agencies has a contracted share of the plant's total capacity of 81 million gallons per day (mgd), which is equivalent to 90,700 afy. The WFA plant's current capacity is less than its rated capacity of 81 mgd due to solids handling limitations.[29] According to the WFA, the current capacity of the WFA plant is about 40 mgd in the summer months and about 20 mgd in the winter months. This suggests that even when imported water is available to the WFA, there is a limitation in the ability to treat the water and deliver it for municipal use.

Other supply reliability issues

Other reliability issues that can affect the Parties include:

- Non-Chino-Basin groundwater supplies. Non-Chino-Basin groundwater is projected to account for 16 to 18 percent of the Parties' aggregate water supplies. This source of water is not available to all the Parties. The reliability of non-Chino-Basin groundwater depends on water quality, water rights, and infrastructure to convey it to a Parties' water systems.
- Local surface water supplies. Local surface water is projected to account for 3 to 5 percent of the aggregate water supplies of the Parties. This water source is not available to all Parties. The reliability of local surface water depends on the hydrologic characteristics of the individual supplies, water quality, water rights, and infrastructure to convey it from points of diversion to a Party's water system.
- Recycled water supply. Recycled water is projected to account for about 7 to 8 percent of the aggregate water supplies of the Parties. The challenges to maximizing the reuse of recycled water are described under Activity D and include: timing of recycled water availability, salt and nutrient management, water quality regulations, and the Santa Ana River Judgment.
- Climate change. Climate change is likely to result in higher temperatures, longer dry periods, and shorter more intense wet periods, which can ultimately affect the availability and management of all water supply sources. For example, shorter more intense precipitation periods are expected to result in reduced recharge, and longer dry periods are expected to result in reduced imported water supplies (as occurred with SWP supplies in the recent drought from 2013 to 2016).

Summary

The water demands of the Chino Basin Parties are expected to increase by 44 percent by 2040, and as illustrated above, there are numerous challenges to the reliability of the supplies and the infrastructure that deliver them. Many of the challenges are interrelated and compounding. And, the impacts to individual Parties and associated costs to manage them are not equal. For example, the reliability of

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[28] Metropolitan. (2018). *Seismic Resilience, First Biennial Report*. February 2018.

[29] Email from Terry Catlin, April 10, 2018.

imported water (and other non-groundwater supplies) not only affects the imported water supply but also the groundwater supplies that are dependent on imported water for blending. According to draft results from IEUA's 2020 IRP, the Parties that require blending are: the MVWD, CVWD, FWC, and the Cities of Pomona, Upland, Chino, Chino Hills, Ontario.

In the Chino Basin, prolonged reductions in groundwater pumping due to land subsidence, groundwater sustainability, or groundwater contamination have the effect of reducing Safe Yield, potentially contributing to the loss of Hydraulic Control and the spread of contamination. The ability to convey water from areas that are not subject to these limitations to areas that may provide flexibility to the Parties to pump their respective Chino Basin groundwater rights.

Activity CG will require a planning process that will ensure that the recommended infrastructure that results from it will meet the Parties' needs. To do this, the planning process should answer the following questions:

1) How do the Parties define reliability? How can this be quantified?
2) What is the desired level of reliability? How is it articulated at the regional and individual Party levels? For example, the level of reliability could be articulated as: the ability to meet all or a percentage of the potable water demands of the Parties under a full interruption of SWP supplies delivered by Metropolitan.
3) What are the other benefits of optimization desired by the Parties? How can such benefits be quantified?
4) What existing/planned infrastructure could be used to optimize the use of all sources of water and how would it be used?
5) What new infrastructure would be required to achieve the desired level of reliability and other benefits?
6) How would the existing/planned/new infrastructure be operated to achieve the desired level of reliability and other benefits?
7) Are the capital and O&M costs of optimization less than the cost to agencies to manage the supply and infrastructure challenges on their own?
8) What institutional arrangements are necessary to operate the facilities to achieve the benefits?

As previously mentioned, the IEUA is currently developing the 2020 IRP, which will serve as a regional implementation strategy for long-term water resources management within IEUA's service area. As part of this work, the IEUA retained INTERA to model the existing major infrastructure of the IEUA's service area and develop scenarios to identify opportunities and vulnerabilities in the existing infrastructure of its member agencies. The IRP is in development, and there is a significant body of work being performed by the IEUA and its member agencies that can be leveraged to accomplish the objectives of Activity CG for all of the Parties. The IEUA is also currently conducting preliminary engineering and planning for the CBP, which is a large Storage and Recovery Program to provide regional, dry-year water supplies and associated infrastructure. The project concepts envisioned in the CBP could meet, at least in part, the objectives of Activity CG. Regardless, the work currently in development can be leveraged to reduce the cost of implementing Activity CG.

In order to optimize the use of all sources of water and identify and implement water supply reliability projects, the Parties should convene a Water Supply Reliability Committee for the purposes of accomplishing the objectives of Activity CG for all Parties. The scope of work is described below.

Scope of Work for Activity CG

The scope of work to develop and implement Activity CG consists of six tasks.

- Task 1 – Form the Water Supply Reliability Committee, define objectives, and refine scope
- Task 2 – Characterize water demands, water supply plans, and existing/planned infrastructure and its limitations
- Task 3 – Develop planning, screening, and evaluation criteria
- Task 4 – Describe water supply reliability opportunities
- Task 5 – Develop reconnaissance-level engineering design and operating plan
- Task 6 – Plan, design, build water reliability alternatives

The tasks are described below.

Task 1 – Form the Water Supply Reliability Committee, define objectives, and refine scope. In this task, a Water Supply Reliability Committee will be convened. The Committee's initial tasks are: (1) to clearly articulate and obtain consensus on the objectives for optimizing the use of all sources of water; (2) to define reliability, benefits, and performance criteria for the Parties; and (3) to refine the preliminary scope of work, schedule, and cost defined for Tasks 2 through 6 to fully leverage the existing data and planning efforts of Watermaster, the IEUA, and others. Four Committee meetings will be conducted to accomplish these tasks. In step (2), the Committee will address the following questions:

1) How do the Parties define reliability? How can this be quantified?
2) What is the desired level of reliability? How is it articulated at the regional and the individual Party levels?
3) What are the other benefits of optimization desired by the Parties? How can such benefits be quantified?

Task 2 – Characterize water demands, water supply plans, and existing/planned infrastructure and their limitations. The objectives of this task are: (1) to characterize the water demands and supply plans of the Parties; (2) to characterize existing/planned infrastructure to convey, treat, and distribute the supplies to meet demands; and (3) to identify opportunities and limitations in the existing/planned infrastructure consistent with the objectives of Activity CG defined in Task 1. The water demands and supply plans will be characterized on a monthly basis for various climate conditions. One committee meeting and one individual meeting with each participating Party will be conducted to review the characterization of water demands and supply plans and existing/planned infrastructure. Two additional meetings will be conducted to identify opportunities and limitations in the existing/planned infrastructure consistent with the objectives of Activity CG defined in Task 1.

Task 3 – Develop planning, screening, and evaluation criteria. The objective of this task is to develop the criteria that will be used to evaluate water reliability projects in Tasks 4 and 5. Criteria to evaluate potential projects will include:

- Watermaster criteria that include no potential MPI, balance of recharge and discharge, and others;
- qualitative criteria that include institutional complexity and others; and
- quantitative criteria that include business case evaluations, expressed as net present value, unit cost, and others.

Task 4 – Describe water supply reliability opportunities. The objectives of this task include identifying potential water supply reliability project alternatives, screening them using the screening criteria developed in Task 3, and developing project alternatives for detailed evaluation. Three meetings will be conducted to develop a list of potential projects that can be implemented, to review the screening of these projects, and to select projects to evaluate in Task 5. In executing this task, the Committee will address the following questions:

4) What existing/planned infrastructure could be used to optimize the use of all sources of water and how would it be used?
5) What new infrastructure would be required to achieve the desired level of reliability and other benefits?

Task 5 – Develop reconnaissance-level engineering design and operating plan. The objective of this task is to characterize the performance and costs of the water supply reliability alternatives developed in Task 4. A reconnaissance-level engineering design and operating plan will be developed for each alternative. Each alternative design will include the approximate size, location, and alignment of major infrastructure, and will describe any potential implementation barriers for the project. A cost opinion will be determined for each alternative. This task includes evaluating alternatives based on the alternative evaluation criteria developed in Task 3, describing how the alternative could be implemented and financed, and recommending an alternative for implementation. The deliverable of this task will be a technical report that summarizes the work performed under Tasks 1 through 5, and it will include a plan to pay for the preliminary design and CEQA documentation of the recommended alternative. Five meetings will be conducted to review the design and estimated benefit of the recommended alternative; review the evaluation of the projects, based on the criteria developed in Task 3; and review the recommended list of projects for implementation; review the implementation plan; and review the technical report. In executing this task, the Committee will address the following questions:

6) How would the existing/planned/new infrastructure be operated to achieve the desired level of reliability and other benefits?
7) Are the capital and O&M costs of optimization less than the cost to agencies to manage supply and infrastructure challenges on their own?
8) What institutional arrangements are necessary to operate the facilities to achieve the benefits?

Task 6 – Plan, design, build water reliability alternatives. The objective of this task is to implement the recommendations of the technical report. This task includes (1) developing and implementing necessary agreements between participating Parties, (2) preparing the preliminary design of the recommended alternative, (3) preparing the environmental documentation for the recommended alternative and other alternatives that will tier-off the 2020 OBMP Update PEIR, (4) preparing a financial plan for constructing the recommended alternative, (5) preparing final design of the recommended alternative, (6) acquiring permits for constructing and operating the recommended alternative, and (7) constructing the recommended alternative.

Cooperative Efforts with Appropriate Entities to Implement Activity CG

This is a basin-wide activity that involves the Parties, the IEUA, the TVMWD, and the WMWD. Given its current efforts, the IEUA would be the logical entity to lead the implementation of Activity D on behalf of all Parties in these service areas, but the process could be led by others. In this role, the agency leading the project on behalf of the Parties would contract for planning and engineering services as required. Watermaster, TVMWD and WMWD would work with IEUA as needed to support the expansion of the planning efforts to cover non-IEUA member agencies. Watermaster would also participate in the process to ensure that Activity CG implementation is consistent with the Judgment, Peace Agreements and other agreements, and the Watermaster Rules and Regulations.

Implementation Actions, Schedule, and Costs for Activity CG

The recommended schedule to complete the scope of work described herein is described below:

Year one:

- Convene Water Supply Reliability Committee, define reliability and other benefits, and refine scope of work, schedule, and budget (Task 1).

Year two:

- Characterize the water demand, water supply plans, and existing/planned infrastructure and its limitations; and identify conceptual facilities and operational improvements that achieve reliability and other benefits defined in Task 1 (Task 2).
- Develop planning, screening, and evaluation criteria for water supply reliability projects (Task 3).
- Develop water reliability alternatives for evaluation (Task 4).

Year three:

- Conduct reconnaissance-level engineering study for the alternatives (Task 5).

Years four through seven:

- Recommend alternative for implementation (Task 5).
- Prepare final report, documenting work performed in Tasks 1 through 5 (Task 5).
- Watermaster, the IEUA, and other potential partners develop a project implementation agreement. The objective of this agreement is to define the roles of each partner in the planning, permitting, design, and implementation of the projects, and the cost allocations.
- Preliminary design of recommended projects. The level of design will be such that it enables the preparation of environmental documentation pursuant to CEQA and provides information for identifying the permits required for construction and operation.
- Prepare environmental documentation for alternatives. CEQA will cover the recommended alternative and other alternatives at the project level, based on the project descriptions developed in Task 5. This documentation will tier-off from the 2020 OBMP Update PEIR. Watermaster will conduct an MPI analysis in parallel with the CEQA process.

Years eight and nine:

- Prepare final designs and acquire permits for the selected alternative.

Years ten and beyond:

- Construct recommended alternative.

Exhibit CG-5 shows the estimated budget-level engineering cost to complete Tasks 1 and 2 which is about $305,000. The cost of Tasks 3 through 6 cannot be estimated until the completion of Task 2. And, because the IEUA is currently conducting its 2020 IRP (the scope of work for which overlaps with scope recommended herein), the cost may be lower than estimated if its work is leveraged.

Some of the facilities and associated operating plans identified under this activity may overlap with those envisioned in Activity EF and/or Activity B. If Activity EF and/or B and CG move forward, there will be cost savings related to facilities planning.

Activity K

Description of Activity K

Activity K defined by the stakeholders is:

> *Develop a management strategy within the salt and nutrient management plan to ensure the ability to comply with the dilution requirements for recycled water recharge.*

The objective of Activity K is to determine if compliance with recycled water recharge dilution requirements, defined in Watermaster and the IEUA's maximum benefit SNMP, can be achieved under existing management plans, and if not, to develop a plan to achieve compliance.

Through the listening session process, the stakeholders identified the following as potential outcomes of performing Activity K:

- Enable the continued and expanded recharge of recycled water, which will:
  - protect water quality,
  - improve water-supply reliability, especially during dry periods, and
  - protect/enhance Safe Yield.

The 2000 OBMP included PE 7—*Develop and Implement Salt Management Plan*—to characterize current and future salt and nutrient conditions in the basin and to subsequently develop and implement a plan to manage them. Such a management strategy was necessary to address historical salt and nutrient accumulation from agricultural operations and to support the aggressive expansion of recycled water recharge and reuse envisioned in PE 2 and PE 3/5. Recognizing that implementing the recycled water reuse program would require large scale treatment and mitigation of salt loading under the then-current antidegradation objectives for total dissolved solids (TDS) and nitrate, defined in the Water Quality Control Plan for the Santa Ana River Basin (Basin Plan), Watermaster and the IEUA petitioned the Regional Board to establish a maximum benefit-based salt and nutrient management plan (maximum benefit SNMP) that involved (1) increasing the TDS and nitrate objectives for the Chino-North groundwater management zone[30] (GMZ) to numerically higher values to enable recycled water reuse without mitigation or treatment and (2) committing to a program of salt and nutrient management activities and projects ("maximum benefit commitments") that ensure the protection of the beneficial uses of the Chino-North GMZ and downgradient water resources (the Santa Ana River and the Orange County GMZ). The maximum benefit commitments included the implementation of a monitoring, analysis, and reporting program to track TDS and nitrate trends; the construction and future expansion of the Chino Basin Desalters to attain Hydraulic Control of the Chino-North GMZ to protect the Santa Ana River; the construction of recharge facilities to increase storm and recycled water recharge; and a commitment to future treatment of recycled water and/or groundwater, as needed, to protect beneficial uses and comply with the maximum benefit TDS and nitrate objectives. These are all activities that were planned to be implemented under the OBMP. The maximum benefit SNMP was incorporated into the Basin Plan in January 2004.

Activity K, as envisioned by the stakeholders, would entail an expansion on the existing analysis requirements in the maximum benefit SNMP to incorporate a forward-looking assessment of the ability to comply with the maximum benefit commitments. It would set up Watermaster and the IEUA to more

[30] The Chino-North GMZ has a maximum-benefit TDS objective of 420 mgl and is a combination of the Chino-1, Chino-2, and Chino-3 antidegradation GMZs that have lower TDS objectives ranging from 250 to 280 mgl.

proactively prepare a compliance plan as opposed to reacting to a trigger event that requires short-term, time-certain response actions.

Need and Function of Activity K

Maximum benefit SNMP commitments

Implementation of the maximum benefit SNMP is a regulatory requirement of the Basin Plan. It's also incorporated into Watermaster and the IEUA's recycled water recharge program permit (R8-2007-0039) and the IEUA's recycled water discharge and direct reuse permit (R8-2015-0021; NPDES No. CA 8000409). There are nine maximum benefit commitments included in the Basin Plan and recycled water permits:

1. The development and implementation of a surface-water monitoring program
2. The development and implementation of a groundwater monitoring program
3. The expansion of the Chino-I Desalter to 10 million gallons per day (mgd) and the construction of the Chino-II Desalter with a design capacity of 10 mgd
4. The additional expansion of desalter capacity to a total capacity of 40 mgd pursuant to the OBMP and the Peace Agreement
5. The construction of the recharge facilities included in the Chino Basin Facilities Improvement Program
6. The management of recycled water quality to ensure that the IEUA agency-wide, 12-month running average wastewater effluent quality does not exceed 550 mgl for TDS and 8 mgl for total inorganic nitrogen (TIN)
7. The management of the basin-wide, volume-weighted TDS and nitrate concentrations of artificial recycled, storm, and imported waters to concentrations that are less than or equal to the maximum benefit objectives as a five-year rolling average
8. The achievement and maintenance of Hydraulic Control of groundwater outflow from the Chino Basin, specifically from the Chino-North GMZ, to protect the water quality of the Santa Ana River and downstream beneficial uses
9. The periodic redetermination of "current" ambient TDS and nitrate concentrations of the Chino Basin GMZs (every three years).

Additionally, Watermaster and the IEUA are required to prepare an annual report to the Regional Board on the status of compliance with the maximum benefit commitments. If the maximum benefit commitments are not met to the Regional Board's satisfaction, the antidegradation objectives would apply for regulatory purposes. The application of the antidegradation objectives would result in a finding of no assimilative capacity for TDS and nitrate in the Chino-North GMZ, and the Regional Board would require mitigation for recycled water discharges to Chino-North that exceed the antidegradation objectives. Furthermore, the Regional Board would require that Watermaster and the IEUA mitigate the effects of discharges of recycled water that took place in excess of the antidegradation objectives under the maximum benefit objectives retroactively to January 2004. The mitigation for past discharges would be required to be completed within a ten-year period following the Regional Board's finding that the maximum benefit commitments were not met.

Current compliance with the recycled water dilution requirements of the maximum benefit SNMP

Commitment number 7 of the maximum benefit SNMP is the stakeholders' stated focus of Activity K. This commitment defines a compliance limit that if met, allows for the continued recharge of recycled water without mitigation. Hereafter, the limit will be referred to as the "dilution limit." Commitment number 7 requires that recycled water recharge be limited to the amount that can be blended, on a basin-wide, volume-weighted basis, with other sources of supplemental recharge to achieve five-year running-average concentrations that are less than or equal to the dilution limits. The dilution limits are the maximum benefit objectives: 420 mgl for TDS and 5 mgl for nitrate (as nitrogen). If the five-year, volume-weighted TDS or nitrate concentrations (hereafter, dilution metrics) exceeds the dilution limits, then Watermaster and the IEUA must develop a plan to come into compliance. Compliance options could include, but are not limited to, increasing the recharge of low-salinity supply sources (storm or imported waters), desalting recycled water to reduce salinity, or desalting groundwater as a salt offset.

Watermaster and the IEUA annually analyze and report on "current" compliance with the dilution limit as part of the *Chino Basin Maximum Benefit Annual Report*. The most recent annual report was submitted to the Regional Board in April 2019 and reported on compliance through December 2018.[31] Exhibits K-1 and K-2 are time-series charts that characterize compliance with the dilution limit since the recycled water recharge program began in 2005. The exhibits show the monthly recharge volumes and TDS and nitrate concentrations of each recharge source, the dilution metrics, and the dilution limits. Note that because recycled water recharge began in July 2005, the first five-year period for which the dilution metric was computed was July 2005 through June 2010.

Exhibits K-1 and K-2 illustrate that the TDS and nitrate dilution limits have never been exceeded. From June 2010 to December 2016, the TDS dilution metric increased from about 203 to 354 mgl. During the same period the nitrate dilution metric increased from 1.1 to 3.0 mgl. After December 2016, the TDS and nitrate dilution metrics decreased to 281 mgl and 2.0 mgl, respectively. As of 2018, the five-year, volume-weighted TDS dilution metric was 139 mgl less than the dilution limit, and the nitrate dilution metric was 3 mgl below the dilution limit.

Threats to compliance with the dilution limits

As suggested by Exhibit K-1, the primary threats to compliance with the TDS dilution limit are the availability of imported and storm waters for recharge. Increases in the TDS concentration of recycled water are also a threat to compliance. The threat of exceeding the nitrate dilution limit is far less given that the nitrate concentration of the recycled water recharge is typically less than the nitrate dilution limit of 5 mgl.

Imported water is a low-TDS source of recharge and has an important influence on the dilution metric. As shown in Exhibit K-1, the TDS concentration of imported water used for recharge ranged from 87 to 367 mgl. In mid-2016, the rate of increase of the TDS dilution metric rose significantly from about 1.3 mgl per month to 12 mgl per month through October 2016 when the metric peaked at 354 mgl. In October 2016, the five-year dilution metric calculation included almost no imported water recharge: the last significant period of imported water recharge occurred in May through September of 2011 (3,700 to 7,800 af). After peaking in October 2016, the dilution metric for TDS began to decrease and stabilize due to a large imported water recharge event that occurred from October 2016 through January 2018 (46,000 total af).

[31] WEI. (2019). *Optimum Basin Management Program Chino Basin Maximum Benefit Annual Report 2018*. April 2019.

A similar trend was observed for the dilution metric for nitrate, as shown in Exhibit K-2. These observations demonstrate the importance of imported water recharge to compliance with the dilution metric.

Stormwater is a more consistent source of recharge, but it occurs in smaller volumes than imported water recharge. Over the most recent five-year period (January 2014 to December 2018), the total volume of stormwater recharge was 39,000 af compared to 47,000 af of imported water. And, while stormwater TDS concentrations are typically low in the wet winter months (50 to 150 mgl), the TDS of dry-weather flows diverted to recharge in summer months are typically greater than 300 mgl. The implementation of the 2013 RMPU is expected to increase the annual average stormwater recharge volume, but even with increased recharge capacity, multiyear drought conditions with limited stormwater recharge opportunities could lead to compliance challenges.

During drought conditions there is: a reduction in the amount of high-quality stormwater recharge; limited or no availability of imported water for recharge; an increase in the TDS concentrations of imported water, if it is available for recharge; and a concomitant increase in the TDS concentrations of the recycled water. Not only are the two primary sources of low-TDS water less available during drought periods, but the source water quality of municipal water supplies is also higher in TDS due to increases in imported water TDS and indoor water conservation practices. Exhibit K-1 shows the influence of the most recent statewide drought, which occurred over 2013 to 2016, on the dilution metric. During this time the dilution metric for TDS steadily increased from about 210 mgl to 350 mgl. This analysis demonstrates the meaningful impact that drought has on compliance with the dilution metric and indicates that climate change, which is expected to result in longer, drier droughts, could potentially threaten future compliance with the dilution limit.

Other maximum benefit SNMP compliance challenges

There are other metrics in the maximum benefit SNMP commitments that would require the evaluation of potential salt offset projects to achieve compliance. Commitment number 6 requires that when the IEUA's agency-wide, 12-month, running-average recycled water effluent TDS concentrations exceeds 545 mgl for three consecutive months or the TIN concentrations exceeds 8 mgl in any one month, Watermaster and the IEUA must submit a water quality improvement plan and schedule to the Regional Board. The plan must demonstrate how the 12-month running-average IEUA agency-wide recycled water effluent will remain in compliance with its discharge permit limits of 550 mgl and 8 mgl for TDS and TIN, respectively.

Exhibit K-3 shows the monthly and 12-month running-average IEUA agency-wide effluent TDS and TIN concentrations for 2005 through 2018. In 2015, the 12-month running-average IEUA agency-wide TDS concentration in recycled water approached the 545 mgl action limit that would require the IEUA and Watermaster to submit a water quality improvement plan and schedule. In analyzing the available data, the IEUA determined that the primary drivers for the increasing recycled water TDS concentration were the increase in the TDS concentration of the water supplies used by its member agencies and an increase of the TDS waste increment from indoor water conservation.

Although the 12-month running-average IEUA agency-wide TDS concentration declined from the 2015 peak before reaching the 545 mgl action limit, it was an important indicator that the TDS concentration of recycled water is likely to approach or exceed the recycled water compliance limit during the next prolonged dry period and require the planning for recycled water quality improvements. In May 2017, recognizing the potential cost of implementing recycled water quality improvements for what might be only short-term exceedances of the 545 mgl action limit, Watermaster and the IEUA petitioned the Regional Board to consider updating the maximum benefit SNMP to incorporate a revised 12-month compliance metric for recycled water effluent (commitment number 6) specifically to allow a longer-term averaging period. The Regional Board agreed that an evaluation of the recycled water compliance metric is warranted and directed Watermaster and the IEUA to develop a technical scope of work to demonstrate the potential impacts of the revised compliance metric. The work began in September 2017 and is ongoing as of the writing of this Scoping Report. If the investigation finds that changing the recycled water compliance metric will not impact beneficial uses in the Chino Basin or cause downgradient water supplies to exceed water quality objectives, then it is likely that the alternative recycled water compliance metric will be approved. If approved, the Regional Board would amend the Basin Plan and the IEUA's permits to incorporate the revised maximum benefit commitments.

The primary objectives of the technical work to support the maximum benefit SNMP and permit updates are: to develop and use an updated groundwater solute transport model to evaluate the TDS and nitrate concentrations of the Chino Basin, to define alternative salinity management scenarios, and to project the future TDS and nitrate concentrations of the Chino Basin for each scenario. The results will be used to develop a regulatory compliance strategy that includes a longer-term average period for recycled water TDS concentrations that is acceptable to the Regional Board. The Regional Board has indicated that in accepting a proposal to modify the recycled water compliance limit, it will require Watermaster and the IEUA to add a new maximum benefit commitment to the Basin Plan that involves updating the TDS and nitrate projections every five years.

The compliance approach being pursued by Watermaster, the IEUA, and the Regional Board illustrates that the Regional Board may be willing to consider adopting an alternative dilution metric—e.g. a longer averaging period—for recycled and supplemental water recharge so long as there are no unmitigated impacts to beneficial uses. The work that is being performed to support the maximum benefit SNMP update can be directly leveraged to achieve the objective of Activity K.

Process required to evaluate potential future dilution compliance challenges

To achieve the objective of Activity K, it is necessary to prepare projections of the dilution metric to evaluate potential compliance challenges and to determine if and when it will be necessary to develop a plan to achieve compliance. The table below summarizes the planning data that are needed to prepare such projections and the existing Watermaster or IEUA programs that produce the planning data.[32]

Planning Data	Existing Watermaster and IEUA Efforts that Compile or Produce the Required Planning Data
Recycled water recharge volumes	Projections prepared through the RMPU process, the Recycled Water Program Strategy, and other efforts.
Recycled water quality	There is no current effort to prepare this projection at the requisite level of detail on a regular basis, but it can be calculated from projections of water supply quality; such a projection was just completed to support the maximum benefit SNMP update.
Imported water recharge volumes	Projections prepared through the RMPU process.

[32] Some additional planning data not listed here would also be required to run the Chino Basin Groundwater Model, which is updated and recalibrated at least every five years.

Planning Data	Existing Watermaster and IEUA Efforts that Compile or Produce the Required Planning Data
Imported water recharge quality	There is no current effort to prepare this projection at the requisite level of detail, but it can be estimated based on historical data; such a projection was just completed to support the maximum benefit SNMP update.
Stormwater recharge volumes	Projections prepared through the RMPU process.
Stormwater recharge quality	Estimates can easily be produced based on historical data.
Groundwater supply volumes	Water supply plans of the Parties are compiled at least once every five years for various Watermaster and IEUA efforts.
Groundwater supply quality	There is no current effort to prepare this projection at the requisite level of detail, which requires the use of a numerical groundwater solute transport model; such a model was just built to support the maximum benefit SNMP update and is being used to prepare groundwater quality projections.
Other water supply volumes	Water supply plans of the Parties are compiled at least once every five years for various Watermaster and IEUA efforts.
Other water supply quality	There is no current effort to prepare this projection at the requisite level of detail, but it can be estimated based on historical data; such a projection was just completed to support the maximum benefit SNMP update.

The planning data would be used to prepare projections of: municipal water supply and quality, imported water quality, recycled water quality, groundwater quality, and ultimately the TDS and nitrate dilution metrics. The projections would be done assuming a range of future cultural conditions (land use changes, population growth, etc.) and climate conditions. These projections would be analyzed to produce best-case and worst-case five-year, ten-year, 15-year, and 20-year recharge projections for imported and storm waters. The best- and worst-case projections of the dilution metric would be appended to the historical record to produce a bracketed series of dilution metric time histories to evaluate the risk of exceeding the dilution metric over a range of potential climate conditions in the short (5-year) and long (20-year) term.

If there is no projected compliance challenge in the next five to ten years, then no additional work would be needed to develop a compliance plan. It would be necessary to update the planning data and modeling tools to evaluate projections at a minimum of every five years. A five-year frequency is consistent with the State Board's 2018 amendments to the SNMP guidelines within its Recycled Water Policy.[33]

If a compliance challenge is projected, then it will be necessary to develop a plan to ensure compliance with the blending metric in the future. As previously noted, the compliance plan could include treatment

[33] The *Water Quality Control Policy for Recycled Water* is available at: https://www.waterboards.ca.gov/water_issues/programs/water_recycling_policy/

of the recycled water, increased recharge of high-quality imported water and/or stormwater, increase in groundwater desalting as a salt offset, or an update to the maximum benefit SNMP to change the compliance metric to a longer averaging period. For the latter, it would first be necessary to demonstrate to the Regional Board that a change to the compliance metric will not harm beneficial uses.

Alignment of Activity K with the current investigation to support the update to the maximum benefit *SNMP*

All of the above steps to analyze compliance challenges with the dilution metric are currently being performed in support of the update to the maximum benefit SNMP. Watermaster and the IEUA anticipate that the compliance strategy for the SNMP update will be finalized during FY 2020/2021. When completed the potential compliance challenges with the dilution limit will be known and a range of compliance plans will have been evaluated at a conceptual level. Thus, it may not be necessary to perform any work pursuant to Activity K, unless it is determined that some form salt offset is required. If no compliance challenges arise, or remain at the completion of the SNMP update, no significant work would need to be performed pursuant to Activity K for at least five years. If a salt offset is required, Watermaster and the IEUA would need to begin reconnaissance-level engineering planning in FY 2021/22.

Summary

In order to achieve the objectives of Activity K to ensure the ability to comply with the maximum benefit SNMP dilution metric in the future, Watermaster and the IEUA should expand the existing analysis and reporting efforts to periodically (every five-years), prepare future projections of recharge volumes and quality to determine if there is a compliance challenge, and if necessary, evaluate compliance alternatives. Projections of the dilution metric and an evaluation of compliance challenges in the future are currently being developed for the investigation to support the update to the maximum benefit SNMP described above. The scope of work to implement Activity K can leverage that work.

Scope of Work for Activity K

The scope of work to achieve the objectives of Activity K—*Develop a management strategy within the salt and nutrient management plan to ensure the ability to comply with the dilution requirements for recycled water recharge*—consists of five tasks:

- Task 1 – Prepare projection to evaluate compliance with recycled water dilution requirements
- Task 2 – Identify alternative compliance strategies
- Task 3 – Evaluate alternative compliance strategies
- Task 4 – Implement the alternative compliance strategy
- Task 5 – Periodically reevaluate compliance with dilution requirements

Task 1 – Prepare projection to evaluate compliance with recycled water recharge dilution requirements. The objective of this task is to prepare projections of compliance with the dilution metric for TDS and nitrate in the maximum benefit SNMP and determine if there is a compliance challenge in the future. In this task, all planning data will be compiled, Watermaster's groundwater solute transport model will be updated and used to estimate future groundwater and recycled water quality, and projections of the dilution metric will be prepared. The planning data will be used to evaluate the dilution metric for best-case and worst-case recharge conditions over a twenty-year period. If there are no projected compliance challenges within the next five years, then Tasks 2 through 4 will not need to be performed. If there is a compliance challenge within the next five years, then Tasks 2 through 4 will need to be performed. Task 5 would be performed regardless of the outcome.

Task 2 – Identify alternative compliance strategies. The objective of this task is to identify potential alternative compliance strategies to address foreseeable challenges with complying with the dilution limit in the future. This task includes the following subtasks:

- Develop planning, screening, and evaluation criteria for projects to comply with the maximum benefit SNMP dilution limit.
- Identify potential alternative compliance strategies.
- Perform initial screening of the alternative compliance strategies based on the evaluation criteria.
- Select alternative compliance strategies to evaluate in Task 3.

Task 3 – Evaluate alternative compliance strategies. The objective of this task is to characterize the performance and costs of the alternative compliance strategies defined in Task 2. A reconnaissance-level engineering design and operations will be developed for each alternative. The reconnaissance-level engineering work will include a description of the activity, description of facilities (if required), its ability to comply with the dilution limits, its impact on the TDS and nitrate concentrations of the Chino Basin, and the estimated cost to implement the project alternatives. The projects will be evaluated and ranked based on the criteria developed in Task 2, and an alternative compliance strategy will be selected. The deliverable for this task will include a technical document that describes the reconnaissance-level engineering design and operations, the selected alternative compliance strategy, and the scope of work and cost estimate to implement the selected alternative compliance strategy.

Task 4 – Implement the alternative compliance strategy. The objective of this task is to implement the selected alternative compliance strategy. This task includes (1) developing and implementing necessary agreements between participating Parties; (2) preparing a Basin Plan amendment, if necessary; (3) preparing preliminary designs of the recommended projects; (4) preparing the environmental documentation for the recommended projects (this will tier-off from the 2020 OBMP Update PEIR); (5) preparing financial plans to construct the recommended projects; (6) preparing final designs of the recommended projects; (7) acquiring necessary permits for constructing and operating the recommended projects; and (8) constructing the recommended projects.

Task 5 – Periodically re-evaluate compliance with dilution requirements. The objective of this task is to proactively evaluate future compliance with the maximum benefit SNMP recycled water dilution limit to address any foreseen compliance challenges. The task includes two efforts:

(1) Prepare projections of the dilution metric on a five-year frequency. This includes updating the model, collecting planning data, preparing the requisite projections (see Task 1), and evaluating if there is a compliance challenge. If it is determined that there is a compliance challenge, then Tasks 2 through 4 will be performed. If it is determined that there is not a compliance challenge, this evaluation will be redone in another five years.

(2) Annually report on current and future compliance with the dilution limit. Annual reporting of current compliance with the dilution metric is already done in the Chino Basin Maximum Benefit Annual Reports. This task would simply involve expanding that reporting discussion to include a comparison of the current dilution metric to the bracketed projections of the dilution metric prepared in Task 1. If the current dilution metric suggests there is a potential compliance challenge that was not predicted by Task 1, Watermaster and the IEUA would initiate a process to determine if additional evaluation of compliance alternatives is warranted.

Cooperative Efforts with Appropriate Entities to Implement Activity K

As co-permittees to the maximum benefit SNMP and recycled water recharge program, this activity involves Watermaster and the IEUA. Similar to the existing implementation of the maximum benefit

SNMP, Watermaster would lead the technical and reporting efforts, and any engineering planning work would be led by IEUA.

Implementation Actions, Schedule, and Costs for Activity K

As previously described, all the work required in Task 1 is currently being performed as part of Watermaster and the IEUA's investigation to support an update to the maximum benefit SNMP to change the recycled water TDS compliance metric to a longer averaging period. Watermaster and the IEUA anticipate that the work to update the compliance strategy for the maximum benefit SNMP will be completed during FY 2020/21. When completed the potential compliance challenges with the dilution limit will be known, and a range of compliance plans will have been evaluated at a conceptual level. Thus, it may not be necessary to perform any work pursuant to Activity K unless it is determined that some form salt offset project is required to address near-term compliance challenges. If no compliance challenges are identified or are resolved through the completion of the SNMP update, no significant work would need to be performed pursuant to Activity K for at least five years. If a salt offset project is required to address anticipated near-term compliance challenges, Watermaster and the IEUA will need to begin reconnaissance-level engineering planning in FY 2021/22 (Tasks 2 through 4).

The recommended schedule to complete the scope of work described herein is described below:

Year one:

- Wait for Watermaster and the IEUA to complete the maximum benefit SNMP update.

Year two:

- Identify alternative compliance strategies, if needed (Task 2).
- Start the evaluation of alternative compliance strategies, if needed (Task 3).
- Report the annual dilution metric compared to dilution limits and projections (Task 5).

Year three:

- Complete the evaluation of alternative compliance strategies, if needed (Task 3).
- Select preferred compliance plan and begin preparing implementation agreements, if needed (Task 4).
- Report the annual dilution metric compared to dilution limits and projections (Task 5).

Year four:

- Begin implementation the of compliance plan, if needed (Task 4).
- Report the annual dilution metric compared to dilution limits and projections (Task 5).

Year five and beyond:

- Reevaluate compliance with dilution requirements every five years (Task 5).

Exhibit K-4 shows the estimated budget-level engineering cost to complete Tasks 1 through 5. Given the ability to leverage the existing work being performed by Watermaster and the IEUA, there is no cost ($0) to perform Task 1. A cost estimate for Task 2 through 4 cannot be prepared because the outcome of the SNMP update is not yet known. It is premature to estimate the cost for performing the five-year update of the projections in Task 5, and there is no increased cost to performing the additional recommended annual reporting.

Activity L

Description of Activity L

Activity L defined by the stakeholders is:

> *Perform the appropriate amount of monitoring and reporting required to fulfill basin management and regulatory compliance.*

The objective of Activity L is to refine the monitoring and reporting requirements of Watermaster to ensure that the objectives of each requirement are being met efficiently at a minimum cost. Through the listening session process, the stakeholders identified the following desired outcomes for Activity L:

- Ensure full compliance with regulatory requirements.
- Ensure full support of basin management initiatives.
- Enable the Parties to monitor the performance of the OBMP IP and related Court orders and regulatory obligations.
- Ensure cost efficiency.

The OBMP IP included PE 1 – *Develop and Implement Comprehensive Monitoring Program*. PE 1 was included in the OBMP to provide the information necessary to support the implementation of all other OBMP program elements and to evaluate their performance. The types of monitoring programs called for by PE 1 in the OBMP IP included:

- Groundwater-level monitoring
- Groundwater-quality monitoring
- Groundwater-production monitoring
- Surface-water discharge and quality monitoring (including managed artificial recharge)
- Ground-level monitoring
- Well construction, abandonment, and destruction

Activity L has identical objectives and desired outcomes to those of PE 1 because Watermaster continues to need data and information to comply with regulations, to fulfill its obligations under its agreements and Court orders, to comply with its requirements under CEQA, and to assess the performance of the evolving OBMP IP, including the 2020 OBMP Update. Financial resources to conduct these monitoring and reporting programs are limited, so through Activity L, the Parties desire to ensure cost efficiency in Watermaster's monitoring and reporting programs.

Need and Function of Activity L

Watermaster monitoring and reporting programs

Data and information acquired in Watermaster's monitoring and data-collection programs are used to prepare reports and data deliverables that are required by regulations and Watermaster's obligations under its agreements, Court orders, and CEQA. The table below is a list of each Watermaster monitoring and reporting requirement and the regulatory entities that require the monitoring and reporting.

Monitoring and Reporting Requirement	Regulatory Entity					
	Court	State Board	Regional Board	California DFW	California DWR	CEQA
Water Rights Compliance Annual Report		X		X		
SGMA Annual Report for Adjudicated Basins					X	
Biannual Evaluation of the Cumulative Effect of Transfers	X					
Biannual Evaluation of the Balance of Recharge and Discharge	X					
Annual Finding of Substantial Compliance with the Recharge Master Plan	X					
Annual Report of Compliance with SB 88 and SWRCB Regulations for Measurement and Reporting of Diverted Surface Water		X				
Safe Yield Recalculation	X					
Recharge Master Plan Update (RMPU)	X					
State of the Basin Report	X					
California Statewide Groundwater Elevation Monitoring Program (CASGEM)					X	
Chino Basin Maximum Benefit Annual Report			X			
Annual Report of the Prado Basin Habitat Sustainability Committee						X
Water Recycling Requirements for the Chino Basin Recycled Water Groundwater Recharge Program			X			
Annual Report of the Ground-Level Monitoring Committee	X					
OBMP Semi-Annual Status Reports	X					

Exhibit L-1 is a comprehensive description of each monitoring and reporting requirement listed in the table above, the associated data types required to meet the reporting requirement, the data analyses performed, the reporting content, and past efforts by Watermaster to reduce the scope and cost of the monitoring and/or reporting requirements.

The scope of the monitoring programs under PE 1 have evolved over time to satisfy new requirements associated with regulations and Watermaster obligations under its agreements, Court orders, and CEQA. In some instances, the monitoring programs have expanded to satisfy new basin-management initiatives and regulations. In some instances, the scope of the monitoring programs has been reduced with periodic reevaluation and redesign to achieve the monitoring objectives with reduced cost.

The following summarizes each of Watermaster's existing monitoring and data-collection programs. Watermaster compiles, checks, and stores the data collected under most of these programs in a centralized environmental database. The database and the database-management procedures ensure the quality and accuracy of the data, allow for efficient data exploration and analysis, and include standardized reports and data exports in formats for regulatory data deliverables or further analysis (e.g. creation of model input files).

Groundwater-production monitoring. Since 1978, Watermaster has collected information to estimate total groundwater production from the Chino Basin. Watermaster uses groundwater-production data to quantify and levy assessments pursuant to the Judgment. Estimates of production are also essential inputs to recalibrate Watermaster's groundwater flow model, which is used to inform redeterminations of the Safe Yield of the Chino Basin, evaluate the state of Hydraulic Control, perform MPI assessments, and support many other Watermaster initiatives. The Watermaster Rules and Regulations require groundwater producers that produce in excess of 10 afy to install and maintain meters on their well(s). Well owners that pump less than 10 afy are considered "Minimal Producers" and are not required to meter or report to the Watermaster. Exhibit L-2 depicts the groundwater-production monitoring program as of 2018. Members of the Appropriative and Overlying Non-Agricultural Pools and CDA record their own meter data and submit them to Watermaster staff on a quarterly basis. For Agricultural Pool wells, Watermaster performed a well-metering program to equip Agricultural Pool wells with in-line flow meters, where feasible. Watermaster staff visit and record production data from the meters at these wells on a quarterly basis. For the remaining unmetered Agricultural Pool wells, including Minimal Producer wells, Watermaster applies a "water duty" method to estimate their production on an annual basis. Watermaster continues its efforts to implement the well-metering program and improve its methods to estimate pumping at un-metered wells.

Groundwater-level monitoring. Watermaster's groundwater-level monitoring program supports many Watermaster management functions, including: the periodic assessment of Safe Yield, groundwater model development and recalibration, evaluating the cumulative impacts of transfers and the balance of recharge and discharge, subsidence management, MPI assessments, estimation of storage change, other scientific demonstrations required for groundwater management, and many regulatory requirements, such as the demonstration of Hydraulic Control and the triennial recomputation of ambient water quality. The wells within the southern portion of the basin were selected for inclusion in the monitoring program to assist in Watermaster's analyses of Hydraulic Control, land subsidence, desalter impacts to private well owners, and riparian vegetation in the Prado Basin. The density of groundwater-level monitoring near the CDA well fields is greater than in outlying areas because hydraulic gradients are expected to be steeper near the CDA well fields, and these data are needed to assess the state of Hydraulic Control. In FY 2017/2018, about 1,300 wells comprised Watermaster's groundwater-level monitoring program. Exhibit L-3 depicts the groundwater-level monitoring network of wells. At about 1,050 of these wells, well owners measure water levels and provide data to Watermaster. These well owners include municipal water agencies, private water companies, the California Department of Toxic Substance Control (DTSC), the County of San Bernardino, and various private consulting firms. The remaining 250 wells are private or dedicated monitoring wells that are mostly located in the southern portion of the Basin. Watermaster staff measures water levels at these wells once a month or with pressure transducers that record water levels once every 15 minutes. Wells monitored by transducers were preferentially selected to support Watermaster's monitoring programs for Hydraulic Control, Prado Basin habitat sustainability, land subsidence, and others where such high-frequency data are necessary to fulfill program objectives. To continue to support assessments of Hydraulic Control, and other analyses, it is anticipated that new monitoring wells will need to be constructed to replace the currently monitored private wells that will be lost as land is converted from agricultural uses to urban uses.

Groundwater-quality monitoring. The Watermaster's groundwater-quality monitoring program supports compliance for two maximum benefit commitments: the triennial ambient water quality recomputation and the analysis of Hydraulic Control. Groundwater-quality data are also used for Watermaster's biennial State of the Basin report, to support ground-water modeling, to characterize non-point source contamination and plumes associated with point-source discharges, to characterize groundwater/surface-water interactions in the Prado Basin area, and to characterize basin-wide trends in groundwater quality. Exhibit L-4 depicts the groundwater-quality monitoring network of wells. The groundwater-quality monitoring program relies on municipal producers, government agencies, and others to supply groundwater-quality data on a cooperative basis. Watermaster supplements these data through its own sampling and analysis program at private wells and monitoring wells in the area generally south of State Route 60. These wells include:

- *Private Wells*: Watermaster collects groundwater quality samples at about 85 private wells, located predominantly in the southern portion of the Basin. The wells are sampled at various frequencies based on their proximity to known point-source contamination plumes. 77 wells are sampled on a triennial basis, and eight wells near contaminant plumes are sampled on an annual basis.
- *Watermaster/IEUA Monitoring Wells*: Watermaster collects groundwater quality samples at 22 multi-nested monitoring sites located throughout the southern Chino Basin. There is a total of 53 well casings at these sites. These include nine HCMP monitoring sites constructed to support the demonstration of Hydraulic Control, nine sites constructed to support the Prado Basin Habitat Sustainability Program (PBHSP), and four sites that fill spatial data gaps near contamination plumes in MZ3. Each nested well site contains up to three wells in the borehole. The HCMP and MZ3 wells are sampled annually. The PBHSP wells are sampled quarterly to triennially.
- *Other Wells*: Watermaster collects samples from four near-river wells quarterly. The data are used to characterize the interaction of the Santa Ana River and groundwater in this area. These shallow monitoring wells along the Santa Ana River consist of two former USGS wells and two Santa Ana River Water Company wells.

For the period 2013 to 2018, water quality data were obtained from a total of 1,357 wells within and adjacent to the Chino Basin. Of those, 650 wells were sampled during FY 2017/2018. To continue to support the triennial ambient water quality recomputation, and other analyses, it is anticipated that new monitoring wells will need to be constructed to replace the currently monitored private wells that will be lost as land is converted from agricultural uses to urban uses.

Surface-water and climate monitoring. Watermaster's surface-water and climate monitoring program supports many Watermaster management functions, including: groundwater model development and recalibration, the periodic assessment of Safe Yield, evaluating the cumulative impacts of transfers and the balance of recharge and discharge, MPI assessments, recharge master planning, the PBHSP, compliance with the recycled-water recharge permit, and the maximum benefit program, among others. Exhibit L-5 depicts the surface-water and climate monitoring network of surface-water discharge sites and atmospheric monitoring stations. Much of these data are collected from publicly available datasets, including POTW discharge data, USGS stream gaging station data, and precipitation and temperature data measured at public weather stations or downloaded from spatially gridded datasets. Watermaster collects stormwater, imported water, and recycled water recharge data from the IEUA. Watermaster also collects quarterly surface-water quality samples from two sites along the Santa Ana River to support the Maximum Benefit program.

Ground level monitoring. The Watermaster's ground-level monitoring program is conducted pursuant to the Chino Basin Subsidence Management Plan. The objective of the plan is to minimize or abate the occurrence of land subsidence and groundwater fissuring within the Chino Basin. Exhibit L-6 depicts the ground-level monitoring program, which is focused across the western portion of Chino Basin within defined Areas of Subsidence Concern—areas of Chino Basin that are susceptible to land subsidence. The ground-level monitoring program consists of the following:

- Watermaster conducts high-frequency, piezometric level monitoring at about 60 wells as part of its ground-level monitoring program. A pressure-transducer/data-logger is installed at each of these wells and records one water-level measurement every 15 minutes. Data loggers also record depth-specific piezometric levels at the piezometers located at Watermaster's Ayala Park Extensometer and Chino Creek Extensometer facilities once every 15 minutes.
- Watermaster installed two extensometers in the MZ1 Managed Area to support the MZ1 Interim Monitoring Program and two extensometers in the Southeast Area understand the effects of pumping at the newly constructed Chino Creek Well Field. Both extensometer facilities record the vertical component of aquifer system compression and expansion once every 15 minutes, synchronized with the piezometric measurements, to understand the relationships between piezometric changes and aquifer-system deformation.
- Watermaster monitors vertical ground-motion via traditional elevation surveys at benchmark monuments and via remote sensing (InSAR) techniques established during the IMP. Elevation surveys are typically conducted in the MZ1 Managed Area, Northwest MZ1 Area, Northeast Area, and Southeast Area once per year. Vertical ground-motion data, based on InSAR, are collected about every two months and analyzed once per year.
- Watermaster monitors horizontal ground-surface deformation across areas that are experiencing differential land subsidence to understand the potential threats and locations of ground fissuring. These data are obtained by electronic distance measurements (EDMs) between benchmark monuments in two areas: across the historical zone of ground fissuring in the MZ1 Managed Area and across the San Jose Fault Zone in Northwest MZ1.

Watermaster convenes a Ground-Level Monitoring Committee (GLMC) annually to review and interpret data from the ground-level monitoring program. The GLMC prepares annual reports that include recommendations for changes to the monitoring program and/or the Subsidence Management Plan, if such changes are demonstrated to be necessary to achieve the objectives of the plan.

Biological monitoring. The Watermaster's biological monitoring program is conducted pursuant to the adaptive monitoring program (AMP) for the Prado Basin Habitat Sustainability Program (PBHSP). The objective of the PBHSP is to ensure that groundwater-dependent riparian habitat in Prado Basin will not incur unforeseeable significant adverse effects due to implementation of the Peace II Agreement. Exhibit L-7 depicts the Riparian Habitat Monitoring Program (RHMP) for the PBHSP. It produces a time series of data and information on the extent and quality of the riparian habitat in the Prado Basin over a historical period that includes both pre- and post-Peace II implementation. Two types of monitoring and assessment are performed: regional and site-specific. Regional monitoring and assessment are appropriate because the main potential stress associated with Peace II activities is the regional drawdown of groundwater levels. The intent of site-specific monitoring and assessment is to verify and complement the results of the regional monitoring.

- Regional monitoring of riparian habitat: Regional monitoring and assessment of the riparian habitat is performed by mapping the extent and quality of riparian habitat over time using: (i) multi-spectral remote-sensing data, Normalized Difference Vegetation Index (NDVI), and (ii) air photos.

- Site-specific monitoring of riparian habitat: Site-specific monitoring performed in the Prado Basin includes field vegetation surveys and seasonal ground-based photo monitoring. The most current vegetation survey conducted for the PBHSP was performed by the United State Bureau of Reclamation (USBR) in 2016, consisting of 38 sites in the Prado Basin: 24 previously established USBR sites and 14 new sites primarily located near the PBHSP monitoring wells.

Watermaster convenes the Prado Basin Habitat Suitability Committee (PBHSC) annually to review and interpret data from the RHMP. The PBHSC prepares annual reports that include recommendations for RHMP and other monitoring for the PBHSP, if such changes are demonstrated to be necessary to achieve the objectives of the PBHSP.

Water-supply and water-use monitoring. Watermaster compiles water supply and use data from the Parties to support two required reporting efforts: the Watermaster Annual Report to the Court and annual reporting requirements for adjudicated basins pursuant to the Sustainable Groundwater Management Act (SGMA). Monthly water use volumes for supply sources other than Chino Basin groundwater are collected from the Parties; this includes groundwater from other basins, recycled water, imported water, and native surface water. This data is collected and compiled twice per year to support fiscal year reporting for the Annual Report and water year reporting for the SGMA.

Planning information. Watermaster periodically compiles future water supply plans from the Parties. The data collected as part of that process represents the Parties' best estimates of their demands and associated water supply plans and are used for future planning investigations (e.g. Safe Yield recalculations and recharge master plan updates). The data collected includes:

- Water supply plans of the Watermaster Parties, including:
  - i. Projected total water demand
  - ii. Projected amount of each water supply by source to meet the projected water demand
  - iii. Monthly distribution of demand and water supplies used to meet the demand
  - iv. Projected groundwater pumping at each currently active well and future planned wells
  - v. Groundwater pumping schedules (well use priorities and capacities)
  - vi. Pumping capacities, required pumping combinations, and sustainable pumping levels (pumping sustainability metric) at each well
- Assumptions for how:
  - vii. Managed storage will be used to meet Replenishment Obligations.
  - viii. Lands currently in agricultural uses will be converted to urban uses.
  - ix. Additional potential conservation above that currently required for new land development will occur.
- Future projections of location and magnitude of storm and Supplemental Water recharge

Well construction, abandonment, and destruction. Watermaster maintains a database on wells in the basin and Watermaster staff makes periodic well inspections. Watermaster staff sometimes finds a new well while implementing its monitoring programs. Watermaster needs to know when new wells are constructed as part of its administration of the Judgment. Valuable information for use in managing the Chino Basin is developed when wells are constructed, including: well design, lithologic and geophysical logs, groundwater level and quality data, and aquifer stress test data. Well owners must obtain permits from the appropriate county and state agencies to drill a well and to put the well in use. Watermaster has developed cooperative agreements with the Counties of Los Angeles, Orange, Riverside, and San Bernardino, and DDW to ensure that the appropriate entities know that a new well has been constructed. Watermaster staff makes best efforts to obtain well design, lithologic and geophysical logs, groundwater level and quality data, and aquifer stress test data. The presence of abandoned wells is a threat to groundwater supply and a physical hazard. Watermaster staff periodically reviews its database, makes appropriate inspections, consults with well owners, maintains a list of abandoned wells in the Chino Basin, and provides this list to the counties for follow-up and enforcement. The owners of the abandoned wells are requested to properly destroy their wells following the ordinances developed by the county in which the abandoned well is located.

Considerations for updating the monitoring and reporting programs

Financial resources are limited, and the Parties desire to conduct these monitoring and reporting programs to satisfy each requirement efficiently at minimum cost. As documented in Exhibit L-1, the scope of Watermaster's monitoring and reporting programs has evolved over time with new or changing regulations, obligations, and management initiatives.

Watermaster staff and its engineer continually review and revise the monitoring programs to collect the minimum data necessary to meet the objectives of the monitoring and reporting requirements. In some instances, Watermaster convenes special committees to analyze monitoring data and develop recommendations for revisions to the programs. What has not been performed by Watermaster in the recent past is a comprehensive review of all monitoring and reporting programs in an open stakeholder process.

To achieve the Parties' desire to satisfy all monitoring and reporting requirements at minimum cost, Activity L should begin with a comprehensive review of each of Watermaster's requirements for monitoring and reporting and a discussion of if and how the programs could be revised. The review should be performed in an open stakeholder process should consider:

- the objectives of the monitoring and reporting program,
- the minimum datasets required to meet the objectives,
- the prospective loss of private (or other) wells that are currently used in the Watermaster's monitoring programs and how they can be cost-effectively replaced over time,
- the methods used to analyze the data, and
- the reporting frequency and content.

In some cases, revision of the monitoring and reporting programs will require Court approvals, regulatory approvals, or modification/amendment to CEQA documents.

Ultimately, Activity L will produce a *Monitoring and Reporting Work Plan* that documents the programs and will be used to define the Watermaster's annual monitoring scope and budget. The *Monitoring and Reporting Work Plan* will be updated as needed to respond to changed conditions within any of the programs with opportunity for input and feedback from the Parties.

Scope of Work for Activity L

The scope of work for Activity L – *Perform the appropriate amount of monitoring and reporting required to fulfill basin management and regulatory compliance* consists of the following tasks:

- Task 1 – Convene Monitoring and Reporting Committee and prepare the *Monitoring and Reporting Work Plan*
- Task 2 – Implement recommendations in *Monitoring and Reporting Work Plan*

- Task 3 (recurring future task) – Conduct monitoring and reporting programs and prepare annual updates to Monitoring and Reporting Work Plan

Task 1 – Convene Monitoring and Reporting Committee and prepare the Monitoring and Reporting Work Plan. The objectives of this task are to:

- Update the Parties on all Watermaster monitoring and reporting requirements associated with regulations and obligations under its agreements, Court orders, and CEQA.
- Review the current monitoring and reporting programs that are designed to satisfy all Watermaster requirements.
- Develop recommendations for a revised monitoring and reporting program, including a scope of work and cost estimates to implement the recommendations.
- Document all Watermaster monitoring and reporting programs in a *Monitoring and Reporting Work Plan*. For each monitoring program, the work plan will include: a statement of objectives/requirements, the monitoring program to satisfy the requirements, the methods for evaluating data, the frequency for data analysis and reporting, and a schedule for initiating future updates to the plan, including construction of new monitoring wells (if needed).
- Prepare a technical memorandum to document the recommendations and a proposed process to revise the monitoring and reporting programs that require specific regulatory and/or Court approvals for modification. The memorandum will describe the anticipated cost savings that the Parties will realize if the revisions to the monitoring and reporting programs are approved. The memorandum will be titled: *Recommended Revisions to Watermaster's Non-Discretionary Monitoring and Reporting Programs*.

A series of six committee meetings will be conducted over an 18-month period to achieve these objectives.

Task 2 – Implement recommended revisions to Watermaster's non-discretionary monitoring and reporting programs. In this task, the plan described in the *Recommended Revisions to Watermaster's Non-Discretionary Monitoring and Reporting Programs* will be implemented. This task will likely require technical demonstrations to the appropriate regulatory body (e.g. Regional Board, the Court, etc.) to gain approval for revisions to the monitoring program, report content, and/or report frequency. This task may be a multi-step, multi-year process to implement all recommended revisions. The results of this task will result in future updates to the *Monitoring and Reporting Work Plan*. Updates will be incorporated as they are approved.

Task 3 (recurring future task) – Bi-Annual review of scope of work and cost to implement the Monitoring and Reporting Work Plan in the subsequent fiscal year. In the first quarter of every other calendar year, the Monitoring and Reporting Committee will meet to review any changes to the *Monitoring and Reporting Work Plan* and the scope of work and budget for the subsequent fiscal year. The work plan updates and subsequent fiscal year budget will incorporate the recommendations made by special committees (such as the Ground-Level Monitoring Committee), any approved changes resulting from work performed in Task 2, and other changed conditions of the monitoring and reporting programs. The annual review can also include discussion and consideration of additional recommendations for efficiencies suggested by the Parties.

Cooperative Efforts with Appropriate Entities to Implement Activity L

This is a basin-wide activity that involves the Parties. Watermaster's role will be to convene the Monitoring and Reporting Committee; to coordinate and administer its activities and meetings; to ensure that the recommendations derived from this effort are consistent with the Judgment, Peace Agreements and other agreements, Court orders, state and federal regulations, and CEQA requirements; and to execute the *Recommended Revisions to Watermaster's Non-Discretionary Monitoring and Reporting Programs*.

Implementation Actions, Schedule, and Costs for Activity L

The recommended schedule to complete the scope of work is described below:

Year one and two:

- Convene Monitoring and Reporting Committee and prepare the *Monitoring and Reporting Work Plan*.
- Prepare memorandum: *Recommended Revisions to Watermaster's Non-Discretionary Monitoring and Reporting Programs*.

Year three and beyond:

- Implement *Recommended Revisions to Watermaster's Non-Discretionary Monitoring and Reporting Programs*.
- Perform bi-annual review of scope of work and cost to implement the *Monitoring and Reporting Work Plan*.

Exhibit L-8 shows the estimated budget-level cost opinion to complete Task 1, which is about $165,000. The cost of Tasks 2 and 3 cannot be estimated until the completion of Task 1.

Activities H, I, and J

Description of Activities H, I, and J

Activities H, I, and J as defined by the stakeholders are intended to equitably allocate and minimize the cost of OBMP implementation. The fourth goal of the 2000 OBMP and the 2020 OBMP Update is to *Equitably Finance the OBMP*. As described in Section 3 of this Scoping Report, the intent of this goal is to identify and use efficient and equitable methods to fund OBMP implementation. Three of the activities defined by the stakeholders address equity and cost.

Activity H is to:

> *Develop an equitable distribution of costs/benefits of the OBMP Update and include in the OBMP Update agreements*

Activity I is to:

> *Develop regional partnerships to implement the OBMP Update and reduce costs and include in the OBMP Update agreements*

Activity J is to:

> *Continue to identify and pursue low-interest loans and grants or other external funding sources to support the implementation of the OBMP Update*

Through the listening session process, the stakeholders identified the following desired outcomes from Activities H, I, and J:

- Provide transparency as to the benefits of the OBMP Update activities, including identification of who benefits.
- Clearly identify Watermaster's roles in OBMP implementation and the associated future assessment costs to the Parties.
- Provide information needed to plan financial resources, such as cost projections similar to a Master Plan process.
- A formal process to revisit the OBMP implementation plan and adjust priorities and schedules as necessary to address changed conditions.
- Improve readiness to apply for grants as they become available.
- Increase the likelihood that the OBMP will be implemented.
- Keep the cost of OBMP implementation as low as possible by obtaining grants and low-interest loans.

As noted above, the fourth goal of the 2000 OBMP is to equitably finance the OBMP, however there were no PEs in the OBMP IP related to this goal. The Peace and Peace II Agreements and OBMP project implementation agreements established cost allocations for certain activities. The benefit and cost allocations included in these agreements were based on negotiations among the Parties and encouraged the use of grant funding to build projects. These funding agreements were deemed equitable when they were developed, and they are in use today.

Together, the management framework of the OBMP IP and implementation agreements enabled the Parties to obtain tens of millions of dollars in grants and other outside funding to implement the 2000 OBMP, including for the Chino Basin Desalters, RMPU recharge facilities, and the recycled water recharge program. In 2018, a contingent grant in the amount of $200 million was awarded to IEUA for the regional CBP Storage and Recovery Program.

Need and Function of Activities of H, I, and J

Benefits of the OBMP

To support the Parties' consideration of the Peace II Agreement, Watermaster contracted with Dr. David L. Sunding to prepare the *Report on the Distribution of Benefits to Basin Agencies from the Major Program Elements Encompassed by the Peace Agreement and Non-Binding Term Sheet*. The economic analysis estimated the costs and benefits of the implementation of the PEs encompassed by the Peace I and Peace II Agreements to the ten Chino Basin appropriator Parties with the largest water rights in the Judgment (they are listed in the table below). These ten Parties account for 91.2 percent of the Operating Safe Yield. The allocation of aggregate costs and benefits to the individual agencies in the basin was computed based on a complex set of legal rules (such as share of Operating Safe Yield), cost-sharing arrangements for implementation, and market forces. The estimated net present value benefits, expressed in 2007 dollars (2007$), to the Parties were primarily based on the value of (1) the gains in pumping created by implementation of the agreements and (2) the offset of the purchase of Tier 2 supplies from Metropolitan for replenishment. The study estimated that together the Peace I and Peace II Agreements would provide over $904 million dollars in net present value benefits to the Parties (2007$) for the implementation period of 2007 to 2030. The following table summarizes the net benefits to the ten agencies, as reported by Sunding:

Party	Net Benefit (2007$)
Chino	$95,966,000
Chino Hills	$73,537,000
Ontario	$232,271,000
Upland	$44,086,000
CVWD	$278,128,000
Fontana	$30,268,000
MVWD	$40,480,000
SAWCo	$7,136,000
Jurupa	$35,254,000
Pomona	$67,537,000
Total	$904,663,000
Average	$90,466,300

Based, at least in part, on these expected benefits, the Parties executed the Peace II Agreement.

During the listening session process, some stakeholders expressed opinions that the distribution of benefits projected by the Sunding work had not come to fruition, that there is a lack of clarity as to the distribution of benefits of the various PEs in the OBMP IP, and that the allocation of the cost of OBMP implementation may not be equitable. And, some stakeholders have expressed concern about participating in new or expanded efforts without first understanding the benefits received to date, performing an analysis of potential future benefits, and assessing the equitable allocation of benefits and costs.

Since the Sunding report was published, no additional work has been done to quantify the benefits that have resulted from OBMP implementation or to update the projection of benefits based on changed conditions. In 2013, the Appropriative Pool Parties discussed performing an updated economic analysis, but ultimately, they elected not to do it.

Costs of the OBMP

The costs of OBMP implementation include, among others:

- Watermaster expenses for engineering work to implement the OBMP IP, including implementation costs of certain projects (e.g. monitoring/reporting and construction of extensometers and monitoring wells)
- Watermaster expenses for other project costs, including recharge debt payments, improvement projects, recharge operations and maintenance costs, recharge, and the Pomona Credit
- Desalter replenishment and related monitoring expenses
- IEUA recycled water recharge costs
- Individual agency costs for water management activities impacted by the OBMP

As previously noted, the Peace and Peace II Agreements and OBMP project implementation agreements established cost allocations for certain activities. Watermaster-related costs for OBMP implementation are assessed annually as part of the Assessment Package. No calculation of the total OBMP costs incurred to date has been performed.

Benefits and costs of the 2020 OBMP Update

Some of the tasks within the 2020 OBMP Update activities provide broad benefit to the Parties and are essential to the Watermaster to do its job to implement the Physical Solution. Some 2020 OBMP Update activities could result in the construction of projects that will provide benefits to all stakeholders or may only provide benefits to a subset of stakeholders.

Based on the scopes of work described herein for the 2020 OBMP Update activities (A, B, CG, D, EF, K and L), there are at least 2-4 years of scoping and preliminary engineering work that would need to be performed to evaluate and select projects envisioned by the 2020 OBMP Update activities and to develop the level of detail required to quantify the benefits and costs from project implementation. Exhibit HIJ-1 illustrates the four phases of work and associated schedule for each of the 2020 OBMP Update activities, assuming that all activities would be initiated in July 2020.[34] The phases shown are: (1) scoping, (2) evaluation of the need for projects, (3) project alternatives evaluation, and (4) project implementation. The exhibit also illustrates the go-no-go decision points to proceed with the activity.

The detail required to quantify the benefits and costs of projects (including ongoing needs for monitoring and assessment) would be developed during the project alternatives evaluation phase. Once the benefits and costs for projects are quantified, the Parties will be able to review them, consider whether or not they want to participate in projects that provide benefits to participants only, and establish equitable cost allocations for the implementation actions that provide specific benefits.

[34] This exhibit is for demonstrative purposes as the parties have yet to finalize the activities for inclusion in the OBMP Update or define a scheduled to implement them.

Grant funding and regional partnerships to minimize the costs of OBMP implementation

In the future, it is anticipated that it will become increasingly difficult to secure grants and low-interest loans due to increased competition. Most grant and low-interest loan programs require, or heavily favor, projects that are within watersheds and groundwater basins with adopted integrated regional management plans, groundwater sustainability plans, or their equivalents. The 2020 OBMP Update is equivalent to a regional water resources and groundwater management plan. The first three phases of each activity described in the prior subsection and shown in Exhibit HIJ-1 should be completed to maximize the ability to be competitive when applying for grants and low-interest loans, or in securing regional funding partners. Assessing cost/benefit at a level of detail appropriate to meet the needs of the stakeholders in establishing equitable cost allocations during the project alternatives evaluation phase will enable the Parties (1) to evaluate projects in a manner that is comprehensive and clear and (2) to enter into regional partnerships and apply for grant opportunities with greater certainty as to the expected benefits and costs.

Scope of Work for Activities H, I, and J

The objectives for Activities H, I, and J can be efficiently met by incorporating tasks within the other activities to characterize the benefits and costs of the projects produced by the activities. This section describes how the scopes of work of the other 2020 OBMP Update activities can accomplish the objectives of Activities H, I, and J.

As described throughout this Scoping Report, each activity has tasks related to identifying and evaluating project alternatives to achieve the activity's objectives (e.g. project evaluation). The project evaluation phase includes the following generalized steps:

1. Develop planning, screening, and evaluation criteria for projects
2. Identify the potential project alternatives
3. Develop reconnaissance-level engineering design and operating plans for each alternative
4. Develop an engineering cost opinion for each alternative
5. Describe how each alternative could be implemented and financed
6. Evaluate project alternatives based on the evaluation criteria
7. Select the preferred project alternative

At such time that each activity reaches the project evaluation phase, the scope of work for project evaluation should include a process to articulate and value the benefits of interest to the stakeholders in establishing equitable cost allocations, considering whether a project has broad basin management benefits and the benefits to specific Parties. Examples of benefits include new yield, water supply reliability, and water quality improvements. The project benefits to analyze and value would be defined during the first step to develop criteria for selecting projects. In step five, the alternative evaluation would include a characterization of implementation benefits and costs (Watermaster expenses and other costs) and their allocation to participants under various levels of participation and cost allocation methods. The benefit and cost projections, together with the other engineering analyses, could then be used by the Parties to select a cost allocation method, prepare projections of costs to support planning of financial resources for implementation, and develop a project implementation agreement that will clearly establish the allocation of benefits and costs to each Party. With regard to the identification and valuation of benefits, the Parties could address this on a case-by-case (project-by-project) basis, or by developing and agreeing to a standard set of benefits to analyze and quantify for every project to achieve equitable cost allocations.

The steps to achieve an equitable allocation of benefits and costs should be addressed in the agreement that will be developed by the Parties to implement the 2020 OBMP Update. The 2020 OBMP implementation agreement could be designed to ensure that the desired extent of cost/benefit assessments are performed to support equitable cost allocations in the implementation of activity scopes of work, to anticipate and accommodate the development of project implementation agreements that define the project-specific cost/benefit allocation, and to periodically update cost projections for implementation of the 2020 OBMP Update activities and associated projects to support planning of financial resources.

Cooperative Efforts with Appropriate Entities to Implement Activities H, I, and J

The Parties that will participate in projects developed through the implementation of the 2020 OBMP Update activities would need to agree to an allocation of costs for the implementation of the projects and document the allocation in the project implementation agreements. Watermaster's role will be to assess certain costs associated with implementation. Watermaster will continue to assess the costs of ongoing OBMP implementation efforts that provide broad benefits to the Parties pursuant to existing agreements and would allocate costs of the implementation of new activities/projects based on the new implementation agreements developed for the 2020 OBMP Update.

Implementation Actions, Schedule, and Costs for Activities H, I, J

Other than the performance of tasks associated with the assessment of benefits and costs within each 2020OBMP Update activity, there are no separate implementation actions associated with this activity as the future implementation agreements will make such considerations. Depending on the types of benefits that need to be quantified and valued to define equitable cost allocations, the project evaluation costs estimated herein for Activities A and D could be higher. (Note that these are the only two activities that have budget-level cost-estimates for project evaluation).

The *2020 OBMP Update: Implementation Plan Report*, which is the next work product of the 2020 Update, will include an implementation plan and schedule for each of the 2020 OBMP Update activities selected for implementation by the stakeholders and a projection of associated Watermaster costs to support the planning of financial resources for implementation.

Appendix C

Table 1

Issues, Needs and Wants of the Chino Basin Stakeholders

Key: 🔴 Need ● Want/Unspecified

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Needs and Wants Categorized by Basin Management Issues	Pool Parties														Others						Addressed by Activities in Table 3*	Alignment with 2000 OBMP Goals
	Appropriative										Agricultural											
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Reductions in Chino Basin Safe Yield																						
Develop a storage management plan to optimize the use of unused storage space in the basin, avoid undesirable results, and encourage Storage and Recovery Programs	🔴	🔴		🔴	🔴			🔴	🔴	🔴	🔴		●		🔴		🔴				B, C	1, 2, 3
Design storage management and storage & recovery programs that maintain or enhance Safe Yield	🔴	●						🔴	🔴	●			🔴		●		●			●	B, C	1, 3
Maintain or enhance the Safe Yield of the basin without causing undesirable results	🔴	●		🔴	🔴			🔴	🔴	🔴	●				●		●			🔴	B, D	1, 3
Manage the basin Safe Yield for the long-term viability and reliability of groundwater supply	🔴	●						🔴	🔴	🔴	🔴			🔴			●	●		🔴	A, B, C	1, 3
Reassess the frequency of the Safe Yield recalculation	●				●												●				I	3
Continue to model and track Safe Yield, but utilize other management strategies to address a decline.																	●				B	1, 3
Develop recharge programs that maintain or enhance Safe Yield	🔴	●					●	●	🔴	●					●		●			●	A, B	1, 3
Develop more facilities to capture, store, and recharge water	●	🔴					🔴			●	●				●		●				A, B, D	1, 2
Enhance recharge in northeast MZ-3	●		●						🔴								●				A, C	1, 3
Maximize use of existing recharge facilities	●	●						●	🔴	●											A, C, F, G	3
Establish incentives to encourage recharge of high-quality imported water	●		●																		H, I	2, 3
Develop an OBMP Update that is consistent with the Physical Solution and allows access to the basin for users to meet their requirements	🔴	●				🔴		🔴													C, E	3
Engage with regional water management planning efforts in the Upper Santa Ana River Watershed that have the potential to impact Chino Basin operations or Safe Yield	●														🔴		●			🔴	I, D	3

Appendix C

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Inability to Pump Groundwater with Existing Infrastructure																						
Pursue collaborative, regional partnerships to implement regional solutions to water management challenges	●			●	●			●							🔴	●	●	●	🔴	🔴	B, E, F, G, I	3
Ensure that sufficient, reliable water supplies will be available to meet current and future water demands	🔴	🔴	🔴	🔴			●	🔴	●	●	●				🔴	●	●	🔴	●		A, B, D, G	1, 3
Develop conjunctive use agreements that provide certainty in the ability to perform during put and take years by clearly defining facilities/infrastructure and operating plans, and that leverage the lessons learned from obstacles encountered during the implementation of the current Dry Year Yield program	●						●	●	●						●		●	●			B, G, I	1, 2, 3
Develop management strategies that enable the Parties to produce or leverage their respective water rights that may be impacted by physical basin challenges like land subsidence or water quality	🔴						●	🔴							●		●				A, C, D, E, F, G, I	3
Design storage management and storage & recovery programs to raise funding to build infrastructure	●			●											●		●				B, D, I, J	3, 4
Develop process to support/facilitate project implementation	●																				F, H, J	4
Design subsidence management plans to allow flexibility in the location and volume of groundwater production in MZ-1 and MZ-2	●						●	🔴		🔴				●	●						A, C, G	3

Appendix C

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Increased Cost of Groundwater Use																						
Seek supplemental financial resources to support the implementation of the OBMP Update	🔴	🔴		⚫			⚫	🔴	🔴	⚫					⚫	🔴	⚫		⚫		D, F, G, I, J	4
Develop regional partnerships to help reduce costs	⚫			⚫			⚫	⚫	🔴						🔴	⚫	⚫			⚫	F, G, I, J	4
Monetize agencies' unused water rights for equitable balance of basin assets			⚫																		G, H	4
Decrease Watermaster assessment costs	⚫				⚫			⚫													I, J	4
Support to develop a justification for increases in water rates and developer fees to invest in needed water infrastructure	🔴	⚫							⚫								⚫				F, G, H	
Develop an equitable distribution of costs/benefits of the OBMP	⚫	⚫		⚫		🔴	⚫	🔴	🔴	⚫				🔴	⚫						H, J	4
Watermaster assessments for implementation of the OBMP should be allocated based on benefits received	⚫				⚫																H	4
Continue or enhance incentives to pump groundwater from the Chino Basin			🔴																		G, I	3, 4
Improve flexibility for Parties to execute water rights transfers														🔴							G, I	4

Appendix C

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Chino Basin Water Quality Degradation																						
Develop a water quality management plan to ensure ability to produce groundwater rights	🔴	●		●			●	●	●	●				🔴	●		●	●			E, F, G, J	2, 3
Develop regional infrastructure to address water quality contamination and treatment				●	●			●													A, B, C, E, F, G, I, J	2
Plan for and be prepared for new drinking water quality regulations that may result in an increase in groundwater treatment and costs	●	●	🔴	🔴			🔴	●	🔴	●					🔴		●				E, F	2
Be more proactive and engaged in the process to develop new drinking water quality regulations								●													A, B, D, E, G, J	2
Recycled Water Quality Degradation																						
Maintain compliance with recycled water and dilution requirements pursuant to the Chino Basin groundwater recharge permit		●					●	●	🔴	🔴				🔴	🔴						A, B, D, E, G, J	2
Increased Cost of Basin Plan Compliance																						
Develop management strategy to ensure sufficient supplies to blend with recycled water and comply with Salt and Nutrient Management Plan	●	●									🔴				●		●				G, K	2
Perform the minimum amount of monitoring/reporting that is required for basin management and regulatory compliance	●			●			●	●													L	3, 4

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Reduced Recycled Water Availability and Increased Cost																						
Fully utilize IEUA recycled water resources		🔴		●			●	●		🔴					●						A, D, E, F, G	1
Maximize the use of recycled water for direct use or recharge	●	🔴		🔴			●	🔴	🔴	🔴					●						A, D, E, F, G	1
Evaluate the potential for direct potable reuse of recycled water	●								●						●						D, E, F	1
Develop alternative management strategies to comply with the recycled water discharge obligations to the Santa Ana River	●	●		●			●	●		●					●		●				D, E, F	1, 3
Utilize non-IEUA sources of recycled water that are not being put to beneficial use	🔴	●					●	●	🔴	🔴					●		●				D, E, F	1
Other																						
Coordinate timing of agreements, grants, etc. to ensure implementation of the OBMP Update	●							●	🔴	●					●	●	●				F, G, H, I, J	
Improve communication between the Parties	🔴			🔴				●						🔴	●		●				F, H, I	
Educate elected officials and decision makers on the need and urgency to address the water management challenges	●	🔴							🔴						●	●	●				F, G, H, I, J	
Consider a long-term planning horizon of up to 50 years	●								●	●					●						F, G, H, I, J	3

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Reduced Imported Water Availability and Increased Cost																						
Ensure that there is a reliable local water supply to replace imported water during shut down of imported water delivery infrastructure for maintenance and longer-term emergency outages	🔴	●	●	🔴			●	🔴	●	●					🔴	🔴	🔴	🔴			B, C, G	1, 3
Identify and utilize new sources of supplemental water	🔴	●		●			🔴	●	●	●					●	●	●				A, B	1, 3
Construct inter-basin and intra-basin connections for the benefit of regional water supply and conjunctive use	●	●		🔴			●	●	🔴			🔴			●	🔴	●	🔴			C, G	1, 3
Understand how imported water reliability from Metropolitan Water District will be affected with and without the California Water Fix	●							●	🔴						●	●	●				-	1, 3
Develop management strategies that ensure Parties will meet future Chino Basin Desalter Replenishment Obligation and have the money to fund it	●	●		🔴			🔴		●								●			🔴	H, I, J	3
Increase water-supply reliability at the lowest possible cost	🔴			●			●	●				🔴		🔴	●		●				A, B, D, J	3
Need a better understanding of the water management plans of the Parties to be able to better plan for imported water needs and to assure reliability of Metropolitan Water District water supply	●			●					🔴			🔴			●	●	●	🔴			A	3
Analyze water management scenarios that plan for unexpected challenges and emergencies	●							●	🔴	●					●	●	●				E, G	3
Ensure that sufficient supplemental water supplies will be available to meet future replenishment requirements							●		🔴	●		🔴			●					🔴	A	1, 3
Despite the best efforts of the Parties to decrease reliance on imported water, the cost of the total water supply continues to increase	●																				-	3
Use more recycled water for Replenishment Obligation	●			🔴			🔴		🔴								●				A, D, E, F	3
Continue to build collaborative programs between the Metropolitan Water District and Chino Basin	🔴						●	●	●						●		●	●			B, I	3

Appendix C

Table 2
Activities for Consideration in the 2020 OBMP Update

ID	Activity
A	Construct new facilities and improve existing facilities to increase the capacity to store and recharge storm and supplemental water, particularly in areas of the basin that will promote the long-term balance of recharge and discharge
B	Develop, implement, and optimize Storage-and-Recovery Programs to increase water-supply reliability, protect or enhance Safe Yield, and improve water quality.
C	Identify and implement regional conveyance and treatment projects/programs to enable all stakeholders to exercise their pumping rights and minimize land subsidence.
D	Maximize the reuse of recycled water produced by IEUA and others
E	Develop and implement a water-quality management plan to address current and future water-quality issues and protect beneficial uses
F	Develop strategic regulatory-compliance solutions to comply with new and evolving drinking water standards that achieve multiple benefits in managing water quality
G	Optimize the use of all sources of water supply by improving the ability to move water across the basin and amongst stakeholders, prioritizing the use of existing infrastructure.
H	Develop an equitable distribution of costs/benefits of the OBMP Update and include in the OBMP update agreements
I	Develop regional partnerships to implement the OBMP Update and reduce costs and include in OBMP Update agreement
J	Continue to identify and pursue low-interest loans and grants or other external funding sources to support the implementation of the OBMP Update
K	Develop management strategy within the Salt and Nutrient Management Plan to ensure ability to comply with dilution requirements for recycled water recharge
L	Perform the appropriate amount of monitoring and reporting required to fulfill basin management and regulatory compliance

Appendix C

Table 3
OBMP Update Goals, Impediments to the Goals, Activities to Remove the Impediments, Expected Outcomes of Activities, and Nexus to Addressing the Issues Needs and Wants of the Stakeholders

	Impediments		Activities to Remove Impediments	Potential Outcomes of Activities	Issues, Needs and Wants, as Categorized by Basin Management Issues, that are Addressed by Activities							
					Reductions in Chino Basin Safe Yield	Inability to Pump Groundwater with Existing Infrastructure	Increased Cost of Groundwater Use	Chino Basin Water Quality Degradation	Recycled Water Quality Degradation	Increased Cost of Basin Plan Compliance	Reduced Recycled Water Availability and Increased Cost	Reduced Imported Water Availability and Increased Cost
Goal 1 - Enhance Basin Water Supplies												
1a	• Not all of the stormwater runoff available to the Chino Basin is diverted and recharged; failure to divert and recharge stormwater is a permanently lost opportunity. • The existing methodology to select recharge projects for implementation is based on the cost of imported water. There are currently no known projects with a unit cost lower than the cost of imported water, hindering expansion of stormwater capture and recharge • Pumping capacity in some areas of the basin is limited due to low groundwater levels, land subsidence, and water quality	A	Construct new facilities and improve existing facilities to increase the capacity to store and recharge storm and supplemental water, particularly in areas of the basin that will promote the long-term balance of recharge and discharge	• Increases recharge of high-quality stormwater that will: • protect/enhance the Safe Yield, • improve water quality, • reduce dependence on imported water, • increase pumping capacity in areas of low groundwater levels and areas of subsidence concern, and • provide new supply of blending water to support the recycled-water recharge program. • Provides additional supplemental-water recharge capacity for replenishment and implementation of Storage and Recovery Programs. • Provides additional surface water storage capacity. • Revised economic criteria for selecting recharge projects for implementation.	✓	✓	✓	✓	✓	✓		✓

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OBMP Update Goals, Impediments to the Goals, Activities to Remove the Impediments, Expected Outcomes of Activities, and Nexus to Addressing the Issues Needs and Wants of the Stakeholders

			Issues, Needs and Wants, as Categorized by Basin Management Issues, that are Addressed by Activities							
Impediments	**Activities to Remove Impediments**	**Potential Outcomes of Activities**	Reductions in Chino Basin Safe Yield	Inability to Pump Groundwater with Existing Infrastructure	Increased Cost of Groundwater Use	Chino Basin Water Quality Degradation	Recycled Water Quality Degradation	Increased Cost of Basin Plan Compliance	Reduced Recycled Water Availability and Increased Cost	Reduced Imported Water Availability and Increased Cost
Goal 1 - Enhance Basin Water Supplies										
1b • There is a surplus of recycled water potentially available to the Chino Basin Parties that is not being put to beneficial use. • Existing infrastructure limits the expansion or reuse and recharge of recycled water in the Chino Basin. • Existing requirements to discharge recycled water to the Santa Ana River limit the amount of IEUA recycled water available for reuse and recharge •The Department of Drinking Water and the Regional Board blending requirements for recycled water recharge could limit expanded recharge opportunities	D Maximize the reuse of recycled water produced by IEUA and others	• Results in a new, consistent volume of in-lieu and/or wet water recharge that will: • protect/enhance the Safe Yield, • reduce dependence on imported water, • improve water-supply reliability, especially during dry periods, and • increase pumping capacity in areas of low groundwater levels and areas of subsidence concern. • Identify additional sources of water to satisfy IEUA discharge requirements pursuant to the Santa Ana River Judgment.	✓	✓					✓	✓

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Goal 2 - Protect and Enhance Water Quality											
2a	• Areas of the basin are contaminated with VOCs, nitrate, perchlorate and other contaminants of emerging concern (CECs). • Water-quality regulations are evolving and becoming more restrictive, which limits the beneficial uses of groundwater. • Groundwater treatment may be necessary to meet beneficial uses, but can be expensive to build and operate. • The basin is hydrologically closed, which causes accumulation and concentration of salts, nutrients, and other contaminants. • Some stored water in the Chino Basin cannot be used due to water quality and insufficient treatment capacity • Recharge sources may contribute CECs to the groundwater basin	E Develop and implement a water-quality management plan to address current and future water-quality issues and protect beneficial uses F Develop strategic regulatory-compliance solutions to comply with new and evolving drinking water standards that achieve multiple benefits in managing water quality	• Proactively addresses new and near-future drinking water regulations. • Enables the Parties to make informed decisions on infrastructure improvements for water-quality management and regulatory compliance. • Removes groundwater contaminants from the Chino Basin and thereby improves groundwater quality. • Enables the Parties to produce or leverage their water rights that may be constrained by water quality. • Ensures that groundwater is pumped and thereby protects/enhances the Safe Yield.	✓	✓	✓	✓				✓
2b	• Water-quality regulations are evolving and generally becoming more stringent, which could limit the reuse and recharge of recycled water.	K Develop management strategy within the Salt and Nutrient Management Plan to ensure ability to comply with dilution requirements for recycled water recharge	• Enables the continued and expanded recharge of recycled water, which will: • protect water quality, • improve water-supply reliability, especially during dry periods, and • protect/enhance the Safe Yield.	✓			✓	✓	✓		✓

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Goal 3 - Enhance Management of the Basin												
3a	• Existing infrastructure (pumping and treatment capacity and conveyance) is insufficient to conduct puts and takes under proposed storage programs. • There is unused storage space in the Basin the use of which is constrained by the storage limits defined in existing CEQA documentation. • Watermaster's current storage management plan is not optimized to protect/enhance basin yield, improve water quality, avoid new land subsidence, ensure balance of recharge and discharge, maintain Hydraulic Control, etc. • Storage and recovery operations could be limited by contaminant plumes or other CECs in groundwater	B	Develop, implement, and optimize Storage and Recovery Programs to increase water-supply reliability, protect or enhance Safe Yield, and improve water quality.	• Storage programs that protect/enhance basin yield, improve water quality, avoid new land subsidence, ensure balance of recharge and discharge, maintain Hydraulic Control, etc. • New regional infrastructure to optimize put and take operations • Leverages unused storage space in the Basin. • Reduces reliance on imported water, especially during dry periods. • Potentially provides outside funding sources to implement the OBMP Update. • Improves water quality through the recharge of high quality water.	✓	✓	✓	✓				✓

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Goal 3 - Enhance Management of the Basin										
3b • Land subsidence in northwest MZ1 may limit the ability for Parties to pump their respective rights in this area. • Poor water quality and increasingly restricting water quality regulations limits the ability for some Parties to pump their respective rights. • Low groundwater levels impact pumping capacity	C Identify and implement regional conveyance and treatment projects/programs to enable all stakeholders to exercise their pumping rights and minimize land subsidence. G Optimize the use of all sources of water supply by improving the ability to move water across the basin and amongst stakeholders, prioritizing the use of existing infrastructure.	• Enables producers in MZ1 and MZ2 to obtain water through regional conveyance, which supports management of groundwater levels to reduce the potential for subsidence and ground fissuring. • Enables the Parties to increase production in areas currently constrained by poor water quality. • Removes groundwater contaminants from the Chino Basin and thereby improves water quality. • Protects/enhances the Safe Yield. • Maximizes the use of existing infrastructure, which will minimize costs. • Provides infrastructure that can also be used to implement Storage and Recovery Programs.	✓	✓	✓	✓				✓
3c • Watermaster needs information to comply with regulations and its obligations under its agreements and Court orders, yet financial resources to collect this information are limited.	L Perform the appropriate amount of monitoring and reporting required to fulfill basin management and regulatory compliance	• Ensures full compliance with regulatory requirements. • Ensures full support of basin management initiatives. • Enables Parties to monitor the performance of the OBMP Update. • Continual review and revision of requirements and monitoring program to ensure cost efficiency	✓	✓	✓	✓	✓	✓	✓	✓

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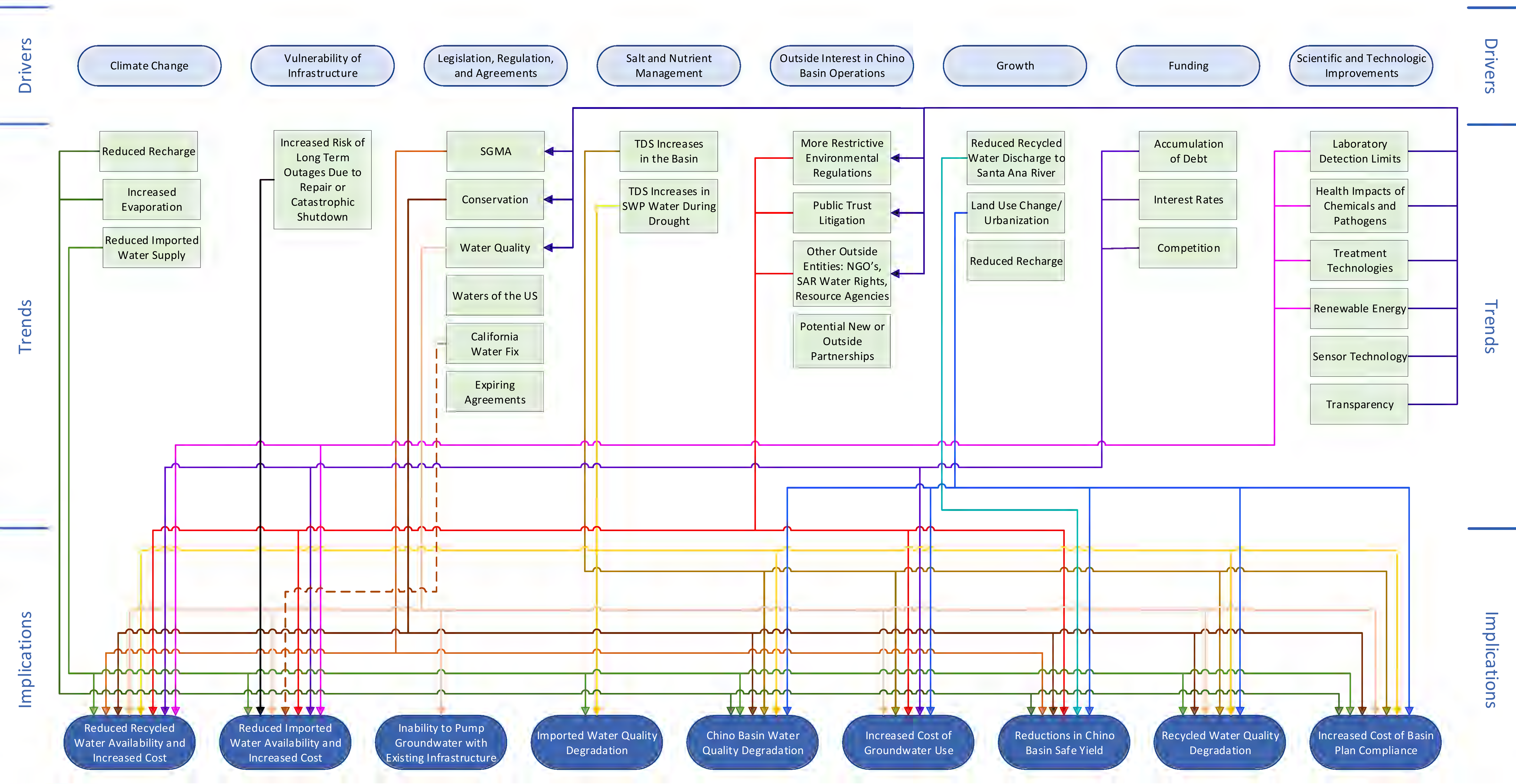
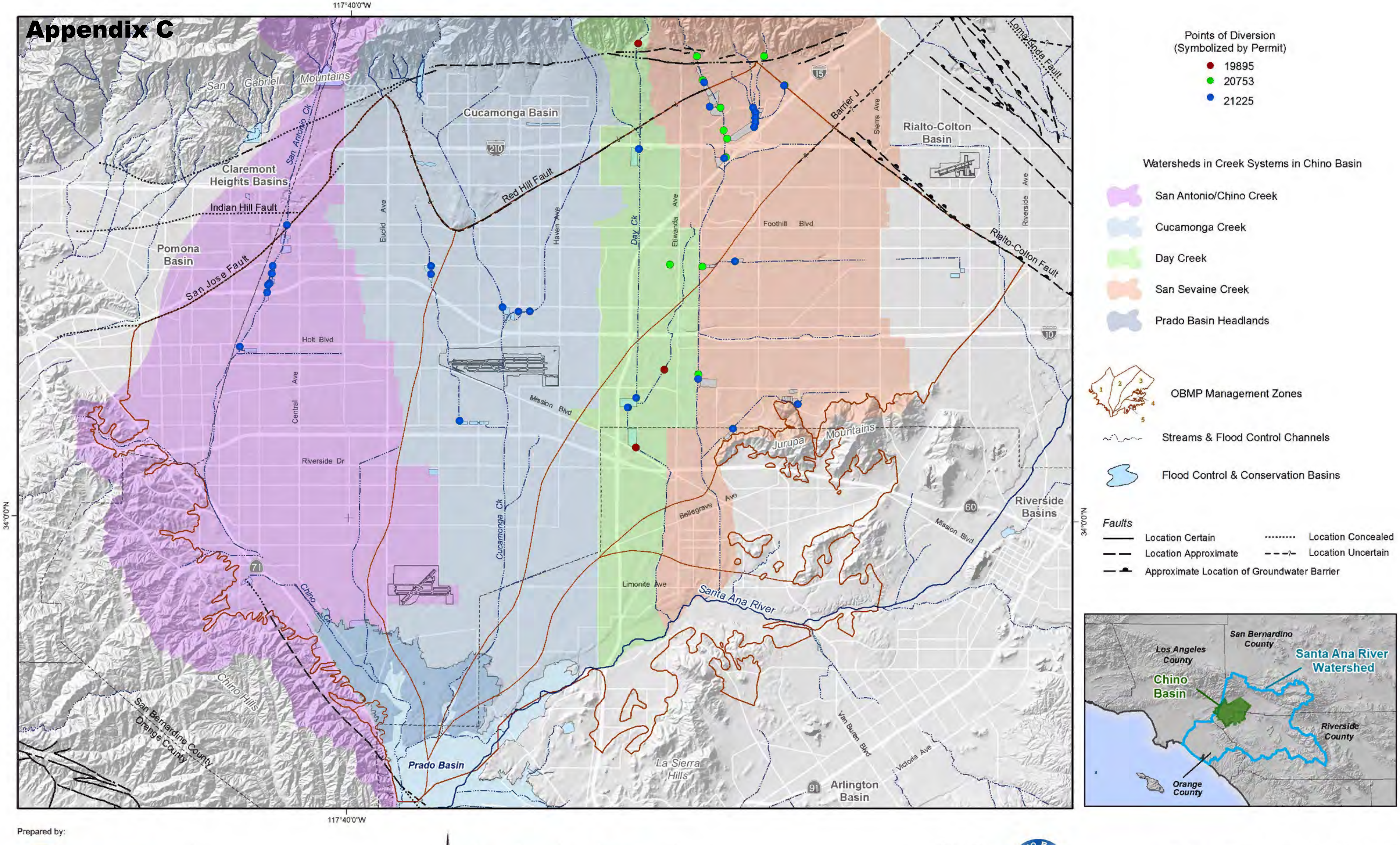
Goal 4 - Equitably Finance the OBMP										
4a • The distribution of benefits associated with the OBMP Update is not defined. • Funding needed for the OBMP implementation activities of the Watermaster is not projected beyond the current year budget, which limits Parties ability to plan required funding for the future. • There is currently no formal process to evaluate and adapt the OBMP implementation plan, schedule and cost.	H Develop an equitable distribution of costs/benefits of the OBMP Update and include in the OBMP update agreements	• Provides transparency as to the benefits of the OBMP Update activities • Identifies Watermaster roles and costs to the Parties • Formal process to revisit implementation plan and adjust priorities and schedule as necessary to address changed conditions • Periodic updates of cost projections for OBMP implementation needed to plan financial resources. • Improves readiness to apply for grants as they become available • Improves the likelihood that the OBMP will be implemented.			✓			✓	✓	✓
4b • Limited financial resources constraint the implementation of the OBMP. • Future reliability of grant funding is uncertain	I Develop regional partnerships to implement the OBMP Update and reduce costs and include in OBMP Update agreement	• Lowers the cost of OBMP implementation. • Improves the likelihood that the OBMP will be implemented.			✓			✓	✓	✓
	J Continue to identify and pursue low-interest loans and grants or other external funding sources to support the implementation of the OBMP Update				✓			✓	✓	✓

Appendix C

Figure 1 – Drivers and Trends and Their Implications
2020 OBMP Update





Prepared by:

WEI
WILDERMUTH ENVIRONMENTAL, INC.

Author: CS
Date: 11/22/2019
File: Exhibit_A-1_PODs.mxd

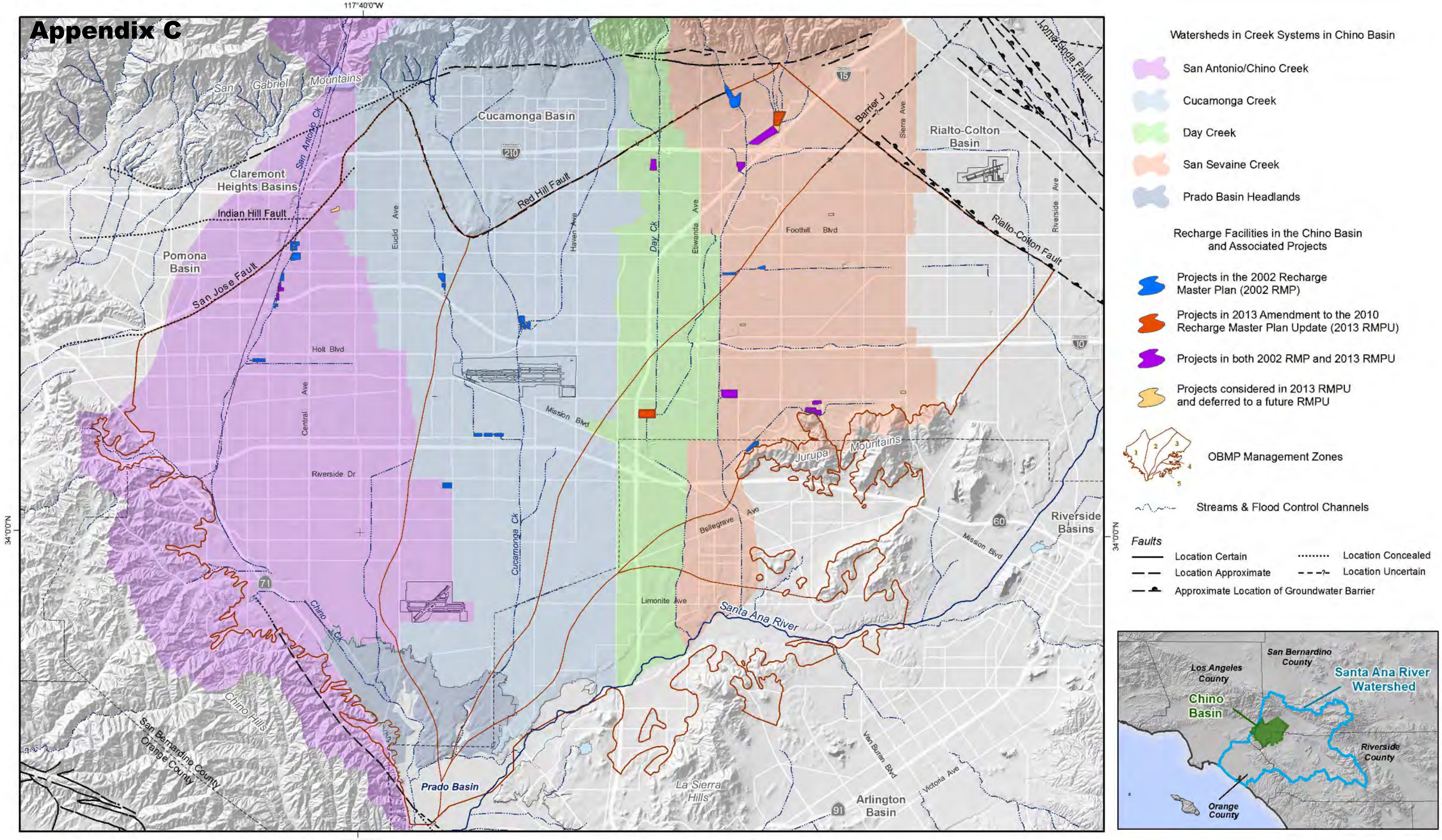
Prepared for:
OBMP 2020 Update
Scoping Report

CHINO BASIN WATERMASTER
Partners in Basin Management

Watermaster Points of Diversion
Permits 19895, 20753, 21225

Exhibit A-1

Appendix C



Prepared by:

WEI
WILDERMUTH ENVIRONMENTAL, INC.

Author: CS
Date: 11/22/2019
File: Exhibit_A-2_RMPUprojects.mxd

0 1 2 3 4 5 Miles
0 2 4 6 8 Km

Prepared for:
OBMP 2020 Update
Scoping Report

CHINO BASIN WATERMASTER
Partners in Basin Management

Recharge Improvements in the Chino Basin Since Implementation of the OBMP

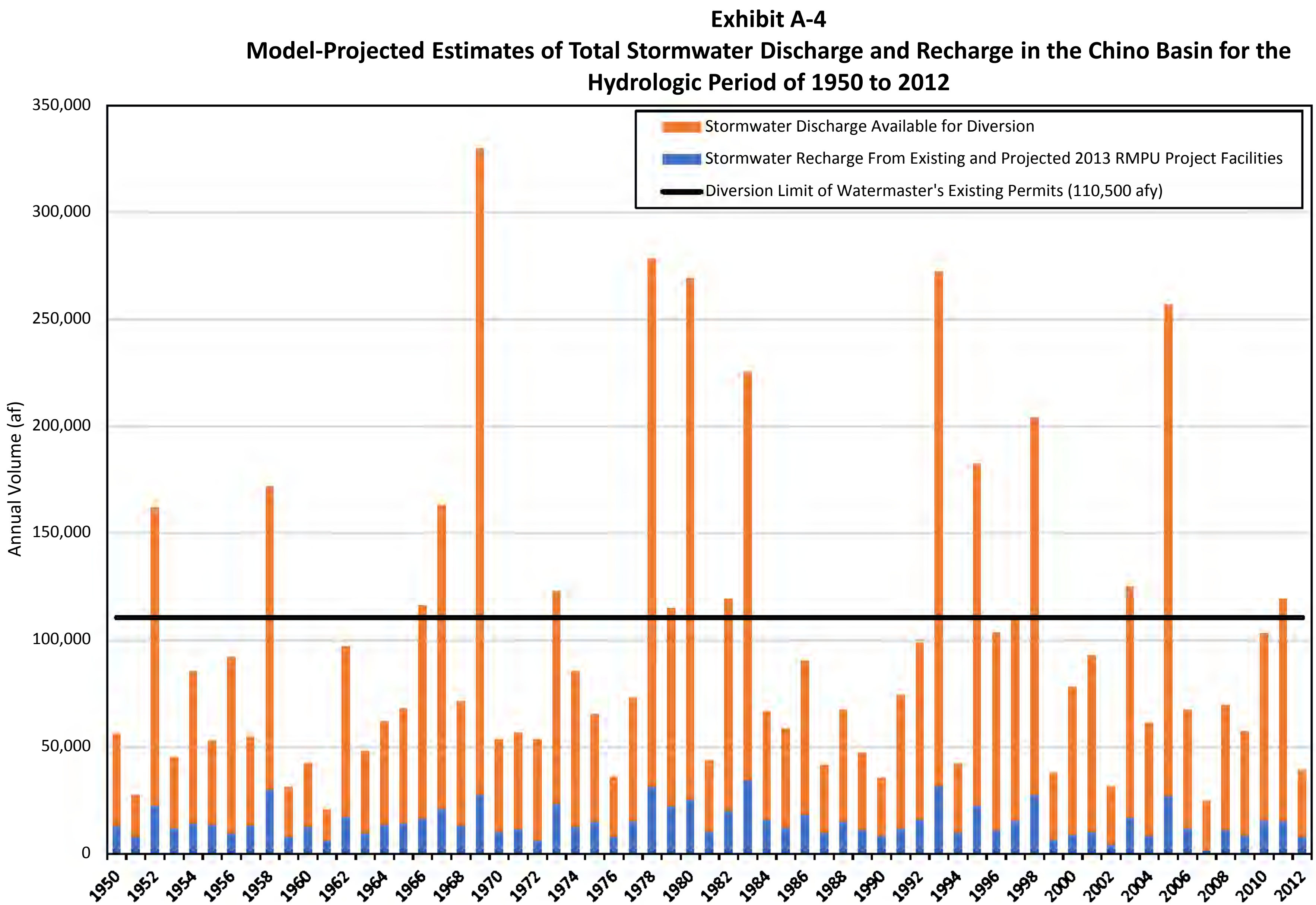
Exhibit A-2

Exhibit A-3
Average Stormwater Recharge and Supplemental Water Recharge Capacity Estimates

Recharge Facility	Average Stormwater Recharge FY 2004/05 through FY 2016/17 (afy)	Theoretical Maximum Supplemental Water Recharge Capacity (afy)	Theoretical Maximum Recharge Capacity (afy)
Brooks Street Basin	489	1,658	2,147
College Heights Basin - East	78	5,816	7,958
College Heights Basin - West		2,064	
Montclair Basin 1	953	409	5,617
Montclair Basin 2		2,940	
Montclair Basin 3		400	
Montclair Basin 4		915	
Eighth Street Basin	1,069	3,426	5,665
Seventh Street Basin		1,170	
Upland Basin	430	891	1,321
Subtotal Management Zone 1	*3,019*	*19,689*	*22,708*
Ely	1,120	4,501	5,621
Grove Basin	305	-	305
Etiwanda Debris Basin	212	2,908	3,120
Hickory Basin East	361	856	2,637
Hickory Basin West		1,420	
Lower Day Basin Cell 1	513	983	1,496
Lower Day Basin Cell 2			
Lower Day Basin Cell 3			
San Sevaine No. 1	816	114	6,025
San Sevaine No. 2		2,869	
San Sevaine No. 3		2,226	
Turner Basin No. 1	1,527	577	4,084
Turner Basin No. 2		227	
Turner Basin No. 3		418	
Turner Basin No. 4A		981	
Turner Basin No. 4B		164	
Turner Basin No. 4C		191	
Victoria Basin	309	2,279	2,588
Subtotal Management Zone 2	*5,163*	*20,713*	*25,876*
Banana Basin	258	1,790	2,048
Declez Basin Cell 1	582	1,235	3,409
Declez Basin Cell 2		823	
Declez Basin Cell 3		770	
IEUA RP3 Basin Cell 1	1,129	4,653	12,716
IEUA RP3 Basin Cell 3		3,266	
IEUA RP3 Basin Cell 4		3,669	
Subtotal Management Zone 3	*1,969*	*16,204*	*18,173*
Total	**10,151**	**56,606**	**66,757**

Source: 2018 Recharge Master Plan (WEI 2018)

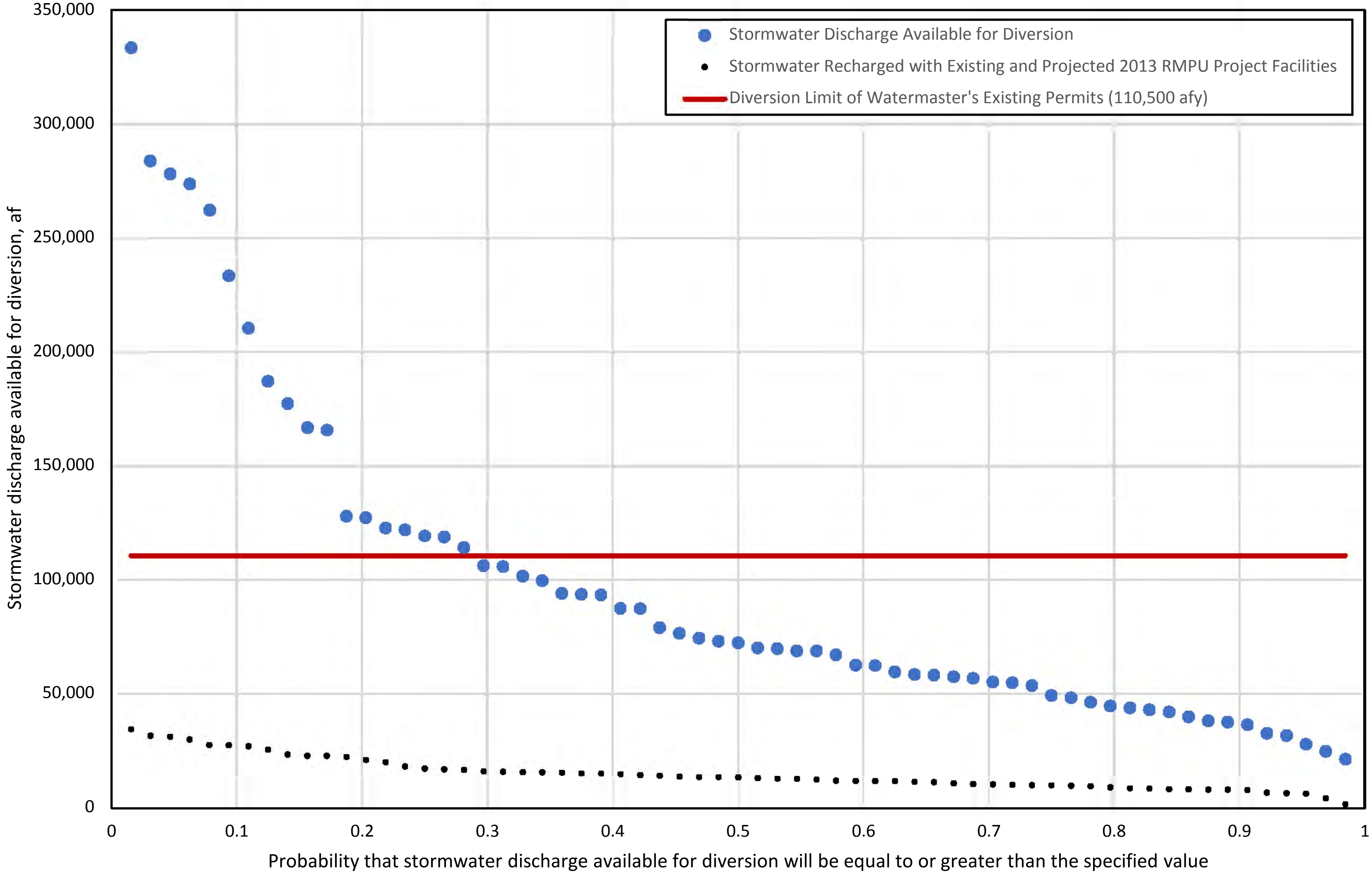
Appendix C



Exhibit_A-4_A-5_Annual_Flow_Available--Figure_3-3
Created on 6/11/2019
Printed on 7/5/2019

Appendix C

Exhibit A-5
Exceedance Frequency Curve of Stormwater Discharge Available for Diversion in the Chino Basin for the Hydrologic Period of 1950-2012



Exhibit_A-4_A-5_Annual_Flow_Available--Figure_3-4
Created on 6/11/2019
Printed on 7/5/2019

Appendix C

Exhibit A-6

Projects Considered and Not Recommended Due to Cost in the 2013 RMPU and New Conceptual Recharge Projects Considered and Not Recommended in the 2018 RMPU[1]

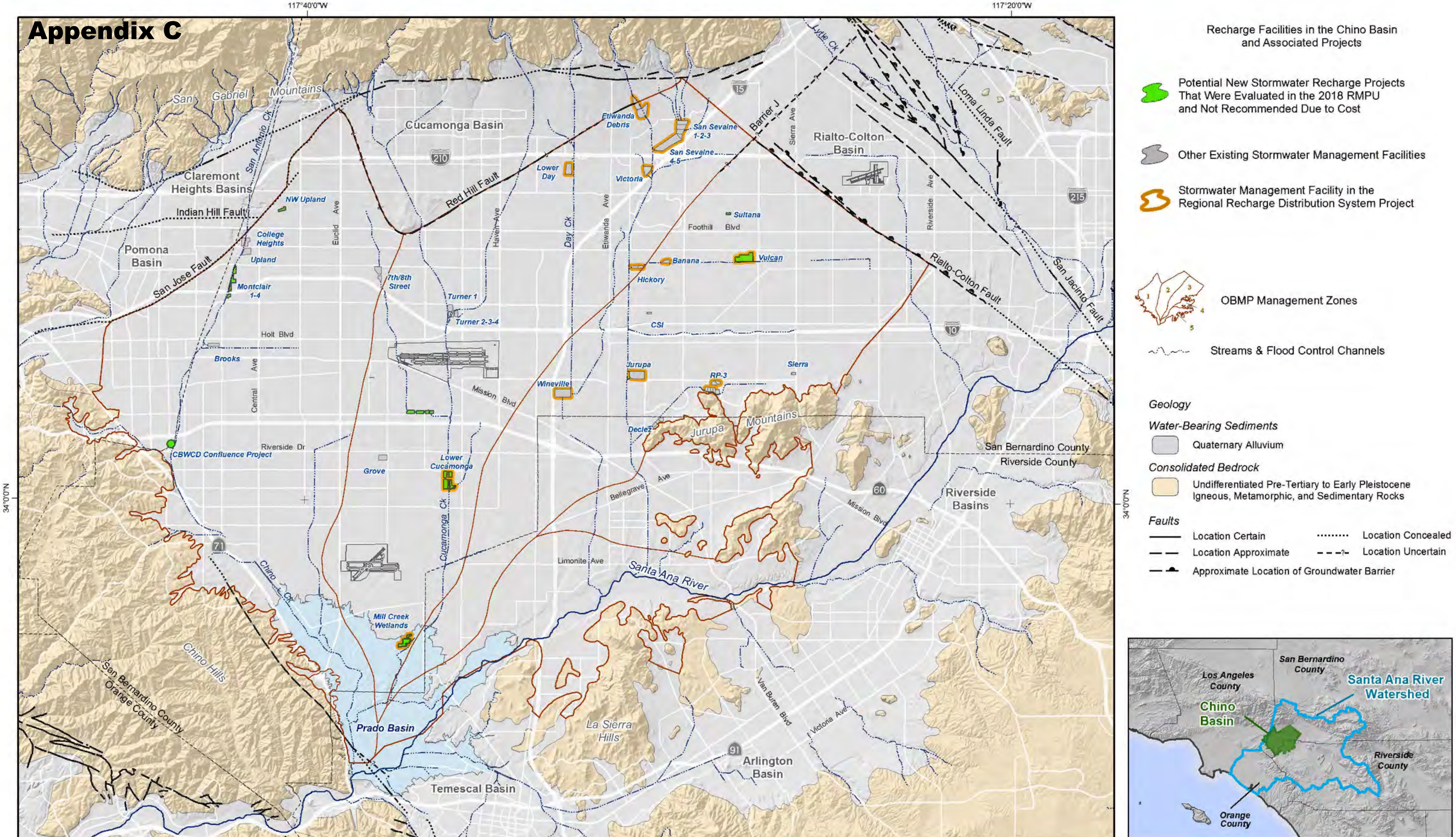
PID[2]	Project	Source	New Stormwater Recharge (afy)	Projected Costs in 2023	
				2018 RMPU Estimated Unit Stormwater Recharge Cost ($/af)	2018 RMPU Estimated Capital Cost
1a	Montclair Basins - Transfer water between Montclair Basins and deepen MC 4	2013 RMPU	71	$5,980	$6,526,000
5	North West Upland Basin - Increase drainage area and basin enlargement	2013 RMPU	93	$4,620	$6,574,000
15	Ely Basin - Basin enlargement and increased drainage area	2013 RMPU	101	$1,990	$3,017,000
24	Vulcan Basin - Construct new inflow and outflow structures	2013 RMPU	857	$2,560	$33 million
26	Sultana Avenue - Deepen basin by 10 feet	2013 RMPU	7	$5,620	$601,000
n/a	Regional Recharge Distribution System	2013 RMPU	5,000	$2,810	$184 million
n/a	Vineyard Managed Aquifer Recharge	2018 RMPU	n/a	n/a	n/a
n/a	CBWCD Confluence Project[3]	2018 RMPU	n/a	n/a	n/a

[1] With the exception of the last two projects listed, projects in this table were included in the 2013 RMPU and were considered in the 2018 RMPU based on the following criteria: projected yield is greater than zero (excluding projects for which yield was not quantified); project was not already implemented; project was determined to be technically and institutionally feasible; project was not recommended for final implementation in the 2013 RMPU

[2] 2013 Project Identification (PID) number; n/a - No PID assigned.

[3] Per an email from Steve Sentes at CBWCD dated August 16, 2018, the potential new stormwater recharge for the Confluence Project is 2,940 afy at a cost of about $17 million (excluding land acquisition costs). The estimated unit stormwater recharge cost is $650/af. This information was not vetted through the CBWM Steering Committee process during the development of the 2018 RMPU.

Appendix C



Prepared by:

WEI
Wildermuth Environmental, Inc.

Author: CS
Date: 11/22/2019
File: Exhibit_A-7_Potential new facilities.mxd

0 1 2 3 4 5 Miles
0 2 4 6 8 Km

Prepared for:
OBMP 2020 Update
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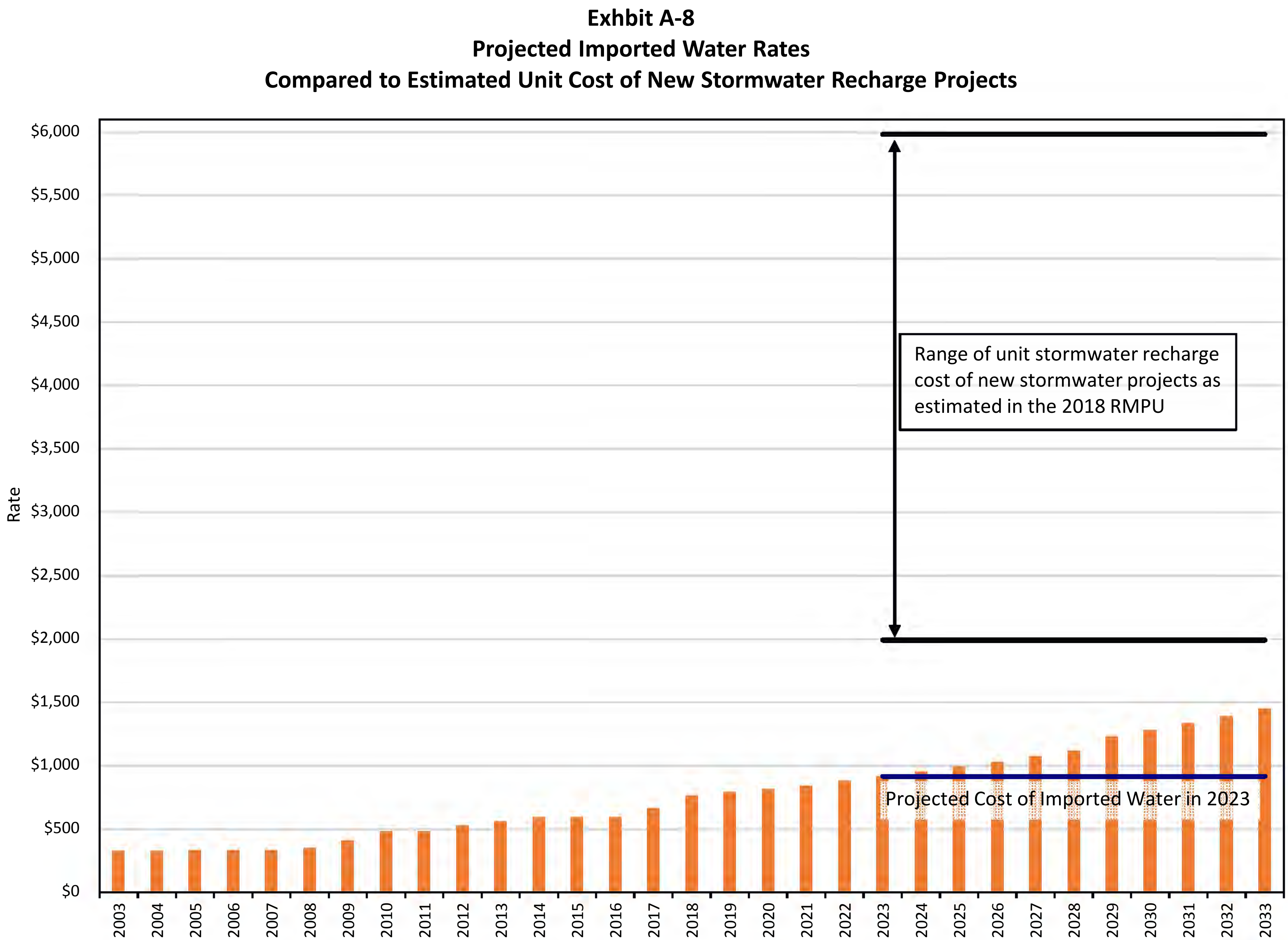
Chino Basin Watermaster — Partners in Basin Management

Potential New Stormwater Recharge Projects Considered in the 2018 RMPU

Exhibit A-7

Appendix C



Exhibit_A-8_IW_Costs--Exhibit A-8
Created on 3/15/2019
Printed on 7/5/2019

Appendix C

Exhibit A-9
Cost-Estimate and Schedule to Implement Activity A

<table>
<tr><th rowspan="2">Task and Subtask Description</th><th rowspan="2">Engineering Cost</th><th colspan="4">FY 2020/21</th><th colspan="4">FY 2021/22</th><th colspan="4">FY 2022/23</th><th rowspan="2">FY 2023/24 and beyond</th></tr>
<tr><th>Q1</th><th>Q2</th><th>Q3</th><th>Q4</th><th>Q1</th><th>Q2</th><th>Q3</th><th>Q4</th><th>Q1</th><th>Q2</th><th>Q3</th><th>Q4</th></tr>
<tr><td>Task 1 Define objectives and refine scope of work
· Define objectives of Activity A
· Refine scope described in TM1
· Refine detailed cost and schedule</td><td>$45,000</td><td>$45,000</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td>Task 2 Develop planning, screening, and evaluation criteria
· Develop criteria on how and where to conduct recharge
· Develop criteria to evaluate project cost and benefit
· Review and finalize criteria</td><td>$125,000</td><td></td><td colspan="3">$125,000</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td>Task 3 Describe recharge enhancement opportunities
· Identify potential stormwater recharge projects
· Select projects for reconnaissance level recharge study</td><td>$80,000</td><td></td><td></td><td></td><td></td><td>$80,000</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td>Task 4 Develop reconnaissance-level engineering design and operating plan
· Characterize potential recharge alternatives
· Rank Alternatives
· Prepare finance plan for soft-costs
· Prepare report</td><td>$325,000</td><td></td><td></td><td></td><td></td><td></td><td colspan="3">$220,000</td><td colspan="4">$105,000</td><td></td></tr>
<tr><td>Task 5 Plan, design, and construct selected recharge projects
· Prepare preliminary design report and CEQA documentation
· Prepare finance plan for project implementation
· Obtain permits and agreements and prepare final design
· Construct selected projects</td><td>$ TBD</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td>$ TBD</td></tr>
<tr><td>Total Cost and Cost by FY</td><td>$575,000</td><td colspan="4">$170,000</td><td colspan="4">$300,000</td><td colspan="4">$105,000</td><td><b>$ TBD</td></tr>
</table>

TBD -- To be determined

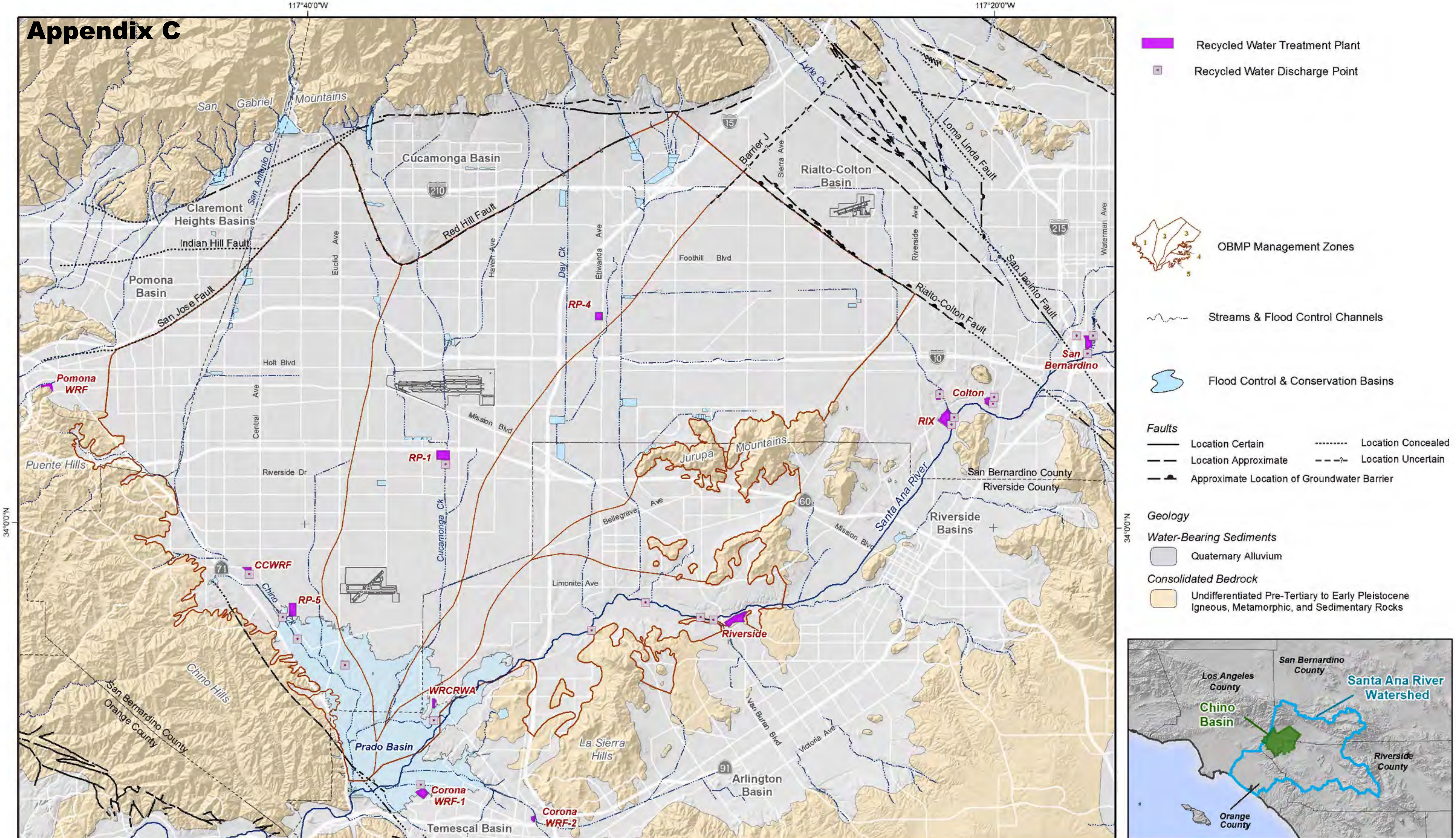
Appendix C

Exhibit B-1
Cost-Estimate and Schedule to Implement Activity B

Task and Subtask Description	Engineering Cost	FY 2020/21				FY 2021/22				FY 2022/23				FY 2023/24 and beyond
		Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	
Task 1 Convene the Storage and Recovery Program Committee, define objectives, and refine scope of work · Convene Storage and Recovery Program Committee · Define objectives and impediments for developing Storage and Recovery Programs · Define mutual benefits expected from Storage and Recovery Programs · Develop scope, schedule, and cost to prepare a *Storage and Recovery Program Master Plan*	$105,000	$105,000												
Task 2 Develop conceptual alternatives for Storage and Recovery Programs at various scales · Identify and characterize potential source waters · Identify potential storing partners and delivery methods · Identify and characterize institutional challenges · Develop planning criteria · Describe several conceptual Storage and Recovery Programs alternatives · Evaluate and select alternatives for Task 3	$ TBD					$ TBD								
Task 3 Describe and evaluate reconnaissance-level facility plans and costs for Storage and Recovery Program alternatives · Describe alternative facility plans, operations, and costs · Characterize basin response, potential MPI, benefits · Describe potential implementation barriers · Assess feasibility and rank alternatives	$ TBD									$ TBD				
Task 4 Prepare *Storage and Recovery Program Master Plan* · Describe results and recommendations of Tasks 1 through 3 · Achieve consensus on the recommendations · Prepare *Storage and Recovery Program Master Plan*	$ TBD												$ TBD	$ TBD
Total Cost and Cost by FY	**$105,000**	**$105,000**				**$ TBD**				**$ TBD**				**$ TBD**

TBD -- To be determined

Appendix C



Prepared by:

WEI
WILDERMUTH ENVIRONMENTAL, INC.

Author: SO
Date: 11/22/2019
File: Exhibit D-1_RW Treatment Plants.mxd

0 1 2 3 4 5 Miles
0 2 4 6 8 Km

Prepared for:
OBMP 2020 Update
Scoping Report

CHINO BASIN WATERMASTER
Partners in Basin Management

Recycled Water Treatment Plants and Discharge Points

Exhibit D-1

Appendix C

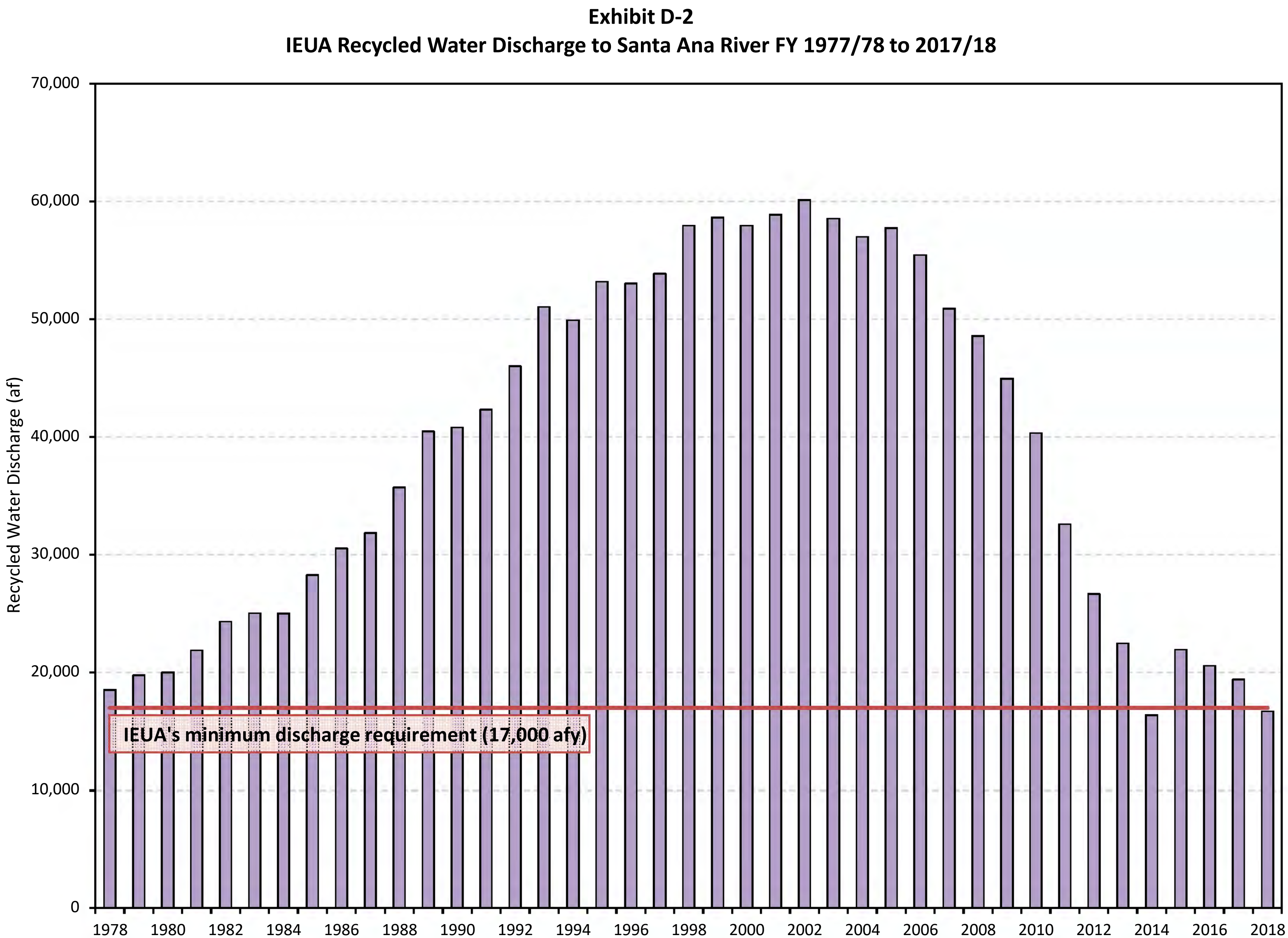


Exhibit D-2
IEUA Recycled Water Discharge to Santa Ana River FY 1977/78 to 2017/18
Recycled Water Discharge (af)
70,000
60,000
50,000
40,000
30,000
20,000
10,000
0
1978
1980
1982
1984
1986
1988
1990
1992
1994
1996
1998
2000
2002
2004
2006
2008
2010
2012
2014
2016
2018
IEUA's minimum discharge requirement (17,000 afy)

Appendix C

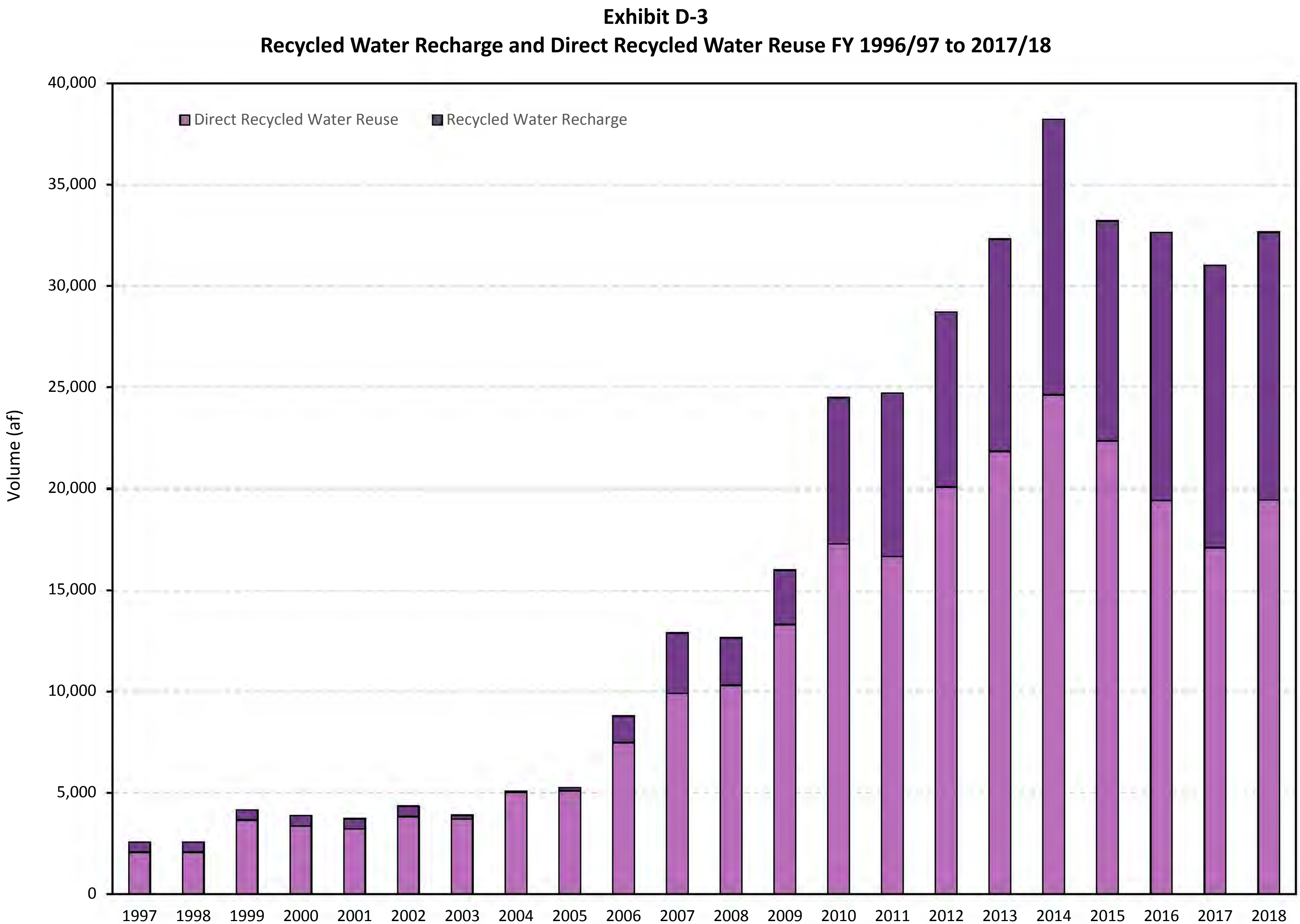
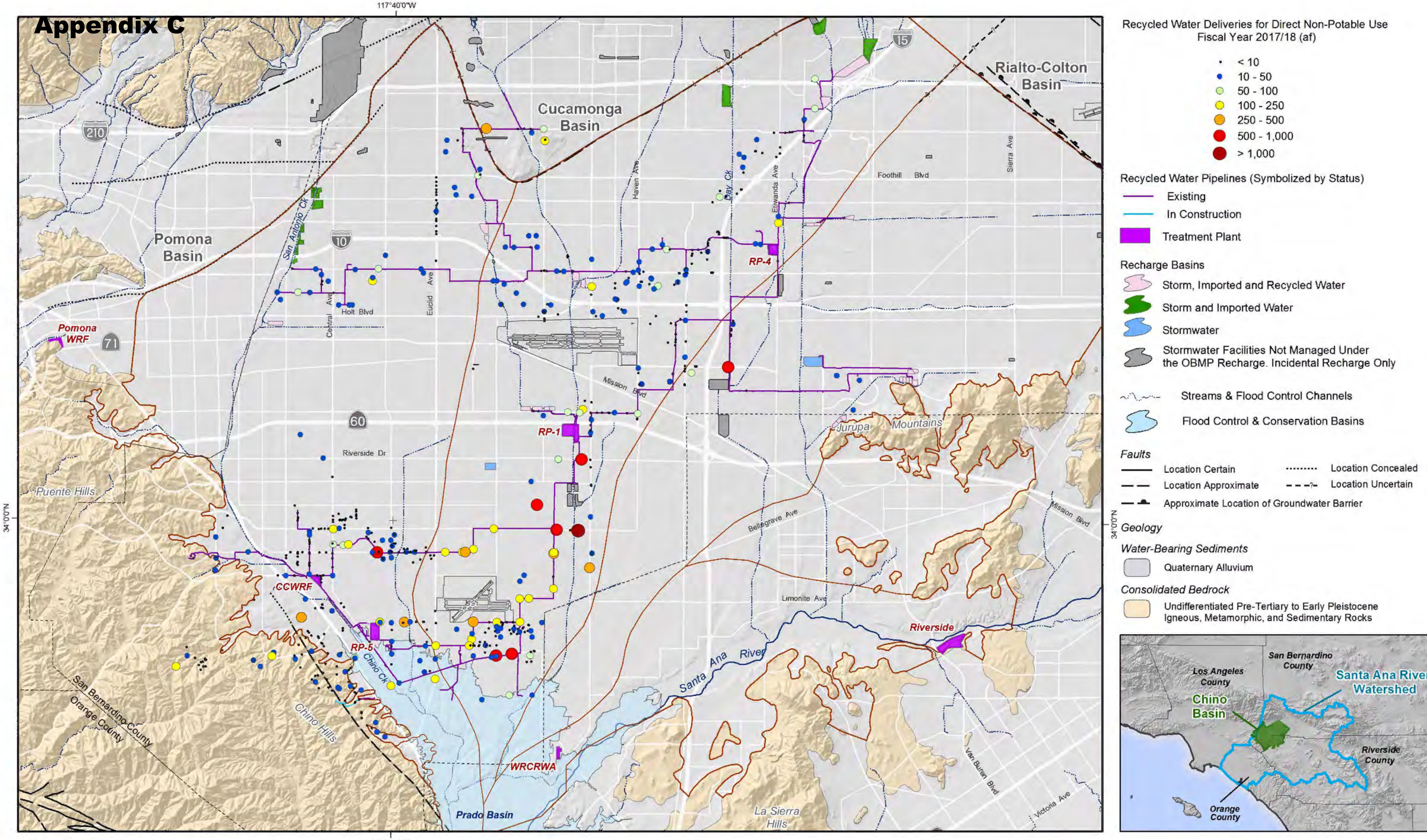


Exhibit D-3_RW Reuse.xlsx -- Exhibit D-3
7/3/2019

Appendix C



Prepared by:

WEI
WILDERMUTH ENVIRONMENTAL, INC.

Author: CS
Date: 20170215
File: Exhibit D-4_RWDeliveries

Prepared for:
OBMP 2020 Update
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CHINO BASIN WATERMASTER

IEUA Recycled Water Delivery System for Direct Reuse
FY 2017/18

Exhibit D-4

Appendix C

Exhibit D-5
IEUA Projections of Recycled Water Production and Reuse through 2040

Recycled Water (af)		FY 2017/18 (Actual)	2020	2025	2030	2040
Production - High*	a	49,369	64,400	70,400	75,200	83,000
Production - Low*			54,400	61,000	67,700	74,700
Direct Reuse*	b	19,450	24,000	27,500	30,000	30,000
Recharge*	c	13,212	16,900	18,700	18,700	18,700
Surplus Supply Available for Reuse and/or Discharge - High	d = a - (b + c)	16,708	23,500	24,200	26,500	34,300
Surplus Supply Available for Reuse and/or Discharge - Low			13,500	14,800	19,000	26,000

* Source: Inland Empire Utilities Agency. *Sources of Water Supply for the Chino Basin Program* . Memo to Member Agencies. February 20, 2019.

Appendix C

Exhibit D-6

Actual and Projected[1] Annual Recycled Water Recharge

(afy)

Basin Permitted for Recycled Water Recharge	Theoretical Maximum Supplemental Water Recharge Capacity[2]		Actual FY 2017/18 Recharge	Projected Annual Recharge for FY 2019/20 to FY 2029/30
	Directly After Cleaning[3]	Average Between Maintenance Periods[4]		
Brooks Street Basin	2,825	1,658	1,268	2,000 [5]
Seventh and Eighth Street Basins	5,045	4,596	1,037	1,490
Subtotal Management Zone 1			*2,305*	*3,490*
Ely Basins	7,375	4,501	1,511	1,100
Hickory Basin	2,433	2,276	1,399	1,650
San Sevaine Basins 1-5	9,637	5,209	0	840
Turner Basins 1-4	3,674	2,557	1,526	1,110
Victoria Basin	2,436	2,279	793	1,530
Subtotal Management Zone 2			*5,228*	*6,230*
Banana Basin	1,913	1,790	2,131	1,050
Declez Basin	3,032	2,827	588	1,250
IEUA RP3 Ponds	12,389	11,587	2,960	4,400
Subtotal Management Zone 3			*5,679*	*6,700*
Total	**50,760**	**39,280**	**13,212**	**16,420**

n/a - not applicable

[1] Source - Andy Campbell, IEUA, June 2016

[2] Subject to Watermaster needs for recharge and replenishment

[3] Total recharge from the 10-month period directly after a cleaning.

[4] Average annual recharge over the span between maintenance. The average cleaning frequency of each recharge facility was provided by the IEUA. This estimate corresponds to continuous use between maintenance periods and is less than the recharge capacity that would occur if the recharge basins are used less frequently.

[5] The projected recharge at Brooks Basin is larger than the theoretical maximum average supplemental water recharge capacity between maintenance periods, but the capacity can increase up to 2,825 afy if the maintenance frequency is increased.

Appendix C

Exhibit D-7
Cost-Estimate and Schedule to Implement Activity D

Task and Subtask Description	Engineering Cost	FY 2020/21 Q1	FY 2020/21 Q2	FY 2020/21 Q3	FY 2020/21 Q4	FY 2021/22 Q1	FY 2021/22 Q2	FY 2021/22 Q3	FY 2021/22 Q4	FY 2022/23 Q1	FY 2022/23 Q2	FY 2022/23 Q3	FY 2022/23 Q4	FY 2023/24 and beyond
Task 1 Convene Recycled Water Projects Committee, define objectives and refine scope of work · Convene Recycled Water Projects Committee · Define objectives of Activity D · Refine scope described in TM1 · Refine detailed cost and schedule	$50,000	$50,000												
Task 2 Characterize the availability of all recycled water supplies and demands · Review 2020 Urban Water Management Plans · Develop water supply and demand projections · Characterize timing and magnitude of recycled water available	$135,000		$135,000											
Task 3 Develop planning, screening, and evaluation criteria · Develop Watermaster criteria · Develop regulatory criteria · Develop criteria to evaluate project cost and benefit · Review and finalize criteria	$40,000				$40,000									
Task 4 Describe recycled water reuse project opportunities · Identify potential recycled water reuse projects · Select projects for reconnaissance level recharge study	$85,000					$85,000								
Task 5 Develop reconnaissance-level engineering design and operating plan · Characterize potential project alternatives · Rank alternatives · Prepare finance plan for soft-costs · Prepare report	$310,000						$130,000			$180,000				
Task 6 Plan, design, and construct selected recycled water projects · Prepare preliminary design report and CEQA documentation · Prepare finance plan for project implementation · Obtain permits and agreements and prepare final design · Construct selected projects	$ TBD													$ TBD
Total Cost and Cost by FY	**$620,000**	**$225,000**				**$215,000**				**$180,000**				**$ TBD**

TBD -- To be determined

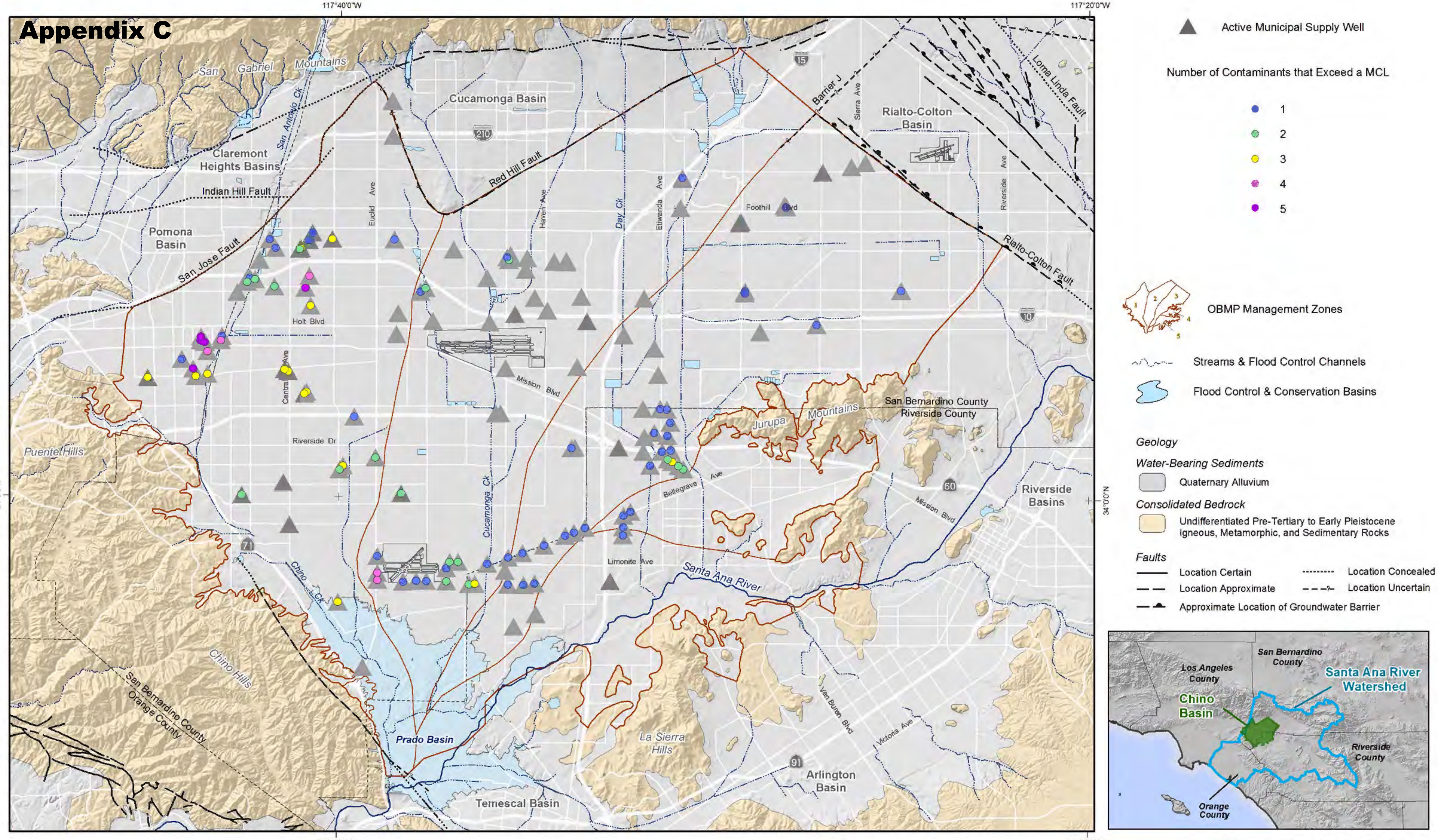
Appendix C

Exhibit EF-1
Summary of Drinking Water Contaminants with Primary MCLs in Municipal Supply Wells
FY 2013/14 - 2017/18

Analyte	Primary CA MCL	Number of Active Municipal Supply Wells with Exceedance of MCL	Number of Municipal Supply Wells with Exceedance of MCL	Number of Total Wells in the Chino Basin with Exceedance of MCL
Nitrate-Nitrogen	10 mgl	71	80	555
1,2,3-Trichloropropane	0.005 µgl	33	36	111
Perchlorate	6 µgl	27	30	387
Trichloroethylene (TCE)	5 µgl	11	14	269
Gross Alpha	15 pCi/L	6	7	14
Chromium	50 µgl	4	4	4
Arsenic	0.01 mgl	3	5	74
1,2-Dibromo-3-chloropropane	0.2 µgl	3	3	4
Tetrachloroethene (PCE)	5 µgl	3	3	96
Trihalomethanes	10 µgl	2	3	2
Nitrite-Nitrogen	1 mgl	2	2	17
1,1-Dichloroethene (1,1-DCE)	5 µgl	1	1	13
Dichloromethane (Freon 30)	5 µgl	1	1	91
Uranium	20 pCi/L	1	1	1

Exhibit EF-1-Exceed Count Report 2014-2018.xls--Table 1_NEW
Created on 7/8/2019
Printed on 7/8/2019

Appendix C



Prepared by:

WEI
Wildermuth Environmental, Inc.

Author: CS
Date: 11/22/2019
File: Exhibit_EF-2_Exceedance_Count.mxd

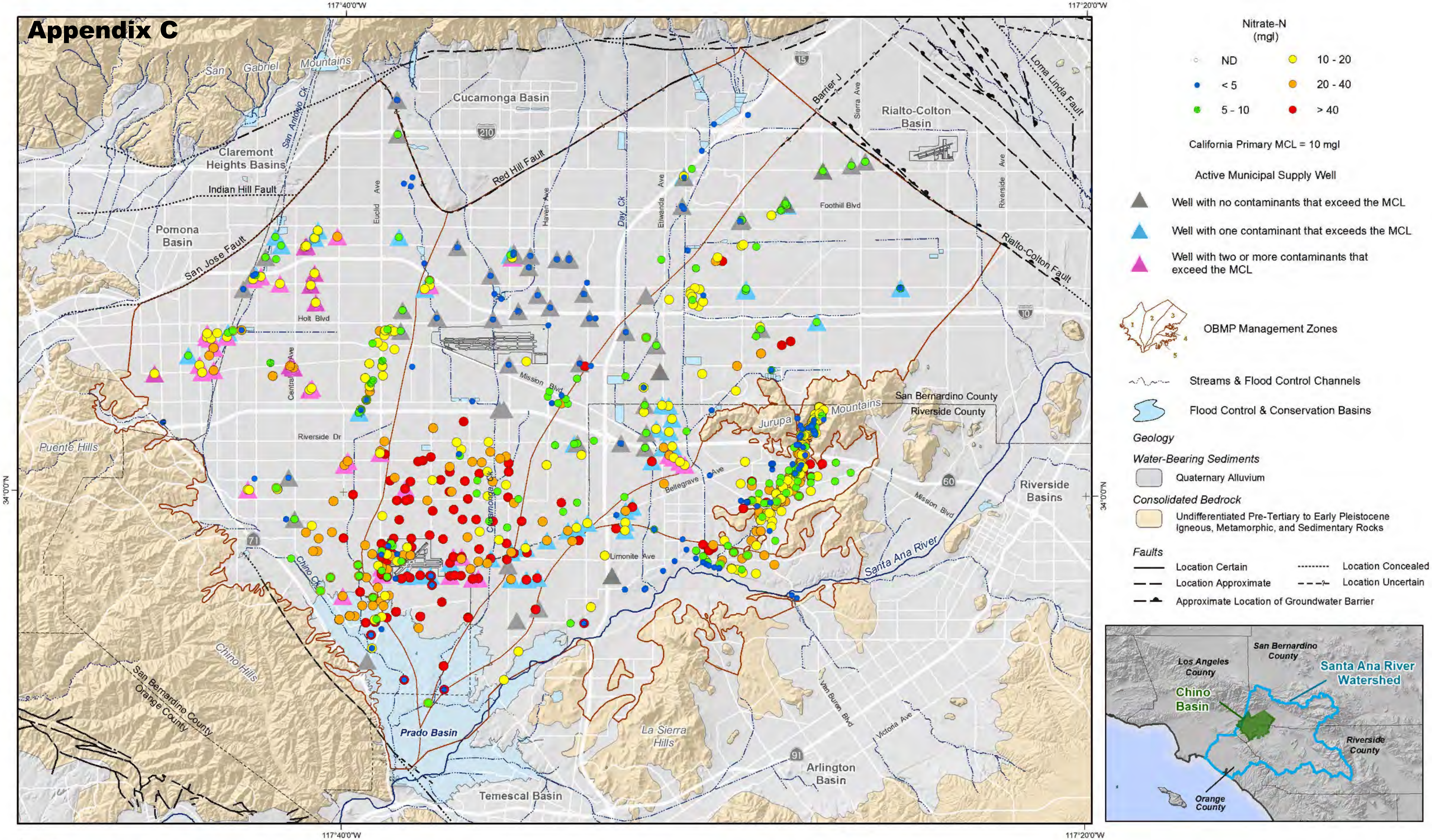
0 1 2 3 4 5 Miles
0 2 4 6 8 Km

Prepared for:
OBMP 2020 Update
Scoping Report

Chino Basin Watermaster
Partners in Basin Management

Occurrence of Drinking Water Contaminants in Active Municipal Supply Wells in Chino Basin
2014-2018

Exhibit EF-2



Prepared by:

WEI WILDERMUTH ENVIRONMENTAL, INC.

Author: CS
Date: 11/22/2019
File: Exhibit_EF-3_NO3_2014-2018.mxd

0 1 2 3 4 5 Miles
0 2 4 6 8 Km

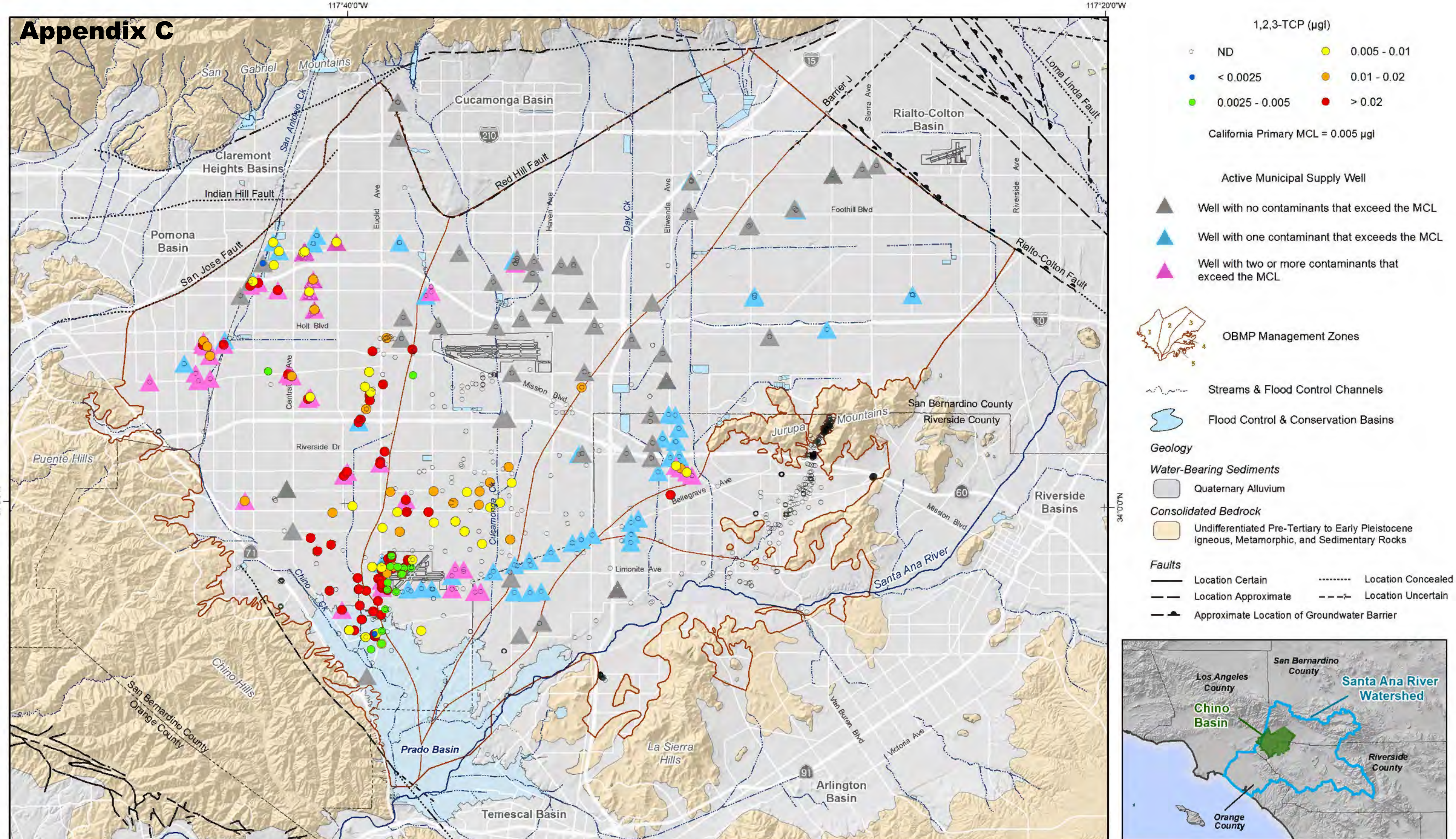
Prepared for:
OBMP 2020 Update
Scoping Report

CHINO BASIN WATERMASTER

Maximum Nitrate Concentration
2014-2018

Exhibit EF-3

Appendix C



Prepared by:

WEI
WILDERMUTH ENVIRONMENTAL, INC.

Author: CS
Date: 11/22/2019
File: Exhibit_EF-4_1,2,3-TCP_2014-2018.mxd

0 1 2 3 4 5 Miles
0 2 4 6 8 Km

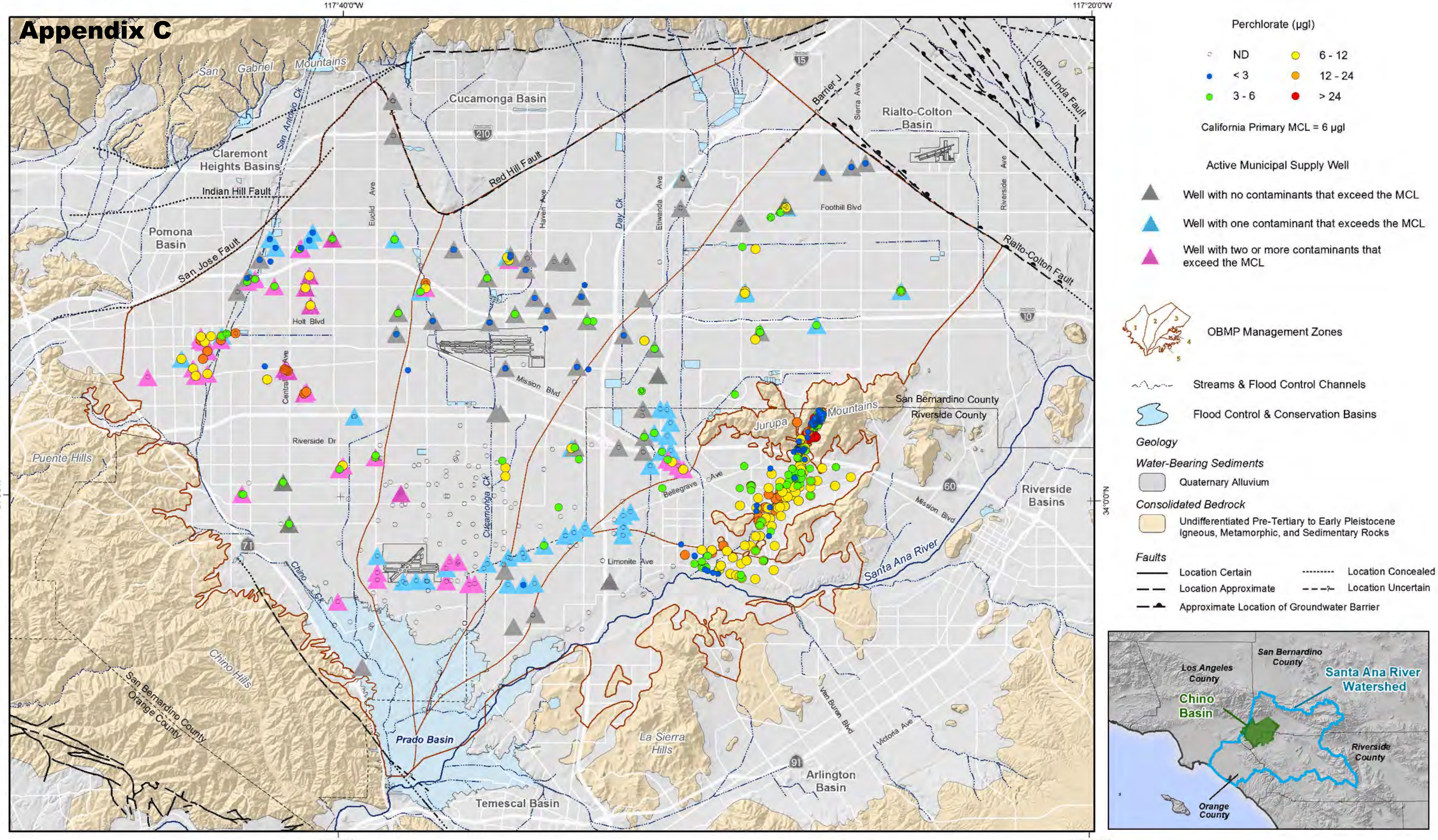
Prepared for:
OBMP 2020 Update
Scoping Report

CHINO BASIN WATERMASTER
Partners in Basin Management

Maximum 1,2,3-Trichloropropane (1,2,3-TCP) Concentration
2014-2018

Exhibit EF-4

Appendix C



Prepared by:

WEI
WILDERMUTH ENVIRONMENTAL, INC.

Author: CS
Date: 11/22/2019
File: Exhibit_EF-5_CLO4_MCL_2014-2018.mxd

Prepared for:
OBMP 2020 Update
Scoping Report

CHINO BASIN WATERMASTER

Maximum Perchlorate Concentration
2014-2018

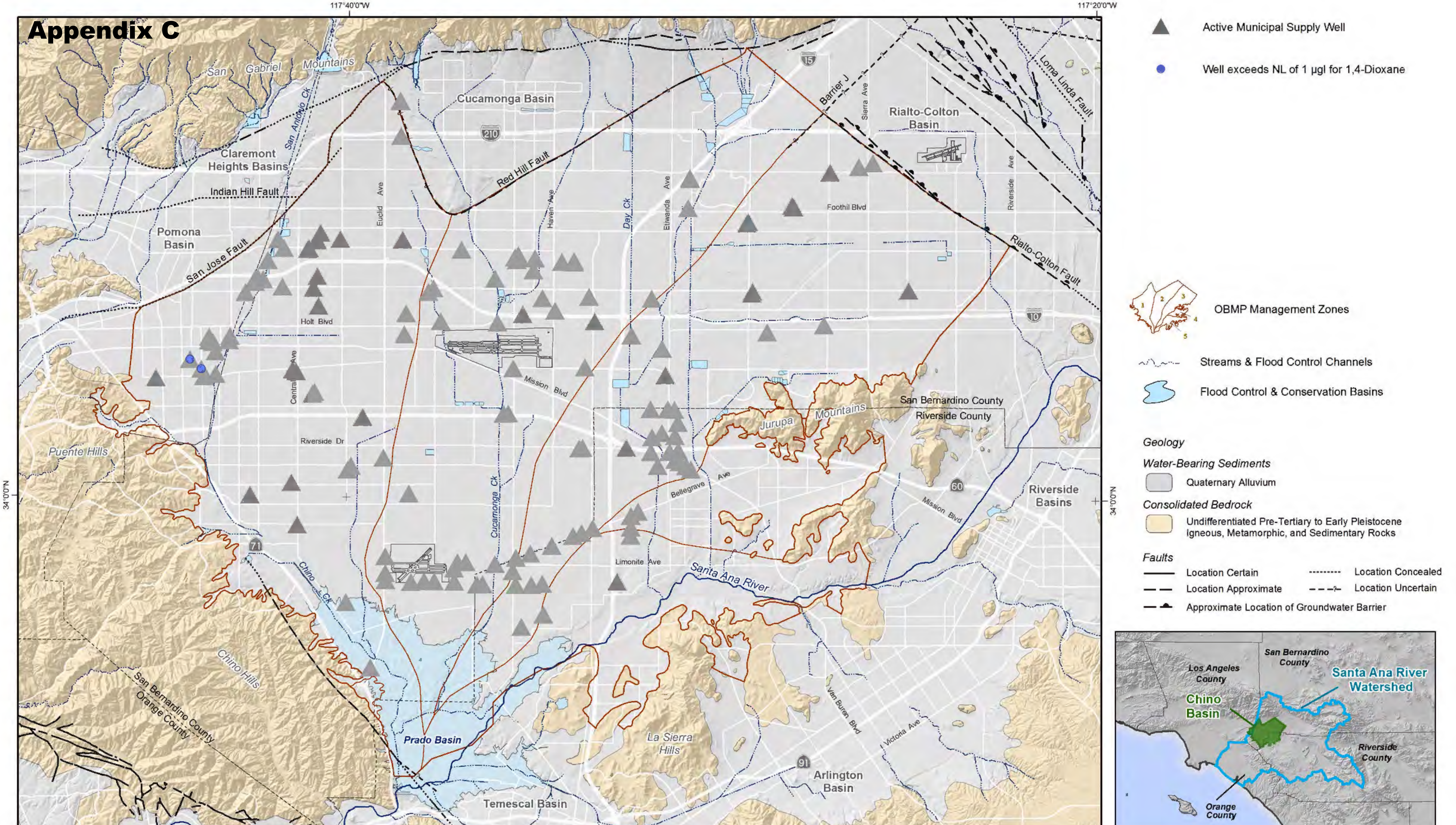
Exhibit EF-5

Appendix C

Exhibit EF-6
Summary of Drinking Water Contaminants with Notification Levels in Municipal Supply Wells
FY 2013/14 - 2017/18

Analyte	CA Drinking Water NL	Number of Active Municipal Supply Wells with Exceedance of NL	Number of Municipal Supply Wells with Exceedance of NL	Number of Total Wells in the Chino Basin with Exceedance of NL
1,4-Dioxane	1 µgl	2	2	133
Manganese	0.5 mgl	0	0	118
N-Nitrosodimethylamine (NDMA)	0.01 µgl	0	0	60
Vanadium	0.05 mgl	0	0	55
Naphthalene	0.017 mgl	0	0	48
1,2,4-Trimethylbenzene	0.33 mgl	0	0	26
1,3,5-Trimethylbenzene	0.33 mgl	0	0	19
Methyl Isobutyl Ketone	0.12 mgl	0	0	11
n-Propylbenzene	0.26 mgl	0	0	11
HMX (Octogen)	0.35 mgl	0	0	11
Chlorate	0.8 mgl	0	0	4
Formaldehyde	0.1 mgl	0	0	3
N-Nitrosodiethylamine (NDEA)	0.01 µgl	0	0	3
Ethylene Glycol	14 mgl	0	0	1
n-Butylbenzene	0.26 mgl	0	0	1

Appendix C



Prepared by:

WEI
Wildermuth Environmental, Inc.

Author: CS
Date: 11/22/2019
File: Exhibit_EF-7_Exceedance_Count_NL.mxd

0 1 2 3 4 5 Miles
0 2 4 6 8 Km

Prepared for:
OBMP 2020 Update
Scoping Report

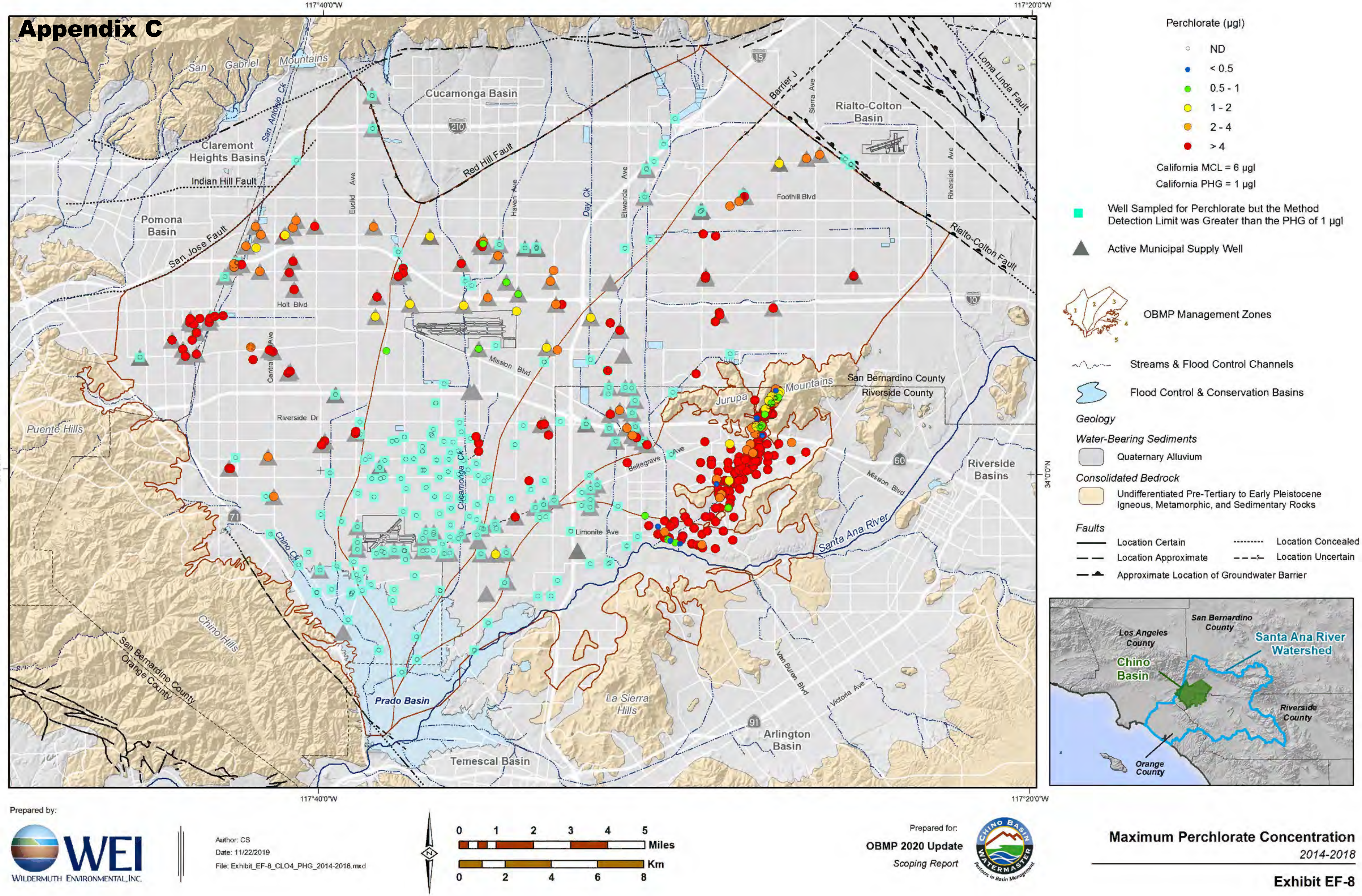
Chino Basin Watermaster — Partners in Basin Management

Contaminants that Exceed the NL in Active Municipal Supply Wells in Chino Basin

2014-2018

Exhibit EF-7

Appendix C



Prepared by:

WEI
Wildermuth Environmental, Inc.

Author: CS
Date: 11/22/2019
File: Exhibit_EF-8_CLO4_PHG_2014-2018.mxd

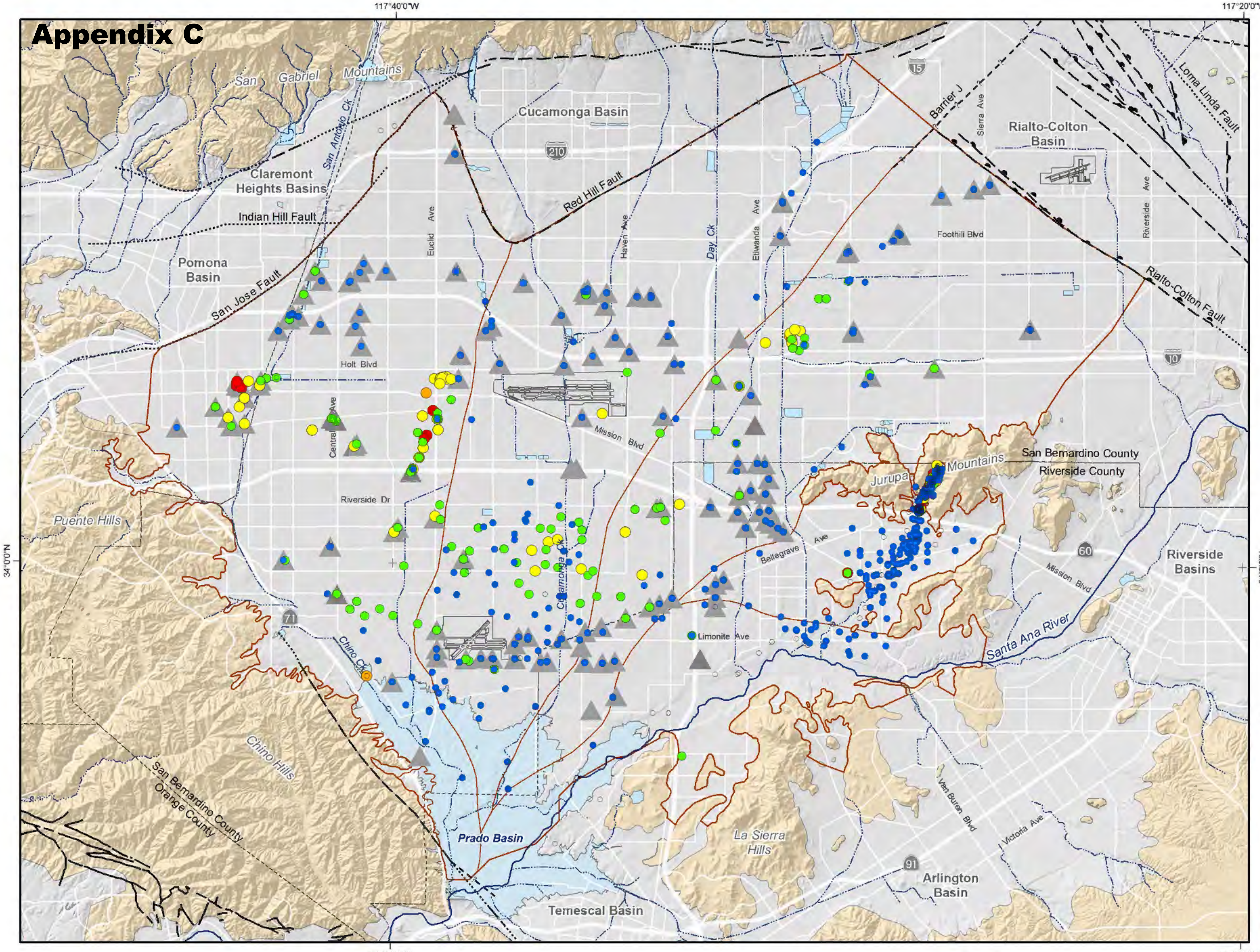
Prepared for:
OBMP 2020 Update
Scoping Report

Chino Basin Watermaster — Partners in Basin Management

Maximum Perchlorate Concentration
2014-2018

Exhibit EF-8

Appendix C



Hexavalent Chromium (µgl)

- ND
- < 5
- 5 - 10
- 10 - 20
- 20 - 40
- > 40

A MCL for Hexavalent Chromium of 10 µgl was established in 2014, and later invalidated by the court in 2017

Active Municipal Supply Well

OBMP Management Zones

Streams & Flood Control Channels

Flood Control & Conservation Basins

Geology

Water-Bearing Sediments

Quaternary Alluvium

Consolidated Bedrock

Undifferentiated Pre-Tertiary to Early Pleistocene Igneous, Metamorphic, and Sedimentary Rocks

Faults

Location Certain — Location Concealed

Location Approximate — Location Uncertain

Approximate Location of Groundwater Barrier

Prepared by:

WEI
Wildermuth Environmental, Inc.

Author: CS
Date: 11/22/2019
File: Exhibit_EF-9_HexCr_2014-2018.mxd

0 1 2 3 4 5 Miles

0 2 4 6 8 Km

Prepared for:

OBMP 2020 Update

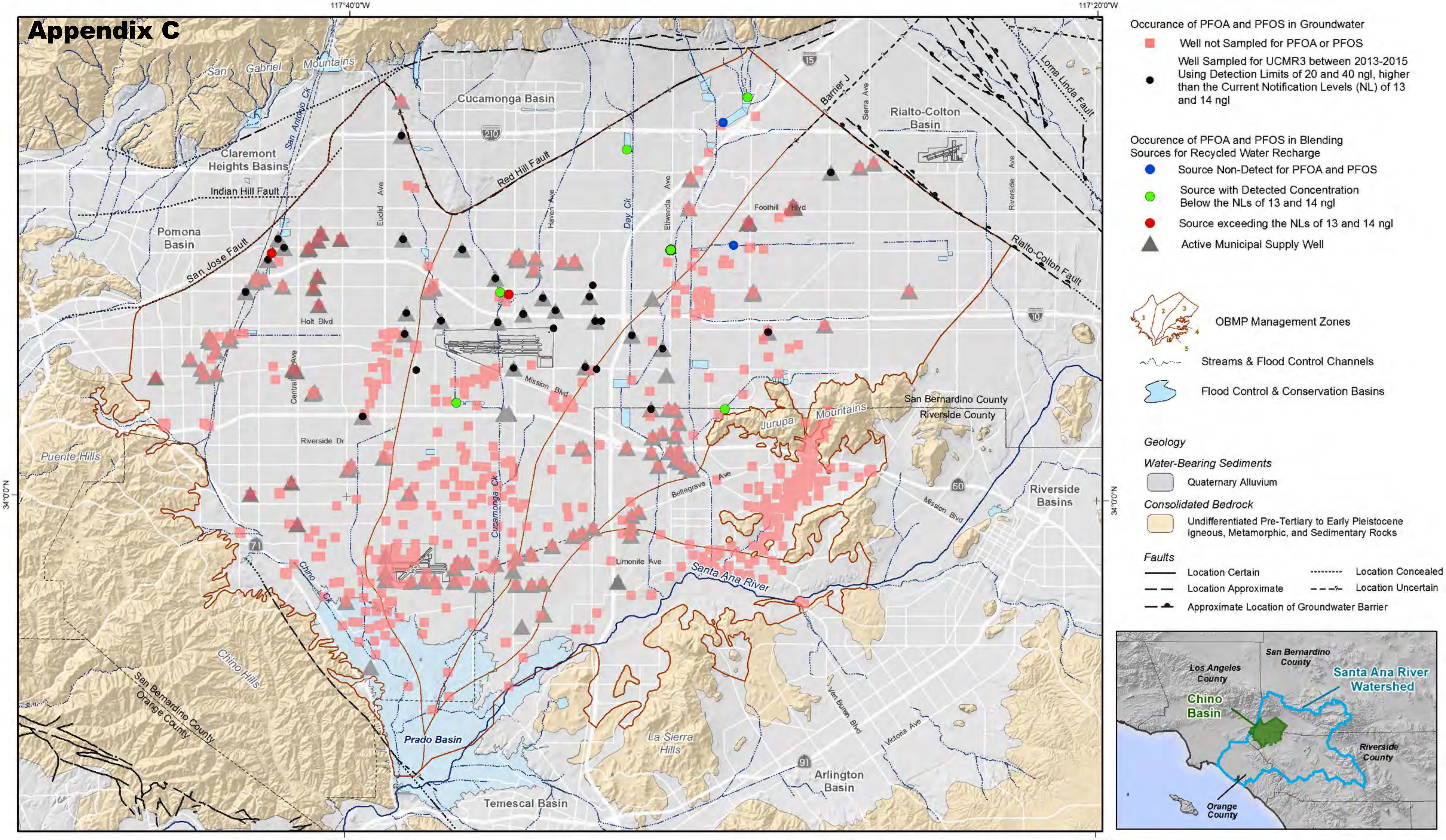
Scoping Report

Maximum Hexavalent Chromium

2014-2018

Exhibit EF-9

Appendix C



Prepared by:

WEI WILDERMUTH ENVIRONMENTAL, INC.

Author: CS
Date: 11/22/2019
File: Exhibit_EF-10_PFAS_1998-2019.mxd

0 1 2 3 4 5 Miles
0 2 4 6 8 Km

Prepared for:
OBMP 2020 Update
Scoping Report

CHINO BASIN WATERMASTER — Partners in Basin Management

PFOA and PFOS Concentrations
Through March 2019

Exhibit EF-10

Appendix C

Exhibit EF-11
Cost-Estimate and Schedule to Implement Activity EF

Task and Subtask Description	Engineering Cost	FY 2020/21				FY 2021/22				FY 2022/23				FY 2023/24 and beyond
		Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	
Task 1 Convene the Water Quality Committee, define objectives, and refine scope of work · Convene Water Quality Committee · Define objectives of Activity EF · Refine scope described in TM1 · Refine detailed cost and schedule	$65,000	$65,000												
Task 2 Develop and implement an initial emerging-contaminants monitoring plan · Determine contaminants of interest · Develop initial monitoring plan · Implement initial monitoring plan	$95,000			$50,000		$45,000								
Task 3 Perform a water quality assessment and prepare a scope to develop and implement a Groundwater Quality Management Plan · Describe current and future challenges and solutions · Develop recommendations for long-term monitoring and assessment · Prepare scope to develop and implement a groundwater quality management plan · Prepare final assessment	$135,000						$80,000			$55,000				
Task 4 Develop planning, screening, and evaluation criteria · Develop criteria to evaluate project cost and benefit · Review and finalize criteria	$ TBD												$ TBD	$ TBD
Task 5 Identify and describe potential projects for evaluation · Identify potential projects · Select projects for reconnaissance level study	$ TBD													$ TBD
Task 6 Conduct a reconnaissance-level study for the proposed projects · Characterize potential treatment projects · Evaluate Projects · Prepare finance plan for soft-costs · Prepare implementation plan	$ TBD													$ TBD
Task 7 Prepare the *Groundwater Quality Management Plan* · Prepare draft plan · Prepare final plan	$ TBD													$ TBD
Task 8 Plan, design, and build water quality management projects · Prepare preliminary design report and CEQA documentation · Prepare finance plan for project implementation · Obtain permits and agreements and prepare final design · Construct selected projects	$ TBD													$ TBD
Total Cost and Cost by FY	**$295,000**	**$115,000**				**$125,000**				**$55,000**				**$ TBD**

TBD -- To be determined

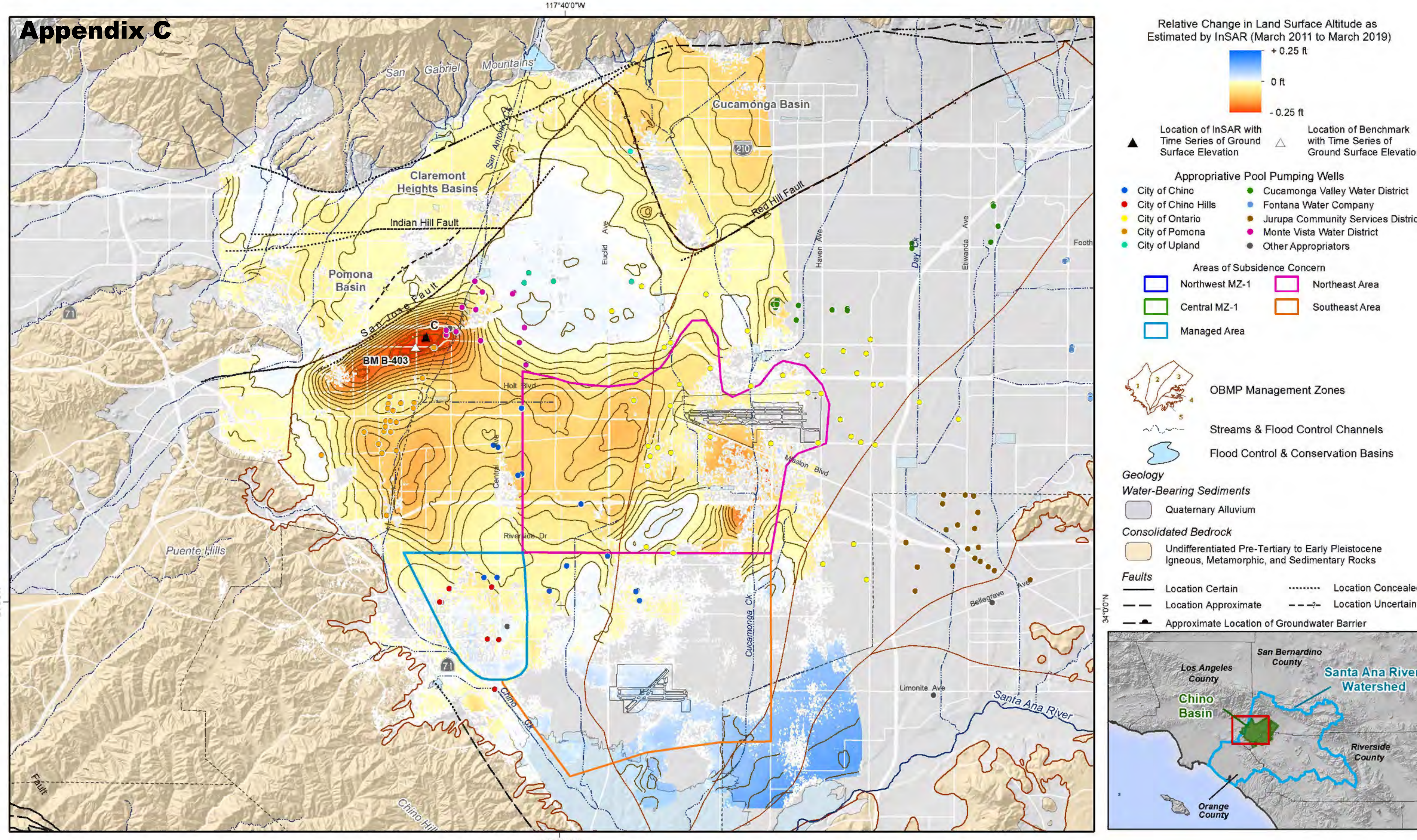
Appendix C

Exhibit CG-1
Aggregate Water Supply Plan for Watermaster Parties

Water Source	2015	2020	2025	2030	2035	2040
Volume (af)						
Chino Basin Groundwater	147,238	145,904	153,804	157,716	168,987	176,652
Non-Chino Basin Groundwater	51,398	55,755	63,441	64,999	66,691	68,483
Local Surface Water	8,108	15,932	15,932	18,953	18,953	18,953
Imported Water from Metropolitan	53,784	86,524	93,738	100,196	102,166	109,492
Other Imported Water	8,861	9,484	10,095	10,975	11,000	11,000
Recycled Water for Direct Reuse	20,903	24,008	24,285	26,583	29,836	33,223
Total	290,292	337,607	361,295	379,422	397,633	417,803
Percentage						
Chino Basin Groundwater	51%	43%	43%	42%	42%	42%
Non-Chino Basin Groundwater	18%	17%	18%	17%	17%	16%
Local Surface Water	3%	5%	4%	5%	5%	5%
Imported Water from Metropolitan	19%	26%	26%	26%	26%	26%
Other Imported Water	3%	3%	3%	3%	3%	3%
Recycled Water for Direct Reuse	7%	7%	7%	7%	8%	8%
Total	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**

Source: Storage Framework Investigation - WEI, 2018

Appendix C



Prepared by:

WEI
Wildermuth Environmental, Inc.

Author: CS
Date: 8/20/2019
File: Exhibit_CG-2_Land_Subsidence.mxd

0 1 2 3 4 5 Miles
0 2 4 6 8 Km

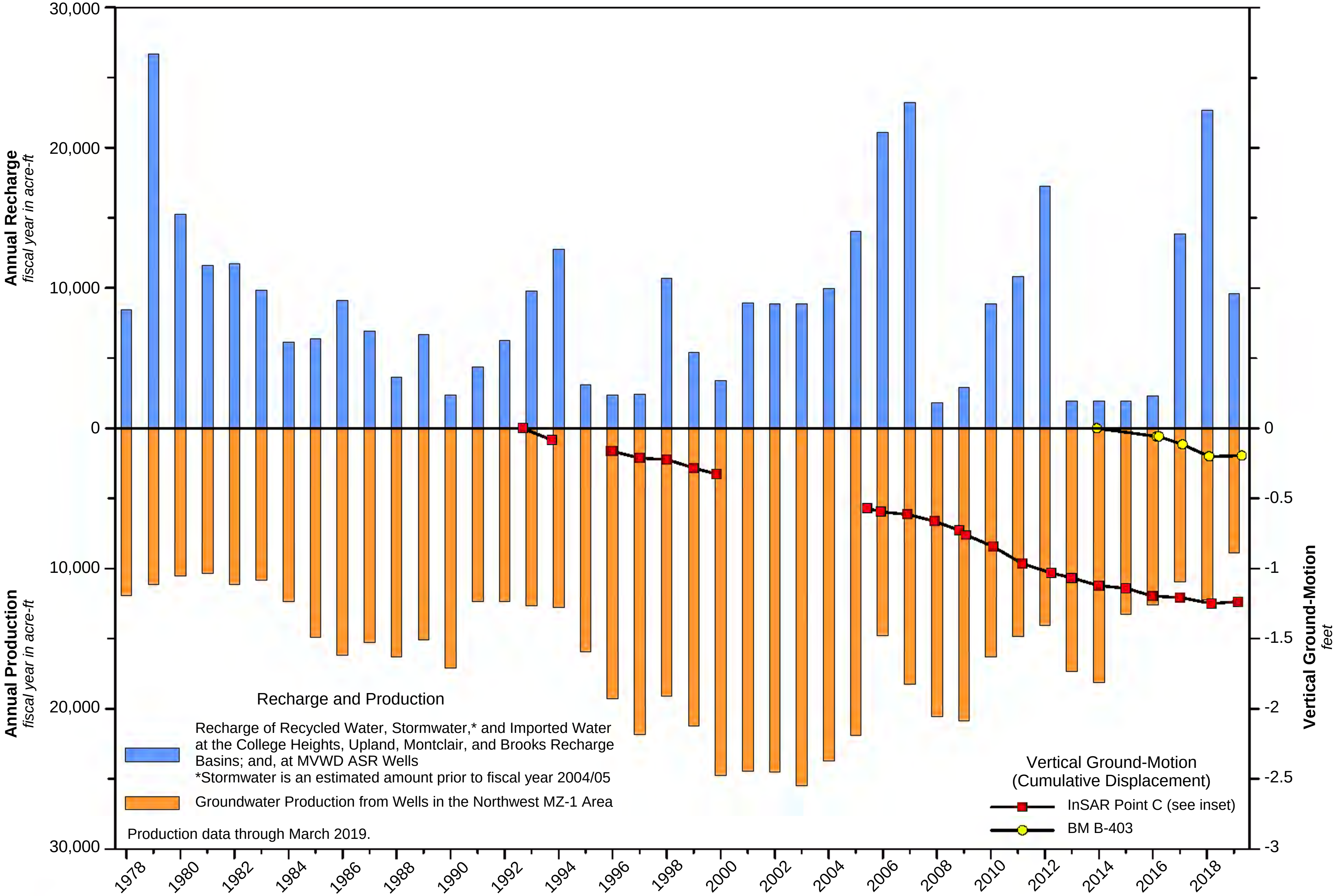
Prepared for:
OBMP 2020 Update
Scoping Report

Chino Basin Watermaster — Partners in Basin Management

Areas of Land Subsidence
2011-2019

Exhibit CG-2

Appendix C



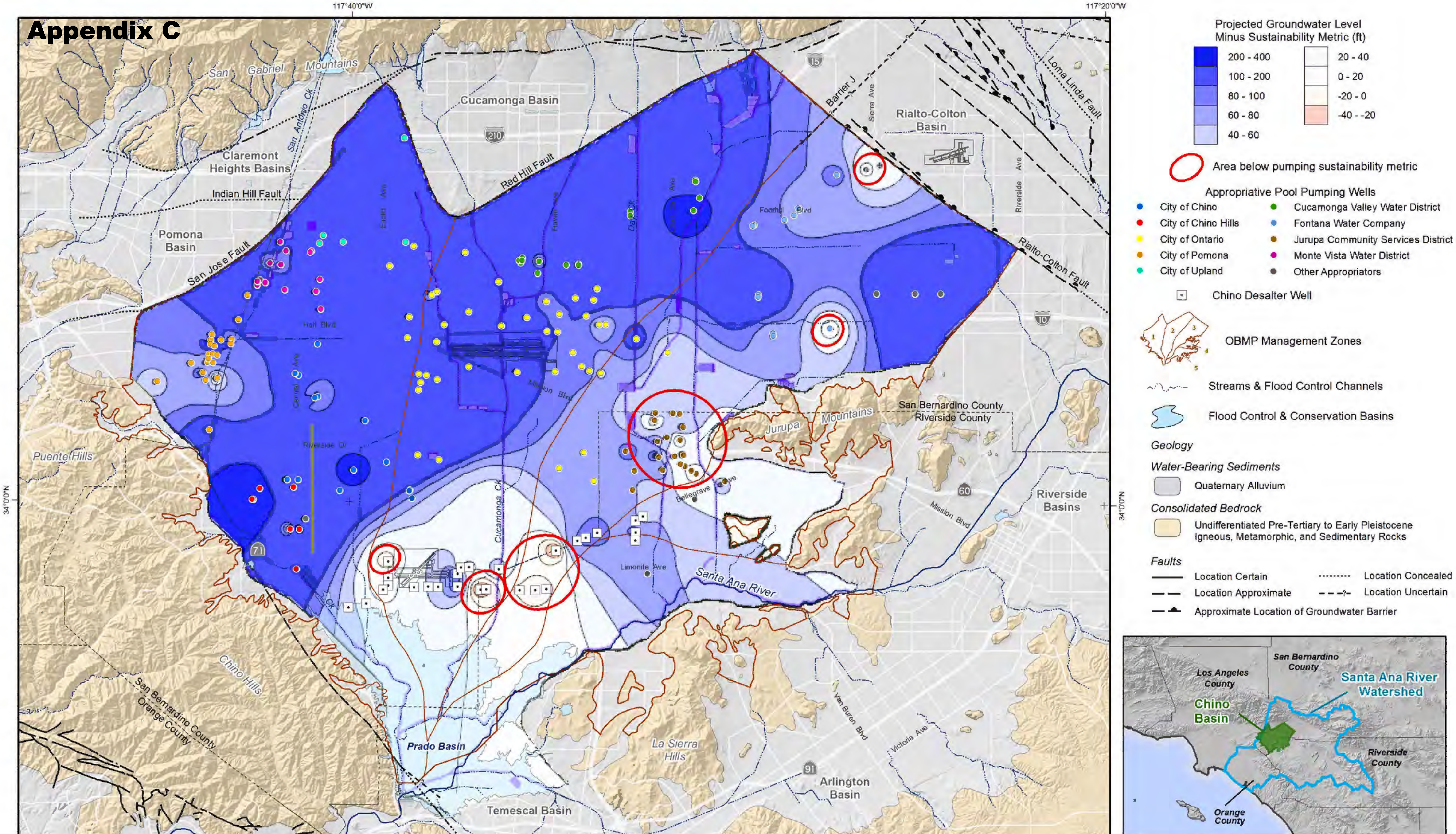
WEI
Wildermuth Environmental, Inc.

Prepared for:
OBMP 2020 Update
Scoping Report

Pumping, Recharge and Land Subsidence in the Northwest MZ-1 Area

Exhibit CG-3

Appendix C



Prepared by:

WEI
WILDERMUTH ENVIRONMENTAL, INC.

Author: CS
Date: 8/20/2019
File: Exhibit_CG-4_Prj_Difference_in_GWLs.mxd

0 1 2 3 4 5 Miles
0 2 4 6 8 Km

Prepared for:
OBMP 2020 Update
Scoping Report

Projected Difference between Groundwater Levels and the Pumping Sustainability Metric
Scenario 1A - FY 2029/30

Exhibit CG-4

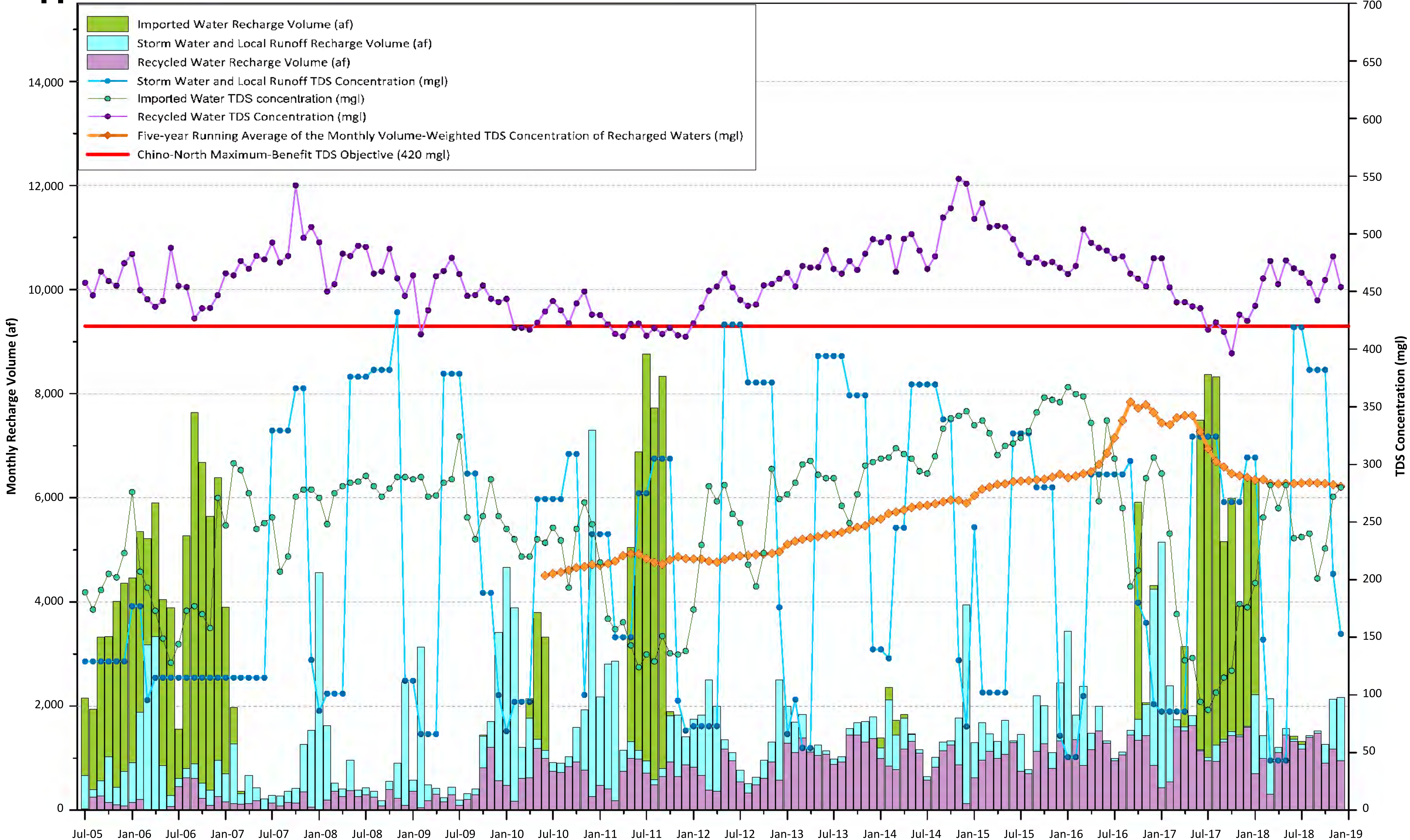
Appendix C

Exhibit CG-5
Cost-Estimate and Schedule to Implement Activity CG

Task and Subtask Description	Engineering Cost	FY 2020/21				FY 2021/22				FY 2022/23				FY 2023/24 and beyond
		Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	
Task 1 Convene the Water Supply Reliability Committee, define objectives, and refine scope of · Convene Water Supply Reliability Committee · Define objectives of Activity CG · Define reliability and other benefits expected from Activity CG · Refine scope described in TM1 · Refine detailed cost and schedule	$95,000	$95,000												
Task 2 Characterize water demands, water supply plans and existing/planned infrastructure and their · Characterize the water supplies and future water demands · Characterize exiting infrastructure to convey, treat, and distribute the supplies to meet the demands · Identify limitations to the existing infrastructure	$210,000				$70,000	$140,000								
Task 3 Develop planning, screening, and evaluation · Develop criteria to evaluate project cost and benefit · Review and finalize criteria	$ TBD							$ TBD						
Task 4 Describe water supply reliability opportunities · Identify potential projects · Select projects for reconnaissance level study	$ TBD								$ TBD					
Task 5 Develop reconnaissance-level engineering design and operating plan · Characterize potential water supply reliability projects · Evaluate Projects · Prepare finance plan for soft-costs · Prepare implementation plan	$ TBD									$ TBD				$ TBD
Task 6 Plan, design, and build water supply reliability alternatives · Prepare preliminary design report and CEQA documentation · Prepare finance plan for project implementation · Obtain permits and agreements and prepare final design · Construct selected projects	$ TBD													$ TBD
Total Cost and Cost by FY	**$305,000**	**$165,000**				**$140,000**				**$TBD**				**$ TBD**

TBD -- To be determined

Appendix C



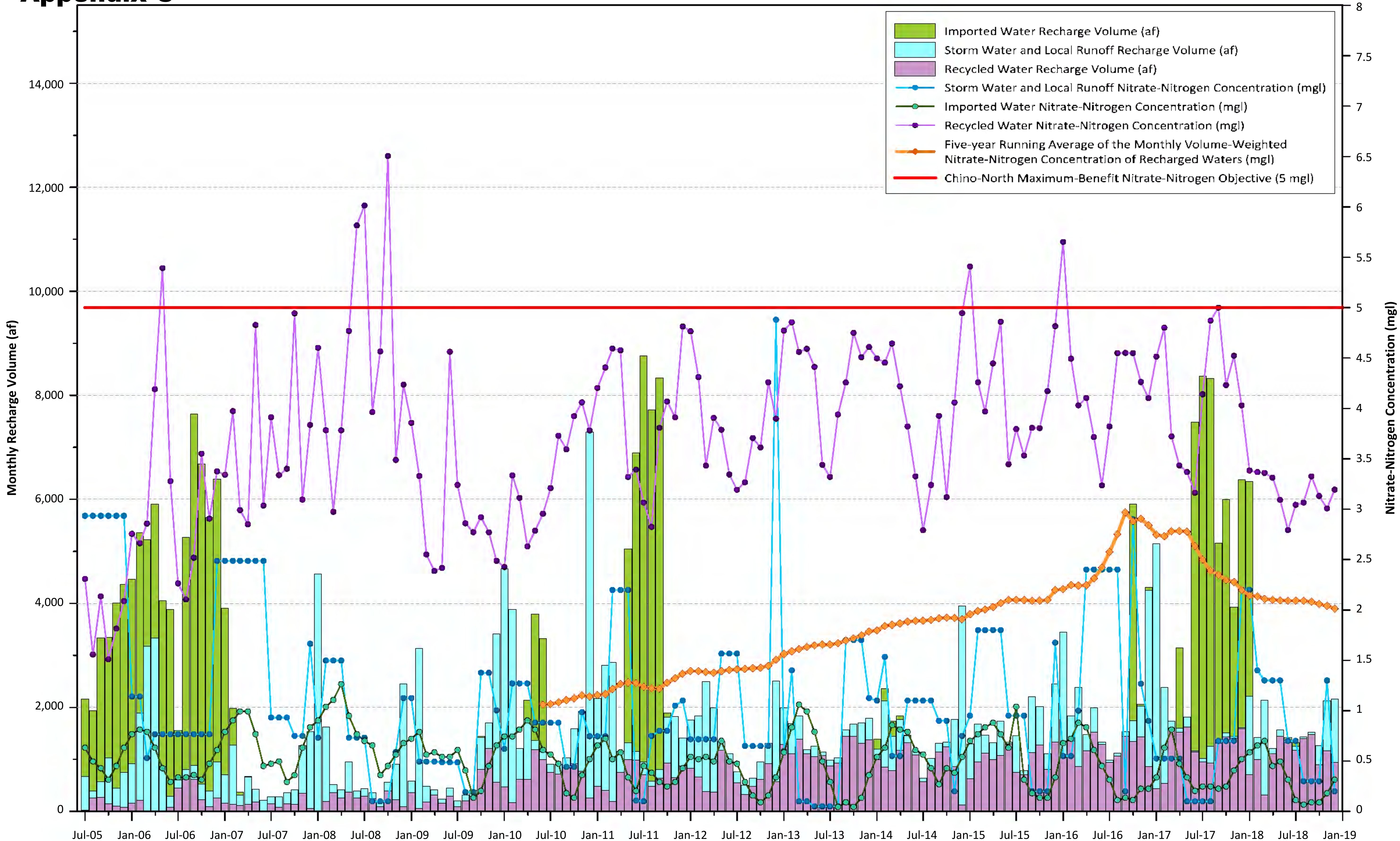
WEI
Wildermuth Environmental, Inc.

Prepared for:
OBMP 2020 Update
Scoping Report

Volume and Total Dissolved Solids (TDS) Concentrations of Recharge Water Sources in the Chino Basin
2005-2018

Exhibit K-1

Appendix C



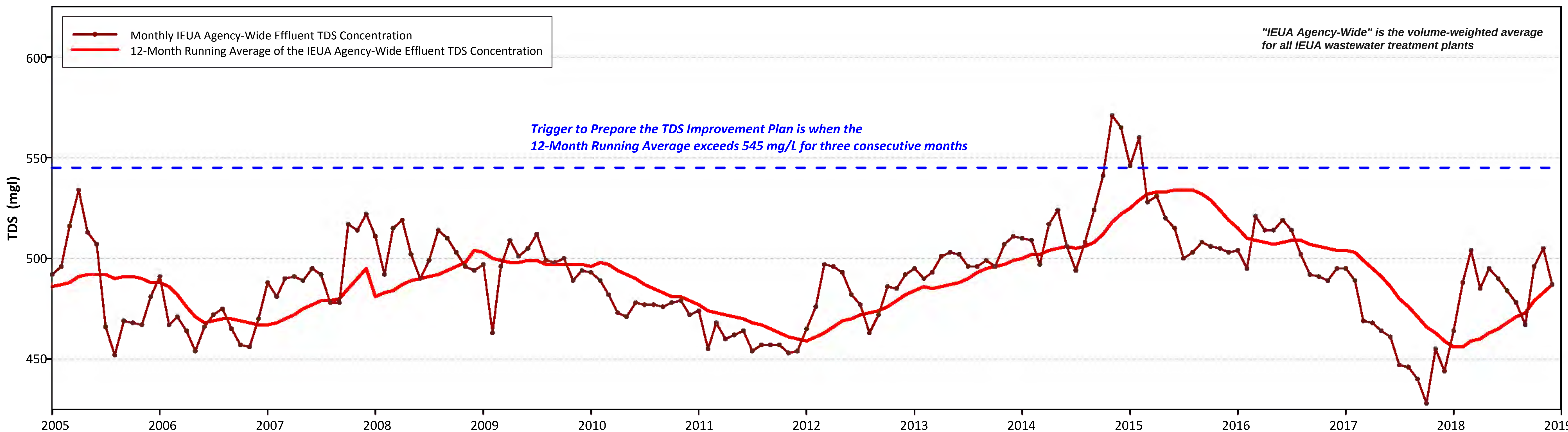
WEI
WILDERMUTH ENVIRONMENTAL, INC.

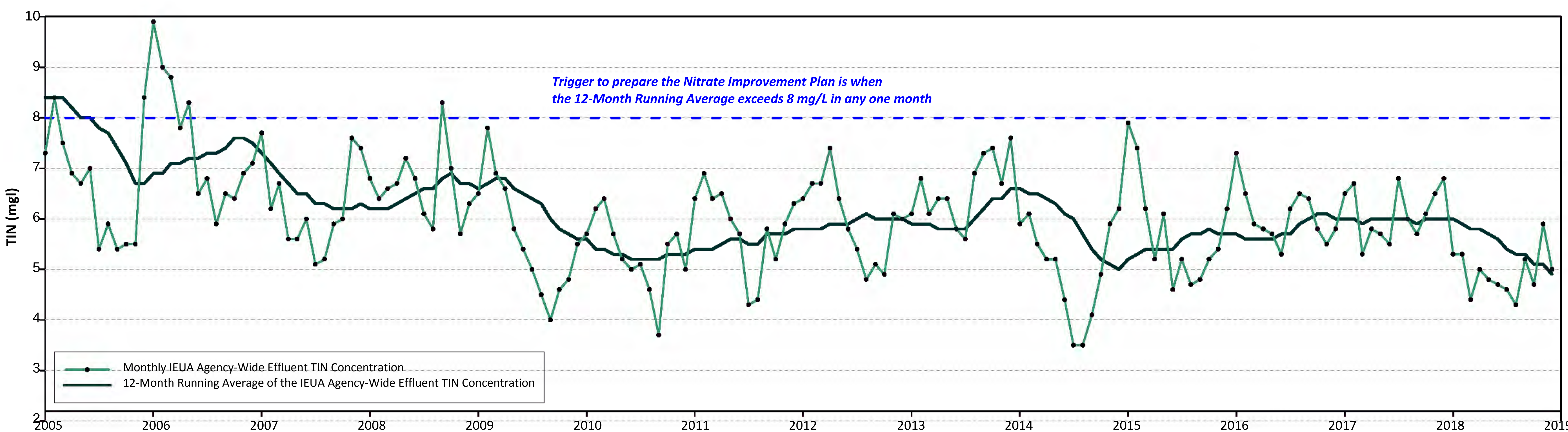
Prepared for:
OBMP 2020 Update
Scoping Report

Volume and Nitrate-Nitrogen Concentrations of Recharge Water Sources in the Chino Basin
2005-2018

Exhibit K-2

Appendix C





WEI
Wildermuth Environmental, Inc.

Prepared for:
OBMP 2020 Update
Scoping Report

Monthly and 12-Month Running Average of the IEUA Agency-Wide Effluent Total Dissolved Solids (TDS) and Total Inorganic Nitrogen (TIN) Concentrations
2005-2018

Exhibit K-3

Appendix C

Exhibit K-4
Cost Estimate and Schedule to Implement Activity K

Task and Subtask Description	Engineering Cost	FY 2020/21				FY 2021/22				FY 2022/23				FY 2023/24 and beyond
		Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	
Task 1 Prepare projection to evaluate compliance with recycled water recharge dilution requirements. · Prepare projections · Evaluate projections for future wet and dry periods within 5 and 10 years · Determine the if there is a compliance challenge	$0	$0												
Task 2 Identify alternative compliance strategies · Identify potential compliance strategies · Select projects for reconnaissance level study	$ TBD					$ TBD								
Task 3 Evaluate alternative compliance strategies · Characterize alternative compliance startegies · Rank alternatives · Prepare finance plan for soft-costs · Prepare report	$ TBD								$ TBD	$ TBD				$ TBD
Task 4 Implement the alternative compliance strategy · Prepare preliminary design report and CEQA documentation · Prepare finance plan for project implementation · Obtain permits and agreements and prepare final design · Construct selected projects	$ TBD													$ TBD
Task 5 Periodically re-evaluate compliance with dilution requirements · Prepare projections of the dilution metric on a five-year frequency · Annually report current and future compliance with the dilution limit	$ TBD													$ TBD
Total Cost and Cost by FY	**$0**	**$0**				**$ TBD**				**$ TBD**				**$ TBD**

TBD -- To be determined

Exhibit K-4_Activity K_Cost.xlsx--Summary_TM1
Created on 6/10/2019
Printed on 8/8/2019

Appendix C

Exhibit L-1

Chino Basin Watermaster -- Monitoring and Reporting Requirements, Data Types, Analyses Performed, Report Contents, and Past Efforts to Reduce Scope/Cost

Purpose/Requirement/Schedule	Data Types									Analyses Performed	Report Content	Past Efforts to Reduce Scope and Cost
	GWP	GWL	GWQ	SW	GL	GEOL	BIO	WS/WU	PLAN			
Water Rights Compliance Monitoring. Pursuant to Term 20 of Watermaster's Water Rights Permit 21225 and an agreement with the California Department of Fish and Wildlife (DFW), Watermaster must prepare an annual report of estimates of monthly changes in discharge in each tributary to the Santa Ana River that resulted from diversions of storm water and dry-weather flow for recharge in the Chino Basin. The annual report covers the 12-month period of July 1 through June 30, and is submitted to the DFW by October 1 of each year.				X						Watermaster Engineer prepares the report with review and input from Watermaster Counsel, which includes the following efforts: 1. Measured data and Watermaster's surface-water model are used to estimate the discharge in flood control channels that cross the Chino Basin and the diversions for recharge. 2. To compute the differences in discharge caused by the diversions for recharge, the discharge from the tributaries to the Santa Ana River is estimated with and without the Watermaster diversions.	A letter report is prepared, including text and exhibits, that describes the data, methods, and results of the analysis.	This report has become standardized and the scope has been reduced to the minimum required for compliance. The cost to complete this work has not increased over the last four years.
Sustainable Groundwater Management Act (SGMA). The SGMA requires that the Watermaster of an adjudicated basin identified in WC Section 10720.8(a) submit specific data, information, and annual reports for the previous water year to the California Department of Water Resources (DWR) by April 1. Pursuant to SGMA WC Section 10720.8(f), Watermaster is required to submit: (A) Groundwater elevation data unless otherwise submitted pursuant to WC Section 10932 (B) Annual aggregated data identifying groundwater extraction (C) Surface water supply used for or available for use for groundwater recharge or in-lieu use (D) Total water use (E) Change in groundwater storage (F) The annual report submitted to the court	X	X		X				X		Watermaster Engineer prepares a technical memorandum, which includes the following efforts: Item (A) is already submitted for the California Statewide Groundwater Elevation Monitoring (CASGEM) Program, so no further data is reported pursuant to SGMA. Items (B), (C), (D) and (F) are compiled from the appropriators, the IEUA, and Watermaster. Item (E) is completed using the Chino Basin groundwater model to simulate storage change over the past water year.	A technical memorandum explicitly documenting the information for required items (A) through (F). The memorandum is included in the agenda packets for review by the Watermaster Pools, Advisory Committee, and Board. The memorandum and its contents are then submitted to the DWR via its online Adjudicated Basin Annual Reporting System.	Watermaster provides the minimum information required by DWR
Biannual Evaluation of the Cumulative Effect of Transfers. Pursuant to the Peace Agreement, page 20, Section 5.1 (e) (iv); the OBMP Implementation Plan, page 21, paragraph 11 (d); and the Rules and Regulations, page 51, Section 9.3, Watermaster will evaluate for the potential for any Material Physical Injury that may result from the cumulative effects of transfers of water in storage or any water rights proposed in place of physical recharge of water to the Chino Basin. The purpose of this evaluation is to provide guidance to Watermaster for future recharge activities. Reporting on this evaluation is required biannually beginning on July 1, 2003.	X	X		X				X		Watermaster Engineer performs this evaluation: 1. If necessary, re-calibrate the Chino Basin groundwater-flow model for the prior two years. 2. Evaluate Watermaster assessment packages to determine which transfers resulted in an avoided wet-water replenishment and prepare a hypothetical historical model scenario that replaces transfers with wet-water replenishment. 3. Simulate the hypothetical historical model scenario with the groundwater-flow model over the period of the Peace Agreement (since 2000). 4. Compare the results of the new model simulation with the calibrated model results to characterize the cumulative effects of transfers since the Peace Agreement.	Watermaster's Engineer prepares one report that documents: (i) any model updates that were performed, (ii) the evaluation of the Balance of Recharge and Discharge, and (iii) the evaluation of the Cumulative Effects of Transfers. The evaluation of the Cumulative Effects of Transfers characterizes the differences in: water levels (especially in areas where low water levels and subsidence are a concern); storage; the achievement and maintenance of Hydraulic Control; Santa Ana River discharge at Prado Dam; and the developed yield of the Chino Basin.	
Biannual Evaluation of the Balance of Recharge and Discharge. Pursuant to Section 7 of the Rules and Regulations, page 35, 7.1 (b) (iii) and (iv) and the Peace Agreement, page 20, Section 5.1 (e) (iii), Watermaster will conduct an evaluation of the Hydrologic Balance of recharge and discharge in the Chino Basin. The purpose of this evaluation is to provide guidance to Watermaster for future recharge activities to promote the goal of equal access to groundwater in each area and sub-area of the Chino Basin. Reporting on this evaluation is required biannually beginning on July 1, 2003.									X	Watermaster Engineer performs this evaluation: 1. Use the same version of the groundwater-flow model that is used for the evaluate of the Cumulative Effect of Transfers. 2. Prepare an updated planning scenario that includes groundwater production projections to comport with the latest Urban Water Management Plans, the IEUA-TVMWD-WMWD planning projections, state mandated water conservation, and climate change projections. 3. Simulate the updated planning scenario with the groundwater-flow model over long-term future period. 4. Evaluate the model results with respect to changes in water levels, the areal balance of recharge and discharge and provide Watermaster with recommendations on the future locations and magnitudes of supplemental water recharge necessary to improve the balance of recharge and discharge.	Watermaster's Engineer prepares one report that documents: (i) any model updates that were performed, (ii) the evaluation of the Balance of Recharge and Discharge, and (iii) the evaluation of the Cumulative Effects of Transfers. The evaluation of the Balance of Recharge and Discharge characterizes long-term changes in water levels across the Chino Basin under the plans of the Parties and the Watermaster, and characterizes the balance of recharge and discharge.	Watermaster completed this work in 2003, 2005 and 2015 -- four reports were skipped. Watermaster evaluates the balance of recharge and discharge in other efforts that include 2007 Peace II engineering work, 2009 Production Optimization investigation, 2013 RMPU, Safe Yield reset, Storage Framework Investigation and the forthcoming 2020 Safe Yield reset.

Appendix C

Exhibit L-1

Chino Basin Watermaster -- Monitoring and Reporting Requirements, Data Types, Analyses Performed, Report Contents, and Past Efforts to Reduce Scope/Cost

Purpose/Requirement/Schedule	Data Types									Analyses Performed	Report Content	Past Efforts to Reduce Scope and Cost
	GWP	GWL	GWQ	SW	GL	GEOL	BIO	WS/WU	PLAN			
Annual Finding of Substantial Compliance with the Recharge Master Plan. Pursuant to Sections 7.3 and 8.1 of the Peace II Agreement, Watermaster must make an annual finding that it is in substantial compliance with a Court-approved Recharge Master Plan, particularly regarding the sufficiency of Replenishment capability to satisfy reasonable projections of future Desalter Replenishment Obligations following the completion of Basin Re-Operation and its associated forgiveness of Desalter Replenishment Obligations.				X					X	Watermaster Engineer performs this work: 1. Describe Watermaster's projections of future Replenishment Obligations based on the most recent production plans of the Parties. These production plans are typically extracted from Watermaster's most current groundwater modeling efforts. 2. Describe Watermaster's projections of future Replenishment capacity as documented in the Recharge Master Plan and/or current RMP implementation efforts. 3. Compare the projections of Replenishment Obligations vs. Replenishment capacity to assess compliance with the Recharge Master Plan.	A letter report is prepared to document the data, methods, and findings of the evaluation of substantial compliance with the Recharge Master Plan.	This report has become standardized, updated content derived from other Watermaster work resulting in reduced scope and reduced cost.
Annual Report of Compliance with SB 88 and SWRCB Regulations for Measurement and Reporting of Diverted Surface Water. Watermaster holds three diversion permits, issued by the SWRCB, that provide authorization to Watermaster to divert and recharge storm and dry-weather discharge. Watermaster reports annually on the amount of water diverted for recharged to the SWRCB pursuant to its permits and SWRCB regulations in Title 23, Chapter 2.7. SB 88 was signed into law by Governor Brown on June 24, 2015. Sections 15 through 18 of that law add new measurement and reporting requirements for a substantial number of diverters, including the Chino Basin Watermaster. Watermaster must demonstrate to the SWRCB its compliance with SB88. Reports are due annually by April 1, the reporting period is calendar year.				X						Watermaster Engineer performs this work: 1. Collect, compile, and summarize estimates of diversion and recharge volumes for the calendar year for each point of diversion for each permit. Much of these data and information are borrowed from the data collected and analyzed for Watermaster's *Water Rights Compliance Reporting* report. 2. Collect information from IEUA on the measurement scheme for each point of diversion (device, accuracy, methods of measurement and calculation, recording frequency). Evaluate each point of diversion for compliance with SB88. If any point of diversion is not in compliance with SB88, develop and document a plan to comply.	1. Prepare a progress report of the estimates of diversion and recharge volumes for the calendar year for each point of diversion, and submit the estimates to the SWRCB electronically on its website. 2. To comply with SB 88, Watermaster must annually report the following in addition to (1.) above: • Information on the device or method used to calculate the amount of water diverted. • Water diversion measurement, either direct diversion or diversion to storage, including the type of device(s) used, additional technology used, who installed the device(s), and any alternative method(s) used in measuring water diversion.	As to the progress report, this work has been reduced to filling out a form on SWRCB water rights portal. As to SB88 compliance, this is a new regulation and Watermaster staff has approached regulations in a way to minimize compliance cost.
Safe Yield Recalculation. Pursuant to the OBMP Implementation Plan and Section 6.5 of Watermaster's Rules and Regulations, Watermaster is required to recalculate and reset the Safe Yield of the Chino Basin in fiscal year 2010/11 and every ten years thereafter. The purpose of the recalculation and reset is to prevent Overdraft, and continue to operate the Chino Basin pursuant to the Physical Solution of the Judgment.	X	X	X	X	X	X		X	X	Watermaster Engineer performs the analysis, and prepares the report. Pursuant to the Safe Yield Reset Technical Memorandum, the methodology to recalculate Safe Yield is: 1. Collect new hydrogeologic information collected since the last model calibration and all the historical hydrologic and water use data, revise conceptual and numerical models and recalibrate groundwater model. 2. Update existing and projected cultural conditions and determine if future projections will based on: (a) long-term historical record of precipitation falling or (b) precipitation projections based on Global System Models to estimate the long-term average net recharge to the Basin. 3. Update pumping projections and all recharge and discharge components that are input to the models. 4. With the information generated in [1] through [3] above, use the groundwater-flow model to project the net recharge for existing current and projected future cultural conditions. 5. Qualitatively evaluate whether the groundwater production at the net recharge rate estimated in [4] above will cause or threaten to cause "undesirable results" or "Material Physical Injury". If so, identify mitigation measures or an alternative Safe Yield to prevent "undesirable results" or "Material Physical Injury."	The report documents the data collected, the model re-calibration, and the analyses performed to calculate net recharge and Safe Yield.	Watermaster developed a task memorandum in 2015 entitled Methodology to Reset Safe Yield Using Long-Term Average Hydrology and Current and Projected Future Cultural Conditions that defines the methodology for the recently approved Safe Yield. This methodology was used to develop the scope and budget for the 2020 Safe Yield reset work and reduces the cost of the 2020 Safe Yield reset relative to the past effort.

Appendix C

Exhibit L-1

Chino Basin Watermaster -- Monitoring and Reporting Requirements, Data Types, Analyses Performed, Report Contents, and Past Efforts to Reduce Scope/Cost

Purpose/Requirement/Schedule	Data Types									Analyses Performed	Report Content	Past Efforts to Reduce Scope and Cost
	GWP	GWL	GWQ	SW	GL	GEOL	BIO	WS/WU	PLAN			
Recharge Master Plan Update (RMPU). The 2010 RMPU was prepared pursuant to requirements of the Peace II Agreement and the December 2007 Court Order that approved and directed Watermaster to implement the Peace II Agreement. The Court directed Watermaster to amend the 2010 RMPU to include updated information on water demands and future replenishment projections. Watermaster completed this amendment on time in September 2013. In approving the 2013 RMPU amendment, the Court directed Watermaster to prepare recharge master plan updates on a five-year cycle. Subsequently, the 2018 RMPU was completed in October 2018 and the next report due in 2023 and every five years thereafter.				X					X	The requirements of the work to be performed in the RMPU are defined in the Peace Agreements and the 2007 report of the Special Referee (see the introduction to the 2013 RMPU amendment) Watermaster Engineer conducts the assessment, which includes: 1. Collect data related to basin management including future groundwater pumping plans, stormwater management, planned supplemental water recharge, legislation and regulations that affect recharge and prepare an assessment of how the water management has changed since the last RMP. 2. Prepare an assessment of the future Replenishment Obligations. 3. Inventory all existing recharge facilities, update their performance information, estimate the supplemental water recharge capacity of each facility and assess: (a) the adequacy of existing recharge facilities to meet future Replenishment Obligations and recharge goals and (b) the adequacy of existing recharge facilities to enable Watermaster to balance recharge and discharge. 4. Develop and analyze new projects to mitigate deficits identified in 3 above and identify new stormwater projects to increase basin yield. 5. Develop and apply criteria to screen and prioritize the recharge projects identified in 4 above and make recommendations for their implementation. 6. Prepare implementation plan.	The report documents the RMPU requirements, the data collected and planning assumption, the existing recharge capabilities, the need for additional supplemental water recharge capacity, project alternatives, screening and prioritization of alternatives and recommendations on project implementation..	This report has become standardized and the scope has been reduced to the minimum required for compliance, resulting in reduced cost relative to the 2010 and 2013 reports.
State of the Basin Report. Pursuant to Section 2.21 of the Rules and Regulations and the November 15, 2001 Court Order, Watermaster prepares a State of the Basin report every two years to describe the status of individual OBMP related activities and document how the basin has physically responded during OBMP implementation (i.e. since September 2000). The report is typically finalized by June 30.	X	X	X	X	X			X		Watermaster Engineer prepares this report. Most of the data and information utilized to prepare the report are acquired from other Watermaster monitoring and reporting efforts. Text, tables, charts, and maps are prepared to characterize: hydrology, production, recharge (replenishment and other recharge), groundwater levels and quality, point-source groundwater contamination, land subsidence, Hydraulic Control, desalter planning and engineering, and production meter installation.	The report includes annotated maps, charts, and tables that characterize the physical state of the basin and how it has changed since 2000. The report is published as a tabloid-sized map atlas and a PDF file for online viewing.	This report has evolved over time from a complex engineering report to simpler, graphically-intense and more readable report. In this process the scope and cost to produce the report was reduced.
California Statewide Groundwater Elevation Monitoring Program (CASGEM). Pursuant to Water Code section 10920, Watermaster must measure and report groundwater-elevation data from a subset of wells to the Department of Water Resources' CASGEM website twice per year (January 1 and July 1) for the Chino (8-2.01) and Cucamonga (8-2.02) Groundwater Subbasins of the Upper Santa Ana Valley Groundwater Basin (8-2).		X								Watermaster Engineer reviews time-series charts of groundwater elevations from a defined set of 37 wells in the Chino Basin and nine (9) wells in the Cucamonga Basin, and selects and compiles monthly measurements for a six-month period (summer/fall and winter/spring) that are representative of non-pumping water levels. This effort is performed in HydroDaVE Explorer. The selected data is exported from HydroDaVE in a file format for seamless upload to the CASGEM website.	The selected groundwater elevations for summer/fall and winter/spring are uploaded to the CASGEM website twice per year.	Watermaster staff reports the required groundwater-elevation data directly from its database to minimize effort and cost.

Appendix C

Exhibit L-1

Chino Basin Watermaster -- Monitoring and Reporting Requirements, Data Types, Analyses Performed, Report Contents, and Past Efforts to Reduce Scope/Cost

Purpose/Requirement/Schedule	Data Types									Analyses Performed	Report Content	Past Efforts to Reduce Scope and Cost
	GWP	GWL	GWQ	SW	GL	GEOL	BIO	WS/WU	PLAN			
Chino Basin Maximum Benefit Annual Report. This annual report is required by the Regional Board pursuant to Chapter 5 of the Basin Plan and Order No R8-2012-0026. There are a total of nine (9) maximum benefit commitments required of the Watermaster and IEUA in exchange for obtaining elevated TDS and nitrate objectives for the Chino-North Groundwater Management Zone. The Maximum Benefit commitments are: 1. The implementation of a surface-water monitoring program. 2. The implementation of a groundwater monitoring program. 3. The expansion of the Chino-I Desalter to 10 million gallons per day (mgd) and the construction of the Chino-II Desalter with a design capacity of 10 mgd. 4. The additional expansion of desalter capacity (20 mgd) pursuant to the OBMP and the Peace Agreement. 5. The completion of the recharge facilities included in the Chino Basin Facilities Improvement Program. 6. The management of recycled water quality to ensure that the agency-wide, 12-month running average wastewater effluent quality does not exceed 550 mg/L and 8 mg/L for TDS and total inorganic nitrogen (TIN), respectively. 7. The management of basin-wide, volume-weighted TDS and nitrogen concentrations in artificial recharge to less than or equal to the maximum-benefit objectives. 8. The achievement and maintenance of the "Hydraulic Control" of groundwater outflow from the Chino Basin to protect Santa Ana River water quality. 9. The determination of ambient TDS and nitrogen concentrations of Chino Basin groundwater every three years. The purpose of the annual report is to describe and document compliance with the Maximum Benefit commitments. The report is due by April 15th, and the reporting period is the calendar year.	X	X	X	X					X	Watermaster Engineer prepares the report, including the following efforts: 1. Collect, check, and upload groundwater-level, groundwater-quality, and surface water-quality data to Watermaster databases. These data are used in the analyses required to demonstrate Hydraulic Control and compute ambient water quality. 2. Review and summarize CDA progress reports on completion of the desalter well fields to achieve 40,000 afy of groundwater-production. 3. Calculate: (i) the 12-month running average of IEUA's effluent TDS concentration to determine whether it has exceeded 545 mg/L for 3 consecutive months, and (ii) the 12-month running average of IEUA's effluent TIN concentration to determine whether it has exceeded 8 mg/L in any one month. 4. Calculate: the 5-year running volume-weighted concentration of TDS and nitrate in recharged recycled water, supplemental water, and new storm water, and determine if the average is less than the TDS and nitrate Maximum Benefit objectives of the Chino-North GMZ. 5. Use groundwater-elevation contours prepared in the State of the Basin Report (every 2 years) to show the extent of Hydraulic Control. 6. Use Watermaster's groundwater-flow model (updated and recalibrated every five years) to determine if the volume of groundwater flowing past the desalter well field is *de minimis* (<1,000 afy). 7. Report on the status of the Recomputation of ambient groundwater quality for the Chino Basin groundwater management zones, which is performed once every three years (for TDS and nitrate-nitrogen). 8. Utilize data from the Santa Ana River Watermaster's Annual Reports to characterize the influence of rising groundwater from the Chino Basin on the flow and quality of the Santa Ana River.	Text and exhibits that describe the status of compliance with the Maximum Benefit commitments. The data collected each calendar year are submitted to the Regional Board as an attachment to the report.	In 2012 Watermaster staff took the lead to substantially reduce the monitoring and reporting effort required under Maximum Benefit. In particular, the surface-water monitoring and quarterly reporting components of the program were virtually eliminated and the scope of annual reporting was reduced to eliminate redundancies. These efforts resulted in an estimated $250,000 per year in cost savings (2012$).
Annual Report of the Prado Basin Habitat Sustainability Committee. The monitoring and mitigation requirements of the Peace II CEQA SEIR (Biological Resources/Land Use & Planning—Section 4.4-3) call for the IEUA, Watermaster, and the Orange County Water District to form the Prado Basin Habitat Sustainability Committee (PBHSC) to ensure that the Peace II Agreement actions will not significantly or adversely impact the Prado Basin riparian habitat. One of the responsibilities of the PBHSC is to prepare annual reports by June 30 of each year.	X	X	X	X		X	X		X	Watermaster Engineer prepares the annual report, which includes the following efforts: 1. Preparation of maps and data graphics that characterize the extent and quality of the riparian habitat in Prado Basin. 2. Preparation of maps and data graphics that characterize the trends in groundwater levels, climate and weather, surface water, and other factors that can affect the riparian habitat. This information is compared to the changes in the extent and quality of the riparian habitat to identity cause-and-effect relationships. 3. Groundwater-level change maps from existing results of Watermaster's groundwater-flow modeling are used to identify prospective areas of concern for the riparian habitat.	Summary of activities conducted for the PBHSC. Documentation of measured loss or prospective loss of riparian habitat (if any) with attribution of cause. Recommendations for ongoing monitoring and a scope of work and budget for the following fiscal year. Recommended adaptive management actions, if any, required to mitigate any measured loss or prospective loss of riparian habitat that is attributable to the Peace II activities.	After the completion of the first report in 2016, Watermaster identified efficiencies in monitoring and reporting, reducing the cost by almost 50 percent.

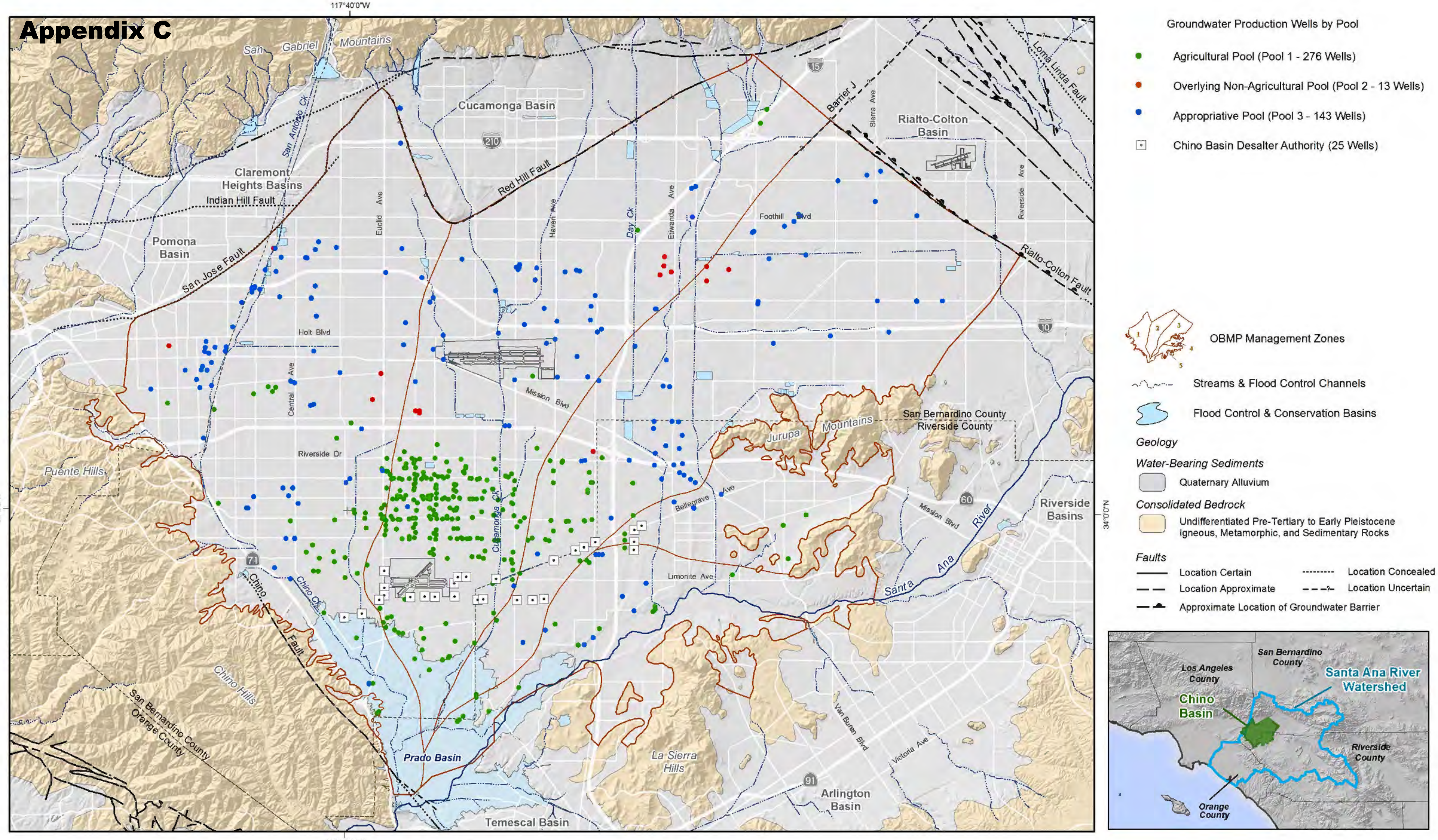
Appendix C

Exhibit L-1

Chino Basin Watermaster -- Monitoring and Reporting Requirements, Data Types, Analyses Performed, Report Contents, and Past Efforts to Reduce Scope/Cost

Purpose/Requirement/Schedule	Data Types									Analyses Performed	Report Content	Past Efforts to Reduce Scope and Cost
	GWP	GWL	GWQ	SW	GL	GEOL	BIO	WS/WU	PLAN			
Water Recycling Requirements for the Chino Basin Recycled Water Groundwater Recharge Program. IEUA and Watermaster have a permit from the Regional Water Quality Control Board (Order R8-2007-0039, amended as R8-2009-0057) for recycled water recharge at 13 sites in the Chino Basin (Phase I and Phase II). The permit requires implementation of a monitoring and reporting program, and the submittal of the following reports: Quarterly and Annual Groundwater Recharge (GWR) Monitoring Reports, five-year Engineering Reports, and Basin Start-up Period Reports.	X	X	X	X						IEUA staff performs the analyses and prepares the reports. The analyses include the following efforts: Collect recycled water, diluent water, and groundwater data and compare to regulatory limits and specifications in the permit; report on recharge operations and any non-compliance events due to water quality, including records of any operational problems, plant upset and equipment breakdowns or malfunctions, and any diversions of off specification recycled water and the locations of final disposal; report of corrective or preventive action(s) taken; certification that no groundwater has been pumped for domestic water supply use from the buffer zone that extends 500 feet and 6-months underground travel time from the recharge basin(s) where recycled water is applied; mass balance calculations to ensure bleeding is occurring in the aquifer; and estimates of approximate travel times of recharged recycled water in the aquifer at each basin. Watermaster, as the co-permittee, has its Engineer provide technical support and review and comment on all reports before they are submitted to the permitting agencies.	Quarterly GWR Monitoring Reports: Summaries of the data in tabular form to demonstrate compliance with permit limits and specifications. Summary of recharge operations and any operational problems and preventive and/or corrective actions taken. Annual GWR Reports: Summaries of recycled water and groundwater monitoring efforts for the year. Demonstration of recycled water recharge and diluent water in-aquifer blending by 120-month mass-balance calculations presented in Recycled Water Contribution (RWC) Management Plans and analysis of monitoring well water quality data. Estimates of approximate travel times of recharged recycled water in the aquifer. Five-year Engineering Reports: Address all project changes over the last five years. Basin Start-up Period Reports: Determination of percolation rates, soil aquifer treatment efficiency, lysimeter monitoring program, and initial maximum average RWC limits.	This report has become standardized and the scope has been reduced to the minimum require for compliance, resulting in reduced cost.
Annual Report of the Ground-Level Monitoring Committee. The MZ-1 Subsidence Management Plan (MZ-1 Plan) was developed by the MZ-1 Technical Committee (now named the Ground-Level Monitoring Committee) and approved by Watermaster in October 2007. In November 2007, the Court approved the MZ-1 Plan and ordered its implementation. The MZ-1 Plan was updated in 2015 and is now called the Chino Basin Subsidence Management Plan (SMP). Pursuant to the SMP, Watermaster prepares an annual report that includes the results of ongoing monitoring efforts, interpretations of the data, and recommended adjustment to the SMP, if any.	X	X		X	X	X			X	Watermaster Engineer prepares the annual report, which includes the following efforts: Preparation and interpretation of maps and graphics of data generated from the Ground-Level Monitoring Program including: the basin stresses of groundwater pumping and recharge, and the basin responses of changes in groundwater levels, aquifer-system deformation, and ground motion.	Background information on the program. Summary of activities conducted for the Ground-Level Monitoring Program. Analysis and interpretation of data. Conclusions and recommendations for ongoing monitoring and a scope of work and budget for the following fiscal year. Recommended updates to the SMP, if any.	The GLMC meets annually to review data and develop an appropriate scope of work for the monitoring program for the subsequent year. The monitoring program has continually evolved to identify and implement efficiencies, address the concerns of the GLMC, and meet the requirements of the SMP.
OBMP Semi-Annual Status Reports. Pursuant to the July 13, 2000 Court Order that approves Watermaster's adoption of the Peace Agreement and the OBMP Implementation Plan, Watermaster is required to prepare semi-annual status reports to the Court on OBMP implementation. The purpose of the report is to provide the Court with updates on progress in implementing the OBMP.	X	X	X	X	X	X	X	X	X	Watermaster staff, with the assistance of Watermaster Engineer and Counsel, prepare text descriptions of activities that were conducted to implement the OBMP for the prior six months.	Descriptions of activities that implement the OBMP program elements for the prior six months.	This report has become standardized and the scope has been reduced to the minimum required for compliance, resulting in reduced cost.
Semi-Annual Reports to the Watermaster Pools, Advisory Committee, and Board meetings. The Parties have requested semi-annual reports that summarize the status of: (i) the groundwater contaminant plumes in the Chino Basin and (ii) the activities of the Ground-Level Monitoring Committee.	X	X	X		X					Watermaster Engineer prepares text descriptions of activities performed during the previous quarter.	A text description of status of each of the known plumes within the Chino Basin and the activities of the Ground-Level Monitoring Committee.	This report has become standardized and the scope has been reduced to the minimum required for compliance, resulting in reduced cost.

Key for Data Types:
- GWP -- Groundwater-production monitoring
- GWL -- Groundwater-level monitoring
- GWQ -- Groundwater-quality monitoring
- SW -- Surface-water and climate monitoring
- GL -- Ground-level (subsidence) monitoring
- GEOL -- Well construction, abandonment, and destruction monitoring
- BIO -- Biological monitoring
- WS/WU -- Water-supply and water use monitoring
- PLAN -- Planning information



Prepared by:

WEI
WILDERMUTH ENVIRONMENTAL, INC.

Author: SO
Date: 11/21/2019
File: Exhibit_L2_Groundwater Prod_.mxd

0 1 2 3 4 5 Miles
0 2 4 6 8 Km

Prepared for:
OBMP 2020 Update
Scoping Report

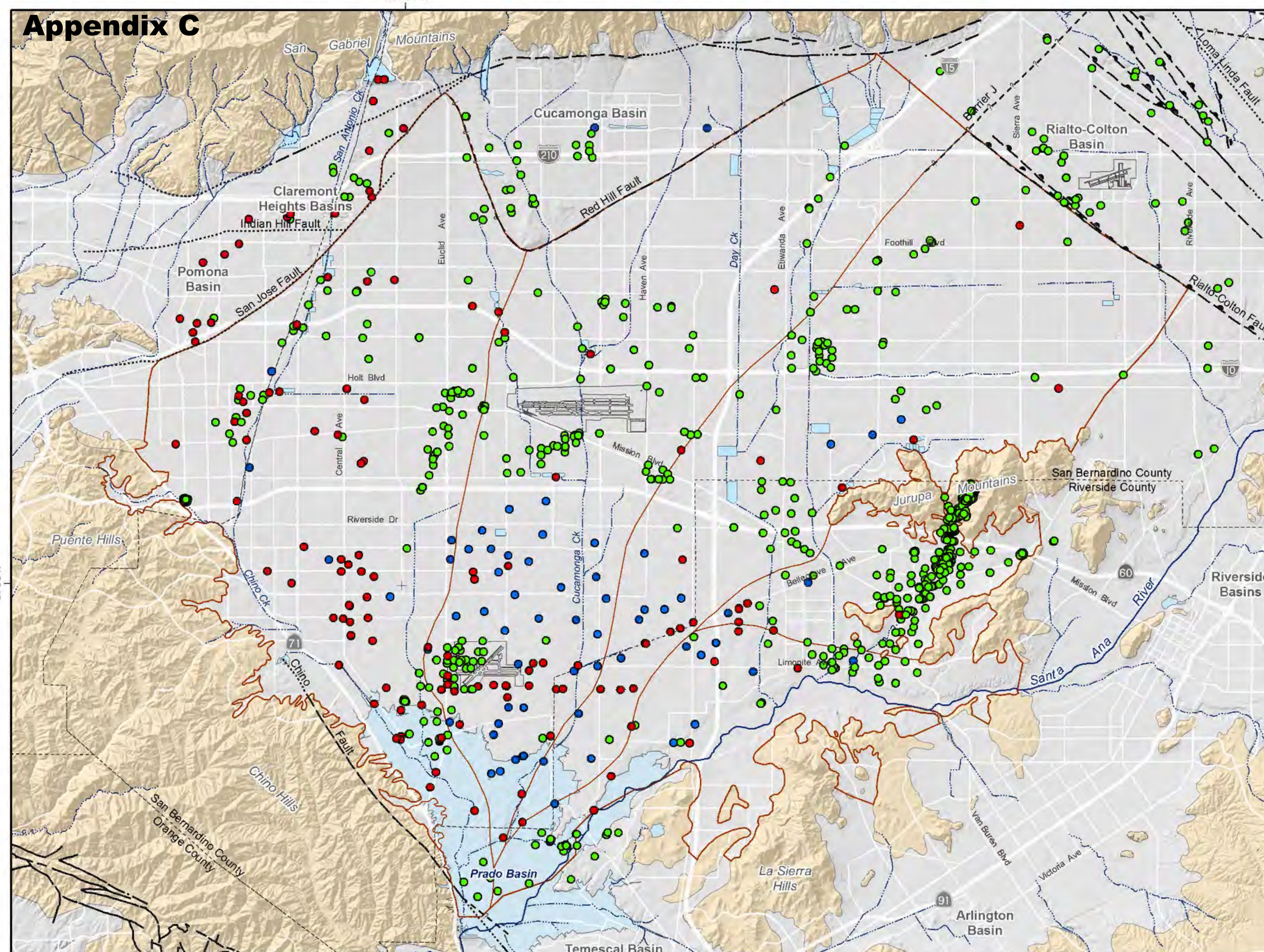
Chino Basin Watermaster — Partners in Basin Management

Groundwater-Production Monitoring

Fiscal Year 2017/18

Exhibit L-2

Appendix C



Groundwater-Level Monitoring Program
Wells symbolized by Measurement Frequency

- Measurement by CBWM Staff - Monthly (69 wells)
- Measurement by Transducer - Every 15 Minutes (177 wells)
- Measurement by Owner at Various Frequencies (1,077 wells)

OBMP Management Zones

Streams & Flood Control Channels

Flood Control & Conservation Basins

Geology

Water-Bearing Sediments

Quaternary Alluvium

Consolidated Bedrock

Undifferentiated Pre-Tertiary to Early Pleistocene Igneous, Metamorphic, and Sedimentary Rocks

Faults

- Location Certain
- Location Approximate
- Approximate Location of Groundwater Barrier
- Location Concealed
- Location Uncertain

Prepared by:

WEI
Wildermuth Environmental, Inc.

Author: SO
Date: 11/21/2019
File: Exhibit_L3_GWL.mxd

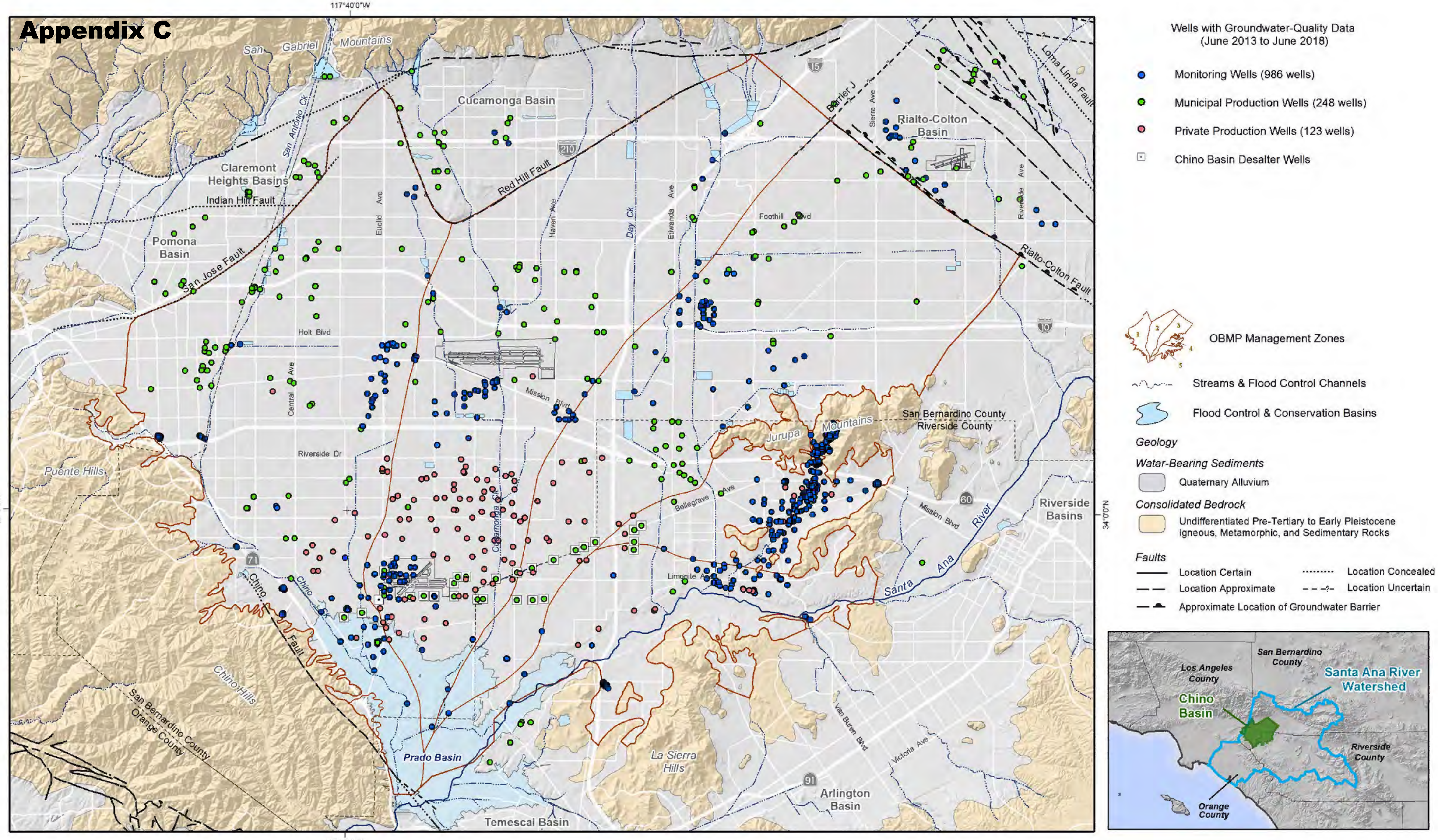
0 1 2 3 4 5 Miles
0 2 4 6 8 Km

Prepared for:
OBMP 2020 Update
Scoping Report

Chino Basin Watermaster — Partners in Basin Management

Groundwater-Level Monitoring
Well Location and Measurement Frequency
Fiscal Year 2017/18

Exhibit L-3



Prepared by:

WEI
WILDERMUTH ENVIRONMENTAL, INC.

Author: SO
Date: 8/22/2019
File: Exhibit_L4_GWQ.mxd

0 1 2 3 4 5 Miles
0 2 4 6 8 Km

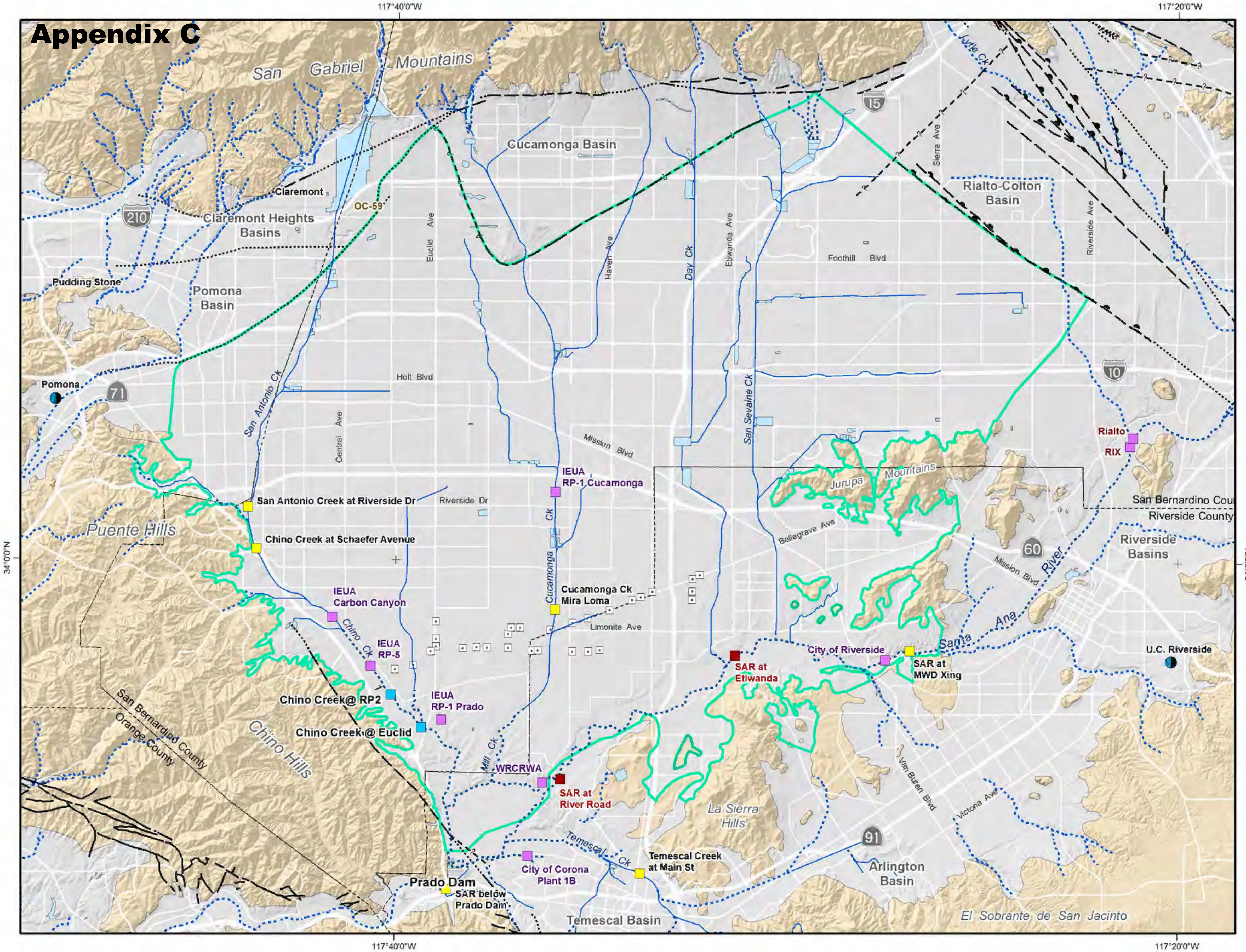
Prepared for:
OBMP 2020 Update
Scoping Report

CHINO BASIN WATERMASTER
Partners in Basin Management

Groundwater-Quality Monitoring
July 2013 to June 2018

Exhibit L-4

Appendix C



Surface-Water Monitoring Program

- POTW Discharge Outfall
- USGS Stream Gage Station
- Maximum-Benefit Monitoring Program Site
- PBHSP Site

Climate Monitoring Program

- CIMIS Stations (Temperature and Evaporation)
- Chino Basin - Area to Extract Grided Data from PRISM and NEXRAD Data Sets (Precipitation)
- Concrete-Lined Channels
- Unlined Rivers and Streams
- Flood Control & Conservation Basins
- Chino Basin Desalter Authority Well

Geology

Water-Bearing Sediments

- Quaternary Alluvium

Consolidated Bedrock

- Undifferentiated Pre-Tertiary to Early Pleistocene Igneous, Metamorphic, and Sedimentary Rocks

Faults

- Location Certain
- Location Approximate
- Approximate Location of Groundwater Barrier
- Location Concealed
- Location Uncertain

Prepared by:

WEI
WILDERMUTH ENVIRONMENTAL, INC.

Author: SO
Date: 8/22/2019
File: Exhibit_L5_SW and Climate Mon

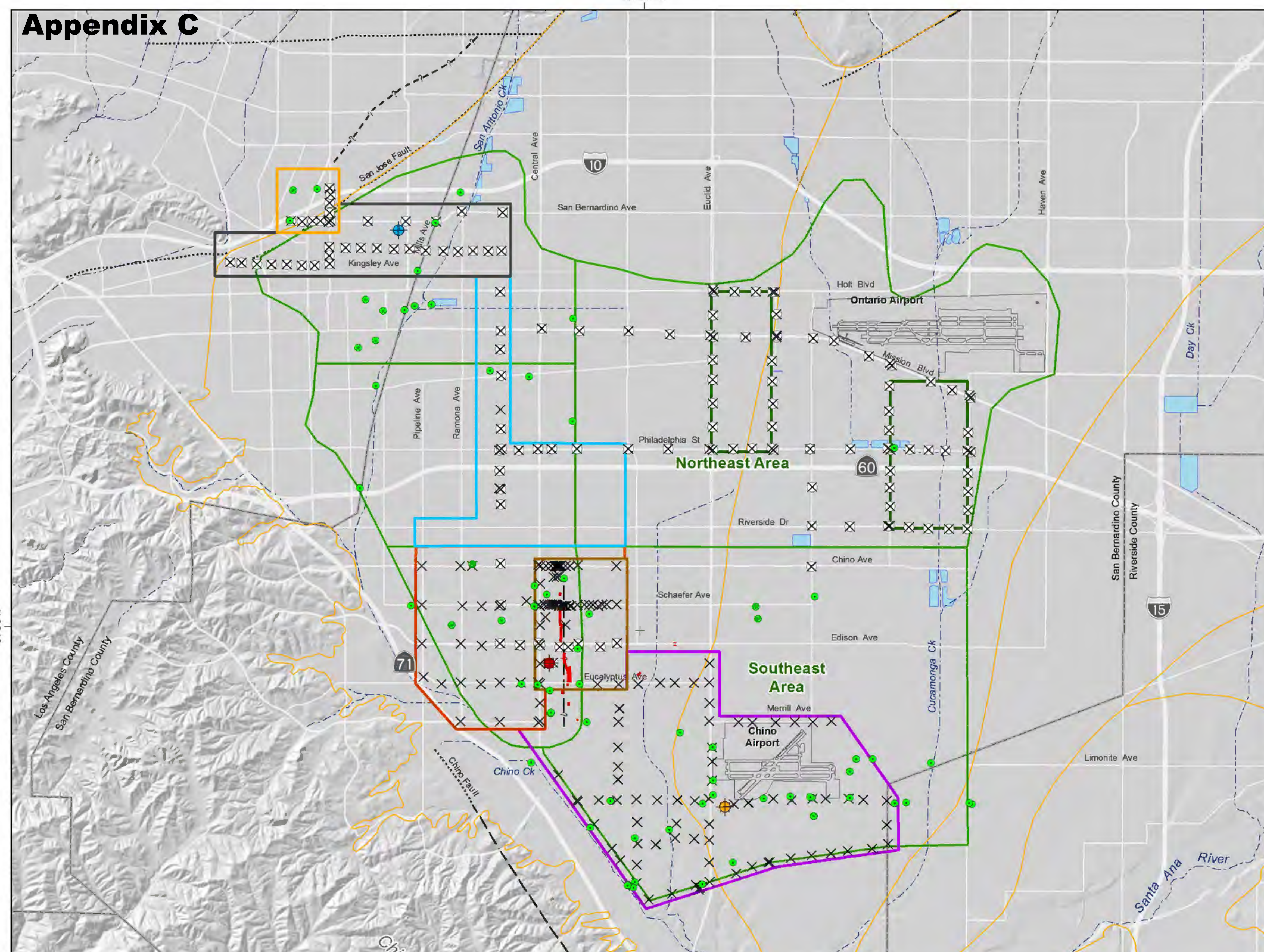
0 1 2 3 4 5 Miles
0 2 4 6 8 Km

Prepared for:
OBMP 2020 Update
Scoping Report

Surface-Water and Climate Monitoring

Exhibit L-5

Appendix C



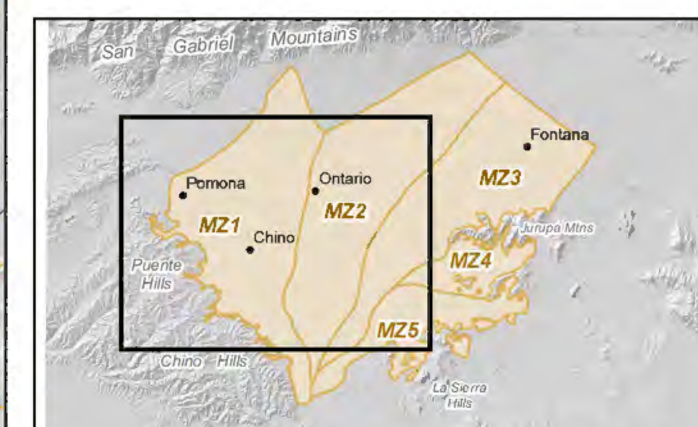
Ground-Level Monitoring Network Facilities

- Ayala Park Extensometer
- Chino Creek Extensometer
- Pomona Extensometer
- Well Equipped with Pressure Transducer (2018/19)
- Ground-Level Survey Benchmark
- Ground-Level Survey Benchmark (Measured in April 15, 2019)

Ground-Level Survey Areas

- Managed Area
- Fissure Zone Area
- Central Area
- Northwest Area
- San Jose Fault Zone Area
- Northeast Area
- Southeast Area

- Areas of Subsidence Concern
- Flood Control and Conservation Basins
- Fault (solid where accurately located; dashed where approximately located or inferred; dotted where concealed)
- Ground Fissures
- Approximate Location of the Riley Barrier



Prepared by:

WEI
Wildermuth Environmental, Inc.

Author: NWS
Date: 8/22/2019
File: Exhibit_L6_Ground-Level Mon..mxd

0 1 2 3 4 5 Miles
0 2 4 6 8 Km

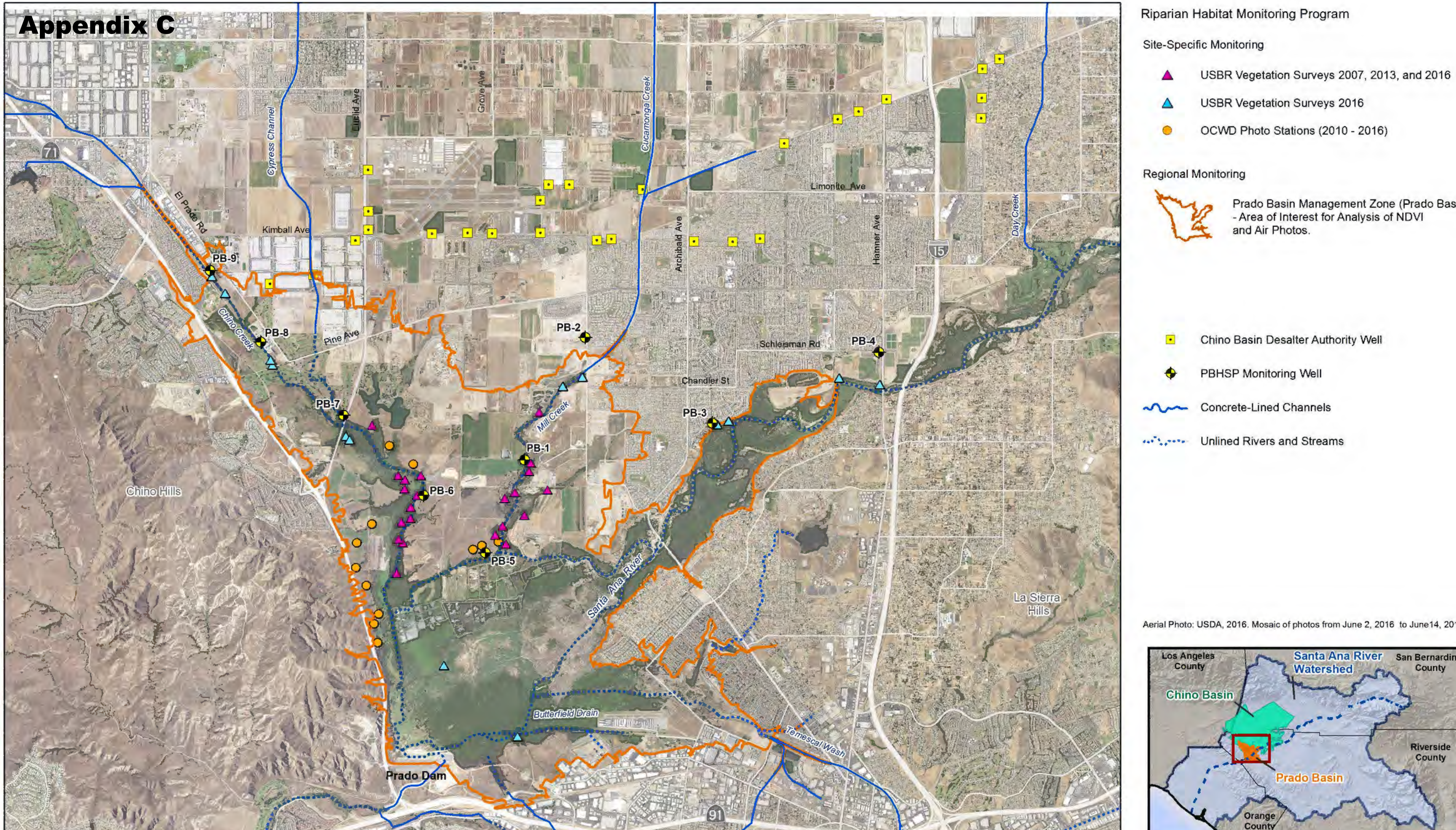
Prepared for:
OBMP 2020 Update
Scoping Report

Chino Basin Watermaster
Partners in Basin Management

Ground-Level Monitoring Network
Western Chino Basin

Exhibit L-6

Appendix C



Aerial Photo: USDA, 2016. Mosaic of photos from June 2, 2016 to June14, 2016

Prepared by:

WEI
Wildermuth Environmental, Inc.

Author: SO
Date: 8/22/2019
File: Exhibit_L7_Bio. Monitoring

Prepared for:
OBMP 2020 Update
Scoping Report

Biological Monitoring

Exhibit L-7

Appendix C

Exhibit L-8
Cost Estimate and Schedule to Implement Activity L

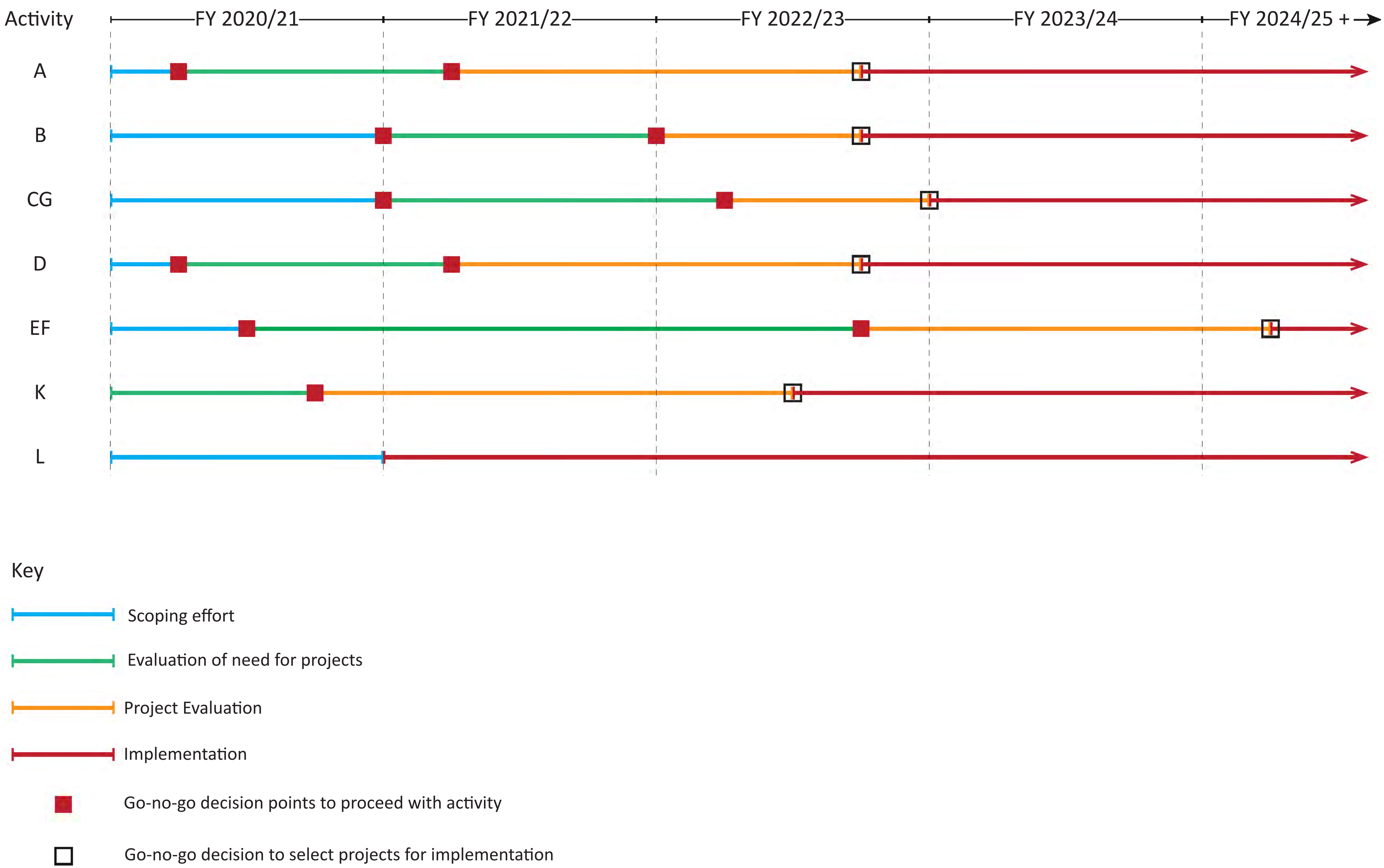
Task and Subtask Description	Engineering Cost	FY 2020/21				FY 2021/22				FY 2022/23				FY 2023/24 and beyond
		Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	
Task 1 Convene Monitoring and Reporting Committee and prepare the Monitoring and Reporting Work Plan · Convene Monitoring and Reporting Committee · Conduct (5) meetings to prepare Work Plan and develop recommended revisions · Prepare Monitoring and Reporting Work Plan · Prepare memorandum: Recommended Revisions to Watermaster's Non-Discretionary Monitoring and Reporting Programs	$125,000	$60,000				$65,000								
Task 2 Implement Recommended Revisions to Watermaster's Non-Discretionary Monitoring and Reporting Programs	$ TBD									$ TBD				$ TBD
Task 3 Annual review of scope of work and cost to implement the Monitoring and Reporting Work Plan in the Subsequent Fiscal Year	$ TBD									$ TBD				$ TBD
Total Cost and Cost by FY	**$125,000**	**$60,000**				**$65,000**				**$ TBD**				**$ TBD**

TBD -- To be determined

Appendix C

Exhibit HIJ-1

Process and Schedule to Implement the OBMP Update Activities



Appendix A

A1. 2020 OBMP Update -- Listening Session #1 Memorandum

A2. 2020 OBMP Update -- Listening Session #2 Memorandum

A2. 2020 OBMP Update -- Listening Session #3 Memorandum

Appendix C

To: Chino Basin Watermaster Stakeholders
From: Watermaster 2020 OBMP Update Team
Subject: 2020 OBMP Update -- Listening Session #1 Memorandum
Date: February 5, 2019

The objectives of this memorandum are to summarize the information provided by the stakeholders during Listening Session #1 and provide information that will assist the stakeholders in reviewing the work products of Listening Session #1 and preparing for Listening Session #2.

Background

During 1998-2000, the Chino Basin Watermaster (Watermaster) conducted a process to develop the Chino Basin Optimum Basin Management Program (OBMP). The OBMP was developed in a collaborative public process that identified the needs and wants of all stakeholders; described the physical state of the groundwater basin; developed a set of management goals; identified impediments to those goals; described a series of actions that could be taken to remove those impediments and achieve the management goals; developed and executed agreements to implement the OBMP; and certified a programmatic Environmental Impact Report (PEIR) pursuant to CEQA.

By 2019, many of the projects and management programs envisioned in the 2000 OBMP have been implemented, while some have not. The understanding of the hydrology and hydrogeology of the Chino Basin has improved since 2000, and new water-management issues have been identified that necessitate that the plan be adapted to protect the collective interests of the Chino Basin parties and their water supply reliability. For these reasons, the Watermaster parties are updating the 2000 OBMP (2020 OBMP Update) to set the framework for the next 20 to 30 years of basin-management activities.

The 2020 OBMP Update will be conducted using a collaborative process like that employed for the development of the 2000 OBMP. A description of the development of the 2000 OBMP and the rationale for and process to prepare the 2020 OBMP Update is included in a white paper prepared for the Chino Basin stakeholders: *White Paper – 2020 Update to Chino Basin Optimum Basin Management Program* (OBMP White Paper). The OBMP White Paper, and all documents relevant to the 2020 OBMP Update, are available on the Watermaster's ftp site.[1]

A series of eight public listening sessions are being held by the Watermaster throughout 2019 to support the 2020 OBMP Update. The purpose of the listening sessions is to obtain information and feedback from the parties and other Chino Basin stakeholders to define the collective goals of the parties, the impediments to achieving the goals, the management actions required to remove the impediments, and an implementation plan for the management actions. Watermaster staff will provide key information prior to and during each listening session to help the parties and other stakeholders provide their input on each topic discussed. The objective is for the ideas and opinions of every stakeholder to be heard. Participation in the listening sessions is critical to the development of the 2020 OBMP Update. Watermaster held Listening Session #1 on January 15, 2019.

Summary of Listening Session #1

Listening Session #1 was a four-hour workshop broken down into three main agenda topics:

[1] https://cbwm.syncedtool.com/shares/folder/9abb162877b999/?folder_id=670

- History of the 2000 OBMP
- Rationale for the 2020 OBMP Update – Drivers, Trends, and Implications (Breakout Session)
- Rationale for the 2020 OBMP Update – Issues, Needs, and Wants (Group Participation Session)

Prior to Listening Session #1 the following materials were distributed:

- Meeting agenda
- The OBMP White Paper
- An explanation of the assignment to prepare for Listening Session #1

These materials and a copy of the presentation given during Listening Session #1 are available on the Watermaster's ftp site.

History of the 2000 OBMP

The history of the 2000 OBMP and its implementation was provided by Watermaster staff and its legal, engineering, and environmental consultants. The presentation provided detail on why the OBMP was created; the process to develop it and the associated implementation agreements and environmental review documents; the OBMP Program Elements; and the progress and accomplishments in implementing each of the OBMP Program Elements, including a discussion on what was not accomplished.

Rationale for the 2020 OBMP Update – Drivers, Trends, and Implications

As described in the OBMP White Paper, the strategic drivers and trends that shaped the OBMP in the late 1990s have since changed. Exhibit 1 in the OBMP White Paper was a first attempt to summarize the current drivers and trends shaping water management, and their basin management implications for the Chino Basin parties. "Drivers" are external forces that cause changes in the Chino Basin water space. Grouped under each driver are expected trends that emanate from that driver. The relationship of the drivers/trends to the management implications are shown by arcs that connect trends to implications.

A breakout session was held to obtain input on the proposed drivers, trends and implications in Exhibit 1. The listening session attendees were divided into four groups to discuss changes and additions to the drivers, trends and implications. Each group documented its discussion and one member of each group reported out a summary of the group discussion to all attendees. The input provided by each breakout group was used to revise Exhibit 1 (attached to this memorandum). The following are the revised implications for Basin management that form a rationale for the 2020 OBMP Update:

- Reduced recycled water availability and increased cost
- Reduced imported water availability and increased cost
- Inability to pump groundwater with existing infrastructure
- Imported water quality degradation
- Chino Basin water quality degradation
- Increased cost of groundwater use
- Reductions in Chino Basin Safe Yield
- Recycled water quality degradation
- Increased cost of Basin Plan compliance

The final version of Exhibit 1 will be included as a final deliverable of the 2020 OBMP Update. Additional comments on Exhibit 1 can be submitted in writing to Edgar Tellez-Foster (etellezfoster@cbwm.org).

Rationale for the 2020 OBMP Update – Issues, Needs, and Wants

As described in the OBMP White Paper, the issues, needs and wants of the parties will form the basis of the management goals of the 2020 OBMP Update and inform the identification of impediments to the goals and action items to remove the impediments. A full group participation session was led by Watermaster staff to obtain feedback from the listening session attendees on their individual issues, needs and wants related to basin management. The listening session attendees articulated the issues, needs, and wants of their associated party in writing and then verbally shared with the full group. The feedback provided by the attendees was transcribed by Watermaster staff and then the needs and wants were organized into similar classes of issues. The classes of issues identified were effectively the same as the implications for basin management defined in Exhibit 1. Table 1 is a summary of the needs and wants of the parties, organized by the basin management issues. Attribution by party was assigned to each need and want.

Next Steps

The next steps in the process to develop the 2020 OBMP Update are:

1. Finalize the descriptions of issues, needs, and wants for basin management in Table 1.
2. Describe the goals for the 2020 OBMP Update, and impediments to achieving the goals.

OBMP Goals and Impediments

For the 2000 OBMP, the Chino Basin stakeholders established four management goals for the OBMP that addressed the issues, needs, and wants of the parties:

> ***Enhance Basin Water Supplies***. The intent of the goal was to increase the volumes and variety of available water supplies. This goal applied not only to local groundwater, but also to all sources of water available to the parties (*e.g.,* recycled, imported).
>
> ***Protect and Enhance Water Quality***. The intent of the goal was to ensure the protection of the long-term beneficial uses of the groundwater basin.
>
> ***Enhance Management of the Basin***. The intent of the goal was to encourage stable, creative, sustainable and fair water resources management for broad mutual benefit to all stakeholders and avoidance of undesirable results.
>
> ***Equitably Finance the OBMP***. The intent of the goal was to identify and use efficient and equitable methods to fund OBMP implementation.

While these general goals are as valid today as they were in 2000, it was apparent from the discussions of issues, needs, and wants at Listening Session #1 that the impediments to achieving the goals have changed and that the stakeholders have more focused goals for basin management. The focus of the next two listening sessions will be to identify the issues/needs/wants that are common to most stakeholders and to define focused goal statements and the impediments to achieving the goals. Listed below are four example goals, based on common issues/needs/wants, for the 2020 OBMP Update. Below each goal are some examples of the impediments to achieving the goals, and actions to remove the impediments. The impediments listed are not exhaustive.

Goal #1: Be able to rely on local supplies to meet potable demands for a [6, 12, 18, 24-month] period in the event of a [short-term, long-term] outage of imported water supply.

Impediments to achieving the goal:

- The current capacity to rely on groundwater during these periods is constrained by insufficient pumping capacity, insufficient conveyance, poor quality, and subsidence.
- Exercising storage in the Chino Basin as a way of enhancing local water-supply reliability can cause undesirable results such as subsidence and loss of yield.

Actions to remove impediments and achieve the goal:

- Develop a Storage Management Plan (SMP) to define how to utilize storage without causing undesirable results.
- Build the production, conveyance and treatment facilities necessary to meet demands and operate in accordance with the SMP.

Goal #2: Avoid shutdown of groundwater production facilities due to existing or potential new water-quality regulations.

Impediment to achieving the goal: Insufficient treatment and brine disposal capacity.

Action to remove impediment and achieve the goal: Build conveyance and regional treatment facilities (with ability to expand, if necessary) to treat current and potential future contaminants of concern.

Goal #3: Optimize the use of unused storage space in the Basin by implementing storage and recovery programs.

Impediment to achieving the goal: Exercising storage in the Chino Basin can cause undesirable results such as subsidence and loss of yield.

Action to remove impediment and achieve the goal: Develop a Storage Management Plan (SMP) to define how to utilize storage without causing undesirable results.

Goal #4: Fund [X%] of the implementation of the OBMP Update with supplemental resources, such as grants, low-interest loans, or outside funding partners.

Impediment to achieving the goal: Competition for future grant funding will be fierce; success in obtaining grant funding is uncertain.

Recommended Preparation for Listening Session #2

1. Review the Issues, Needs, and Wants matrix in Table 1. Ensure that the feedback you reported at Listening Session #1 was accurately captured. Come to Listening Session #2 prepared to provide your feedback and add your party's attribution to the needs or wants identified by others, if you deem appropriate. The intent is to finalize Table 1 and use it to identify the specific concerns shared by most stakeholders. These common concerns will serve as that starting point for defining goals for the 2020 OBMP Update.
2. Based on your review of this memo and Table 1, come prepared to suggest and formulate goals for the 2020 OBMP Update and the impediments to achieving those goals.

Appendix C

Table 1
Issues, Needs and Wants of the Chino Basin Stakeholders

Key: 🔴 Need ● Want **x** Unspecified

Needs and Wants Categorized by Basin Management Issues	Pool Parties														Others				
	Appropriative										Agricultural								
	Pomona	Chino	Fontana	CVWD	SAWCO	MVWD	Chino Hills	Upland	JCSD	Ontario	Crops	Dairy	State of CA	Overlying Non-Ag	IEUA	TVMWD	WMWD	Metropolitan	CBWCD
Reductions in Chino Basin Safe Yield																			
Manage the basin safe yield for the long-term viability and reliability of groundwater supply											🔴							x	
Develop an OBMP Update that is consistent with the Physical Solution and enables the Parties to leverage their respective water rights						x													
Maintain or enhance the safe yield of the basin without causing undesirable results				🔴	🔴					🔴	x				x				
Reassess the frequency of the safe yield recalculation					x												x		
Develop recharge programs that maintain or enhance safe yield																	x		
Design storage management and storage & recovery programs that maintain or enhance safe yield													🔴		●				
Engage with regional water management planning efforts in the Upper Santa Ana River Watershed that have the potential to impact Chino Basin operations or safe yield	x																x		
Develop more facilities to capture, store, and recharge stormwater	●	🔴									●								
Enhance recharge in northeast MZ-3			●																
Maximize use of existing recharge facilities	●																		
Establish incentives to encourage recharge of high-quality imported water			●																
Develop a storage management plan to optimize the use of unused storage space in the basin, avoid undesirable results, and encourage storage and recovery programs		🔴		🔴	🔴						🔴		●		x		🔴		

Appendix C

Table 1
Issues, Needs and Wants of the Chino Basin Stakeholders

Key: 🔴 Need ● Want x Unspecified

Needs and Wants Categorized by Basin Management Issues	Pool Parties														Others				
	Appropriative										Agricultural			Overlying Non-Ag					
	Pomona	Chino	Fontana	CVWD	SAWCO	MVWD	Chino Hills	Upland	JCSD	Ontario	Crops	Dairy	State of CA		IEUA	TVMWD	WMWD	Metropolitan	CBWCD
Inability to Pump Groundwater with Existing Infrastructure																			
Design subsidence management plans to allow flexibility in the location and volume of groundwater production in MZ-1 and MZ-2	x					x	x			🔴					x				
Develop management strategies that enable the parties to produce or leverage their respective water rights that may be impacted by physical basin challenges like land subsidence or water quality						x	x												
Ensure that sufficient, reliable water supplies will be available to meet current and future water demands			🔴	🔴				🔴		x	x							🔴	●
Design storage management and storage & recovery programs to raise funding to build infrastructure															●				
Develop conjunctive use agreements that provide certainty in the ability to perform during put and take years by clearly defining facilities/infrastructure and operating plans, and that leverage the lessons learned from obstacles encountered during the implementation of the current Dry Year Yield program.	x																	x	
Develop process to support/facilitate project implementation																🔴			
Pursue collaborative, regional partnerships to implement regional solutions to water management challenges					●												●	●	🔴

Appendix C

Table 1
Issues, Needs and Wants of the Chino Basin Stakeholders

Key: 🔴 Need ● Want x Unspecified

Needs and Wants Categorized by Basin Management Issues	Pool Parties														Others				
	Appropriative										Agricultural								
	Pomona	Chino	Fontana	CVWD	SAWCO	MVWD	Chino Hills	Upland	JCSD	Ontario	Crops	Dairy	State of CA	Overlying Non-Ag	IEUA	TVMWD	WMWD	Metropolitan	CBWCD
Increased Cost of Groundwater Use																			
Develop an equitable distribution of costs/benefits of the OBMP						x									x				
Watermaster assessments for implementation of the OBMP should be allocated based on benefits received					x														
Decrease Watermaster assessment costs	●				●														
Seek supplemental financial resources to support the implementation of the OBMP Update		🔴		●					🔴						x	🔴			●
Monetize agencies unused water rights for equitable balance of basin assets			●																
Support to develop a justification for increases in water rates and developer fees to invest in needed water infrastructure	🔴	x															x		
Develop regional partnerships to help reduce costs															●				
Continue or enhance incentives to pump groundwater from the Chino Basin			🔴																
Chino Basin Water Quality Degradation																			
Develop a water quality management plan to ensure ability to produce groundwater rights				x											x			x	
Address existing and new drinking water quality regulations that may result in an increase in groundwater treatment and costs	x	x	🔴					x									x		
Develop regional infrastructure to address water quality contamination and treatment					●														
Recycled Water Quality Degradation																			
Maintain compliance with recycled water and dilution requirements pursuant to the Chino Basin groundwater recharge permit															🔴				

Appendix C

Table 1
Issues, Needs and Wants of the Chino Basin Stakeholders

Key: 🔴 Need ● Want **x** Unspecified

Needs and Wants Categorized by Basin Management Issues	Pool Parties														Others				
	Appropriative										Agricultural								
	Pomona	Chino	Fontana	CVWD	SAWCO	MVWD	Chino Hills	Upland	JCSD	Ontario	Crops	Dairy	State of CA	Overlying Non-Ag	IEUA	TVMWD	WMWD	Metropolitan	CBWCD
Increased Cost of Basin Plan Compliance																			
Perform the minimum amount of monitoring/reporting that is required for basin management and regulatory compliance							●												
Develop management strategy to ensure sufficient supplies to blend with recycled water and comply with Salt and Nutrient Management Plan											🔴								
Reduced Recycled Water Availability and Increased Cost																			
Maximize the use of recycled water for direct use or recharge	●			🔴					🔴						●				
Utilize non-IEUA sources of recycled water that are not being put to beneficial use	🔴								🔴										
Develop alternative management strategies to comply with the recycled water discharge obligations to the Santa Ana River															x		●		
Evaluate the potential for direct potable reuse of recycled water															●				
Fully utilize IEUA recycled water resources								🔴		🔴									
Reduced Imported Water Availability and Increased Cost																			
Increase water-supply reliability at the lowest possible cost								●											
Despite the best efforts of the Parties to decrease reliance on imported water, the cost of the total water supply continues to increase	x																		
Continue to build collaborative programs between the Metropolitan Water District and Chino Basin																		x	
Identify and utilize new sources of supplemental water															●				
Ensure that sufficient supplemental water supplies will be available to meet future replenishment requirements							x												

Appendix C

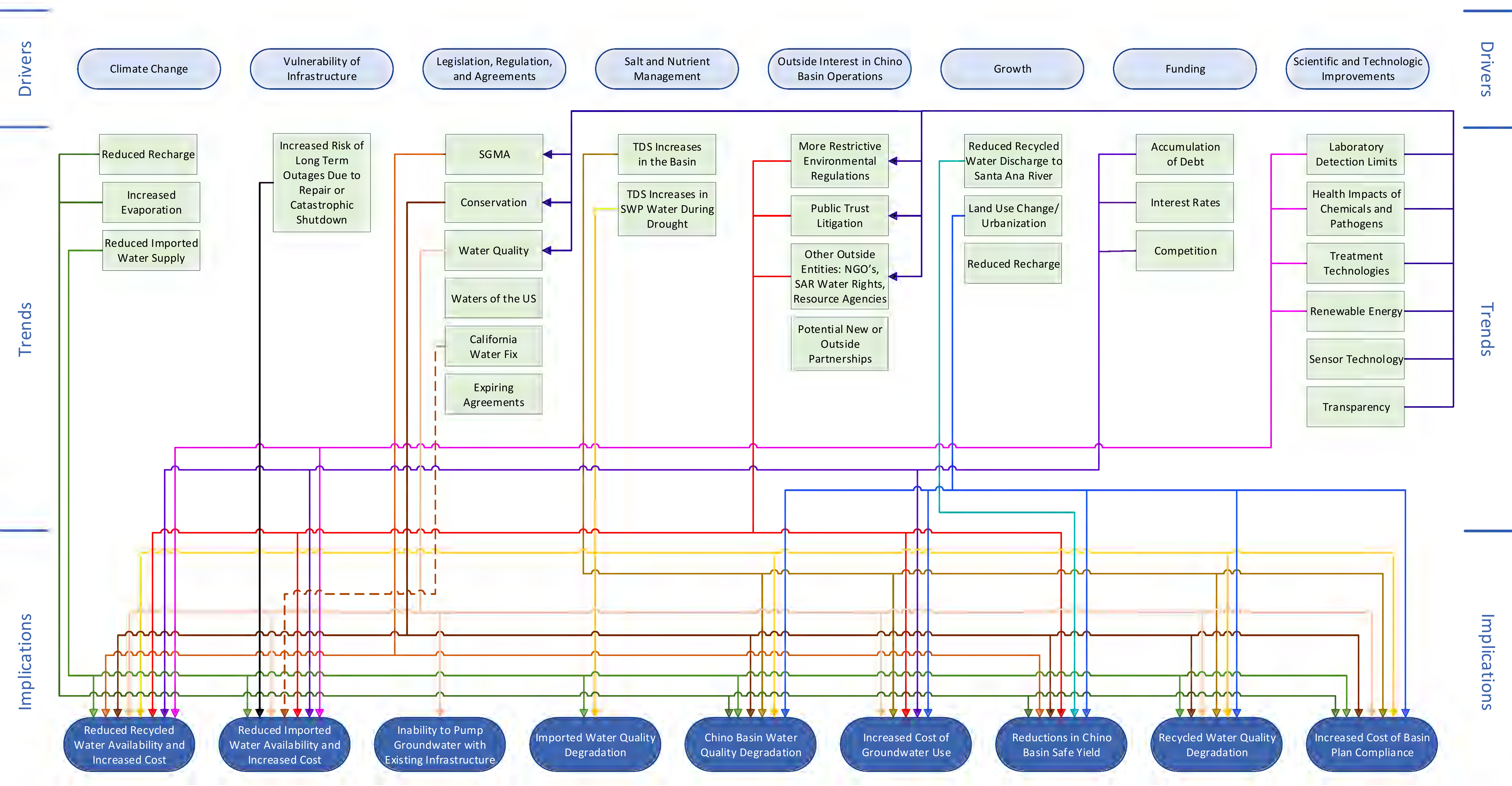
Table 1
Issues, Needs and Wants of the Chino Basin Stakeholders

Key: 🔴 Need ● Want x Unspecified

Needs and Wants Categorized by Basin Management Issues	Pool Parties														Others				
	Appropriative										Agricultural								
	Pomona	Chino	Fontana	CVWD	SAWCO	MVWD	Chino Hills	Upland	JCSD	Ontario	Crops	Dairy	State of CA	Overlying Non-Ag	IEUA	TVMWD	WMWD	Metropolitan	CBWCD
Reduced Imported Water Availability and Increased Cost																			
Understand how imported water reliability from Metropolitan Water District will be affected with and without the California Water Fix															x				
Need a better understanding of the water management plans of the Parties to be able to better plan for imported water needs and to assure reliability of Metropolitan Water District water supply																		🔴	
Construct inter-basin and intra-basin connections for the benefit of regional water supply and conjunctive use		🔴		🔴				●							●		●	🔴	
Ensure that there is a reliable local water supply to replace imported water during shut down of imported water delivery infrastructure for maintenance and longer-term emergency outages	🔴		x	🔴			x	🔴	x						x			🔴	
Analyze water management scenarios that plan for unexpected challenges and emergencies															x				
Use more recycled water for replenishment obligation				🔴															
Develop management strategies that ensure parties will meet future desalter replenishment obligation and have the money to fund it				🔴													x		
Other																			
Improve communication between the parties	●																		
Coordinate timing of agreements, grants, etc. to ensure implementation of the OBMP Update															x				
Consider a long-term planning horizon of up to 50 years															●				
Educate elected officials and decision makers on the need and urgency to address the water management challenges		🔴																	

Appendix C

Exhibit 1 – Drivers and Trends and Their Implications
2020 OBMP Update



Appendix C

To: Chino Basin Watermaster Stakeholders
From: Watermaster 2020 OBMP Update Team
Subject: 2020 OBMP Update -- Listening Session #2 Memorandum
Date: March 14, 2019

The objectives of this memorandum are to summarize the information provided by the stakeholders during Listening Session #2 and provide information that will assist the stakeholders in reviewing the work products of Listening Session #2 and preparing for Listening Session #3.

Background

During 1998-2000, the Chino Basin Watermaster (Watermaster) conducted a process to develop the Chino Basin Optimum Basin Management Program (OBMP). The OBMP was developed in a collaborative public process that identified the needs and wants of all stakeholders; described the physical state of the groundwater basin; developed a set of management goals; identified impediments to those goals; described a series of actions that could be taken to remove those impediments and achieve the management goals; developed and executed agreements to implement the OBMP; and certified a programmatic Environmental Impact Report (PEIR) pursuant to CEQA.

By 2019, many of the projects and management programs envisioned in the 2000 OBMP have been implemented, while some have not. The understanding of the hydrology and hydrogeology of the Chino Basin has improved since 2000, and new water-management issues have been identified that necessitate that the OBMP be updated to protect the collective interests of the Chino Basin stakeholders and their water supply reliability. For these reasons, the Watermaster parties are updating the 2000 OBMP (2020 OBMP Update) to set the framework for the next 20 to 30 years of basin-management activities.

The 2020 OBMP Update is being conducted using a collaborative process like that employed for the development of the 2000 OBMP. A description of the development of the 2000 OBMP and the rationale for and process to prepare the 2020 OBMP Update is included in a white paper prepared for the Chino Basin stakeholders: *White Paper – 2020 Update to Chino Basin Optimum Basin Management Program* (OBMP White Paper). The OBMP White Paper, and all documents relevant to the 2020 OBMP Update, are available on the Watermaster's ftp site.[1]

A series of public listening sessions are being held by the Watermaster throughout 2019 to support the 2020 OBMP Update. The purpose of the listening sessions is to obtain information, ideas, and feedback from the Chino Basin stakeholders to define their collective goals, the impediments to achieving the goals, the management actions required to remove the impediments, and an implementation plan for the management actions. Watermaster staff is providing key information prior to and during each listening session to enable the stakeholders to provide their input on each topic discussed. The objective is for the ideas and opinions of every stakeholder to be heard. Participation in the listening sessions is critical to the development of the 2020 OBMP Update.

Watermaster held Listening Session #2 on February 12, 2019. Prior to Listening Session #2, the *Listening Session #1 Memorandum* was distributed which summarized: the feedback received during Listening Session #1, how the feedback will be used for 2020 OBMP Update, and the recommended preparation for Listening Session #2.

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[1] https://cbwm.syncedtool.com/shares/folder/9abb162877b999/?folder_id=670

Summary of Listening Session #2

Listening Session #2 was a three-hour workshop broken down into two main agenda topics:

- Update and refinement of the issues, needs, and wants of the Chino Basin stakeholders (individual breakout activity)
- Development of draft goals for the 2020 OBMP Update (group breakout session)

Update and refinement of the Issues, Needs, and Wants of the Chino Basin Stakeholders

As described in the OBMP White Paper, the issues, needs and wants of the stakeholders form the basis of the management goals of the 2020 OBMP Update and inform the identification of impediments to the goals and action items to remove the impediments. The issues, needs and wants were first discussed in Listening Session #1: the listening session attendees articulated the issues, needs, and wants of their associated party in writing and then verbally shared with the full group. Following Listening Session #1, the 167 individual issues, needs and wants provided by the attendees were transcribed by Watermaster staff and then combined into a list of 55 unique needs and wants. The needs and wants were then reviewed and categorized into nine classes of basin management issues:

- Reductions in Chino Basin Safe Yield
- Inability to pump groundwater with existing infrastructure
- Increased cost of groundwater use
- Chino Basin water quality degradation
- Recycled water quality degradation
- Increased cost of Basin Plan compliance
- Reduced recycled water availability and increased cost
- Reduced imported water availability and increased cost
- Other

A draft matrix was then developed to show attribution of the needs and wants by party/stakeholder. This matrix was circulated for review, editing, and comment as part of the *Listening Session #1 Memorandum*.

The OBMP Update Team gave a presentation to explain the process to develop the draft matrix and explained that the next step is to identify the needs and wants that are common to most stakeholders. These common needs and wants will serve as the starting point for defining goals for the 2020 OBMP Update. Following the presentation, the participants at Listening Session #2 were asked to circulate the room to review poster-sized versions of the matrix to: (1) confirm that attribution for their party's needs and wants were appropriately assigned, (2) revise the needs and want statements as needed to accurately describe their needs and wants, and (3) add their party's attribution to the needs and wants identified by others. Members participating by phone were asked to email their comments and input.

Table 1 (attached) is the revised matrix of the issues, needs and wants of the Chino Basin Stakeholders, inclusive of all feedback provided by stakeholders prior to, during, and following Listening Session #2. Additional edits to the matrix can be submitted via email to Edgar Tellez-Foster (etellezfoster@cbwm.org).

Discussion of Goals for the 2020 OBMP Update

The OBMP Update Team provided an overview of the goals of the 2000 OBMP, which were:

1. ***Enhance Basin Water Supplies***
2. ***Protect and Enhance Water Quality***
3. ***Enhance Management of the Basin***

4. ***Equitably Finance the OBMP***

These goals were based on the then-current issues, needs and wants of the Chino Basin stakeholders and included associated activities that would be needed to achieve the goals. Using a similar transparent process as is being employed now for the 2020 OMPU Update, the stakeholders defined the impediments to the goals and activities and the specific actions required to remove the impediments and achieve the goals. The actions were formed into the 2000 OBMP implementation plan.

During Listening Session #2, a group breakout session was held to obtain input on defining goals for the 2020 OBMP Update based on the issues, needs, and wants of the stakeholders. The meeting attendees were divided into six groups. Each group was assigned to one or multiple of the nine “basin management issues” and their associated needs and wants. Each group was asked to:

1. Identify the needs and wants that are common to most stakeholders.
2. Define one or more goals or activities for the 2020 OBMP Update to address the most common needs and wants.

Following the group breakout session, one member from each group reported on the group’s discussions and ideas for goals and activities. Table 2 (attached) lists the stakeholder input presented by the breakout groups for goals and activities, categorized by basin management issues.

Proposed Goals for the 2020 OBMP Update

The feedback and input provided by the stakeholders during Listening Session #2 was used by The OBMP Update Team to develop proposed goals and their associated activities for the 2020 OBMP Update for review and discussion at Listening Session #3. The process followed to develop the proposed goals and activities included:

- An assessment of alignment of the stakeholder input in Tables 1 and 2 with the goals of the 2000 OBMP.
- An assessment of alignment of the basin management goals and activities in Table 2 with the needs and wants in Table 1.

The stakeholder input shown in Tables 1 and 2 indicates that the 2000 OBMP goals are still relevant today. To illustrate, Tables 1 and 2 each contain a column entitled “Alignment with 2000 OBMP Goal(s).” In both tables, the column indicates which of the four goals from the 2000 OBMP is in alignment with each line item of input provided, if applicable. Every need and want listed in Table 1 can be addressed through activities that are consistent with the 2000 OBMP goals. And, every activity described in Table 2 is in alignment with one or more of the 2000 OBMP goals. For this reason, we recommend that the goals for the 2020 OBMP Update are the same as the goals for the 2000 OBMP. While we propose that the goals for the 2020 OBMP Update are unchanged, the activities and implementation plan defined in 2000 need to be refined for the 2020 OBMP Update.

Our assessment of the stakeholder input for basin management goals and activities in Table 2 indicates that most of the issues, needs and wants described in Table 1 would be addressed by the activities. To illustrate, a column entitled “Addressed by Activities in Table 2” was added to Table 1. This column indicates which of the 17 activities listed in Table 2 have the potential to address each need and want. There are seven needs and wants in Table 1 that may not be addressed by the activities in Table 2 – additional activities may need to be considered to address these needs.

Based on our assessment, we propose the following set of goals and associated activities for the 2020 OBMP Update. For each goal, the following information is described: a statement of intent (relevant to

2000 and 2020), what has been accomplished to achieve the goal during the last 19 years of OBMP implementation, and a list of the proposed new or modified activities for to achieve the goals. The list of activities is based on the input in Table 2 (the number in parentheses following the activity description matches with the identification number shown in the first column the stakeholder input in Table 2).

Goal No. 1 - Enhance Basin Water Supplies. The intent of this goal is to increase available water supplies for all the stakeholders that rely on the Chino Basin and to improve supply reliability. This goal applies to Chino Basin groundwater, to other sources of water available to the OBMP stakeholders, and to the optimized use of Chino Basin storage to regulate the variability of the available water supplies and improve supply reliability.

Since the implementation of the 2000 OBMP, Watermaster and the OBMP stakeholders have completed or are currently implementing the following activities that enhance basin water supplies:

- constructed recharge projects to offset the stormwater recharge lost due to channel lining, increase Safe Yield, and ensure that there will be enough supplemental water recharge capacity to satisfy replenishment obligations;
- expanded the recharge and direct reuse of recycled water;
- constructed the Chino Basin desalters to recover contaminated groundwater in the southern part of the basin and to maintain the Safe Yield that would have otherwise been reduced due to the land use transition from agricultural to urban uses;
- recalculated the Safe Yield for the period 2011 through 2020; and
- started the process to recalculate the Safe Yield for 2021 through 2030.

The proposed new or modified activities to enhance basin water supplies to address the issues, needs and wants identified by the stakeholders in Listening Sessions 1 and 2 are based on the input in Table 2 and include:

- Construct new recharge facilities to increase the capacity for stormwater and recycled water recharge and provide recharge capacity in areas of the basin necessary to ensure long-term balance of recharge and discharge (1, 4 and 9).
- Develop and implement storage-and-recovery programs to increase water supply reliability, increase Safe Yield, and improve water quality (1, 2 and 3).
- Develop and implement regional conveyance and treatment programs to enable all stakeholders to exercise their pumping rights and minimize land subsidence (7, 12 and 13).
- Maximize the reuse of recycled water produced by IEUA and others (10 and 11).

Goal No. 2 - Protect and Enhance Water Quality. The intent of this goal is to ensure the protection of the long-term beneficial uses of Chino Basin groundwater.

Since the implementation of the 2000 OBMP, Watermaster and the OBMP stakeholders have completed or are currently implementing the following activities to protect and enhance water quality:

- initiated a comprehensive basin-wide water-quality monitoring program;
- collaborated with the Regional Board in its efforts to facilitate the cleanup of groundwater contamination in the basin;
- developed an innovative salt and nutrient management plan to enable the use of recycled water that reduced treatment requirements without adversely impacting beneficial uses;
- constructed and operated the Chino Basin desalters to recover high-TDS and high-nitrate groundwater in the southern part of the basin and put it to beneficial use;

- identified opportunities to use the Chino Basin desalters to assist in the remediation of the Chino Airport and South Archibald plumes; and
- constructed new recharge facilities to enhance the recharge of high-quality storm and imported waters.

The proposed new or modified activities to protect and enhance water quality to address the issues, needs and wants identified by the stakeholders in Listening Sessions 1 and 2 are based on the input in Table 2 and include:

- Develop a water-quality management plan to address current and future water-quality issues and ensure the protection of beneficial uses, now and into the future (5).
- Develop strategic regulatory-compliance solutions that achieve multiple benefits in managing water quality (6).

Goal No. 3 - Enhance Management of the Basin. The intent of this goal is to encourage stable, creative, sustainable and fair water-resources management for broad mutual benefit to all stakeholders and avoid undesirable results.

Since the implementation of the 2000 OBMP, Watermaster and the OBMP stakeholders have completed or are currently implementing the following activities to enhance management of the basin:

- initiated a comprehensive basin-wide monitoring program for groundwater levels, recharge and land subsidence;
- developed a subsidence management plan to minimize or abate the occurrence of land subsidence and ground fissuring;
- implemented the OBMP storage management plan and more recently initiated the process to update it;
- developed methods to estimate storage losses;
- entered into the Dry-Year Yield program with Metropolitan; and
- became eligible for a $207 million grant to develop and implement a storage and recovery program.

The proposed new or modified activities to enhance management of the basin to address the issues, needs and wants identified by the stakeholders in Listening Sessions 1 and 2 are based on the input in Table 2 and include:

- Develop and implement storage-and-recovery programs that increase Safe Yield, improve water quality, and provide increased water supply reliability (1, 2, 3).
- Optimize the use of all sources of water supply by developing the ability to move water across the basin and between stakeholders (8 and 12).

Goal No. 4 - Equitably Finance the OBMP. The intent of this goal is to identify and use efficient and equitable methods to fund OBMP implementation.

Since 2000, Watermaster and the OBMP stakeholders have completed or are currently implementing the following activities to equitably finance the OBMP:

- completed the Peace Agreement, Peace II Agreement, and other agreements to provide incentives and funding plans to construct and operate the Chino Basin desalters and recharge improvements;

- entered into an agreement with Metropolitan for a Dry-Year Yield Program to store imported water and provided funding for the construction of new wells and wellhead treatment to produce degraded water when Metropolitan made a call for the water in storage; and
- obtained low-interest loans and grants to construct groundwater treatment, recycled water treatment, conveyance, and recharge facilities to enable the cost-efficient implementation of the OBMP.

The proposed new or modified activities to equitably finance the OBMP to address the issues, needs and wants identified by the stakeholders in Listening Sessions 1 and 2 are based on the input in Table 2 and include:

- Develop an equitable distribution of costs/benefits of the OBMP Update and include in the OBMP update agreements (14).
- Develop regional partnerships to implement the OBMP Update and reduce costs and include in OBMP Update agreement (16).
- Continue to identify and pursue low-interest loans and grants to support the implementation of the OBMP Update. An example of such an effort is the Chino Basin Project (15).

Next Steps

The next steps in the process to develop the 2020 OBMP Update are:

1. Obtain feedback on the proposal that the goals of the 2020 OBMP Update are the same goals defined in the 2000 OBMP but that continued progress toward these goals requires consideration of new or modified activities in an updated OBMP implementation plan.
2. For each goal, obtain feedback on the proposed list of activities for consideration in the development of the 2020 OBMP Update implementation plan.
3. Identify and describe the impediments to implementing the activities and achieving the goals.
4. Develop an initial set of actions to remove the impediments, including reconnaissance-level cost estimates, for consideration by the stakeholders.

Recommended Preparation for Listening Session #3

1. Review Table 1 and confirm that the feedback you provided at Listening Session #2 was accurately captured in the issues, needs and wants matrix. Please send any edits to Edgar Tellez-Foster (etellezfoster@cbwm.org).
2. Review the assessments of the nexus of the 2000 OBMP Goals with the needs and wants and activities in Tables 1 and 2; and the nexus of the activities in Table 2 to the needs and wants in Table 1. Be prepared to provide feedback (e.g. do the activities in Table 2 address all of the needs and wants? Are there any activities that could be added to the activities in Table 2?).
3. Review the proposed goal statements and associated new/modified activities for the 2020 OBMP Update. Be prepared to provide your feedback on these goals and activities. The intent is to (i) finalize the goals and (ii) have a complete list of potential new or modified activities for consideration as part the 2020 OBMP Update implementation plan.
4. Be prepared to identify impediments to implementing the goals and their associated activities.

Appendix C

Table 1
Issues, Needs and Wants of the Chino Basin Stakeholders

Key: 🔴 Need ⚫ Want/Unspecified

*The number in this column matches with the identification number of the stakeholder input in Table 2 (first column)

Needs and Wants Categorized by Basin Management Issues	Pool Parties														Others						Addressed by Activities in Table 2*	Alignment with 2000 OBMP Goals
	Appropriative										Agricultural											
	Pomona	Chino	Fontana	CVWD	SAWCO	MVWD	Chino Hills	Upland	JCSD	Ontario	Crops	Dairy	State of CA	Overlying Non-Ag	IEUA	TVMWD	WMWD	Metropolitan	CBWCD	CDA		
Reductions in Chino Basin Safe Yield																						
Develop a storage management plan to optimize the use of unused storage space in the basin, avoid undesirable results, and encourage storage and recovery programs	🔴	🔴		🔴	🔴			🔴	🔴	🔴	🔴		⚫		🔴		🔴				1, 2	1, 2, 3
Design storage management and storage & recovery programs that maintain or enhance safe yield	🔴	⚫						🔴	🔴	⚫			🔴		⚫		⚫			⚫	2, 3	1, 3
Maintain or enhance the safe yield of the basin without causing undesirable results	🔴	⚫		🔴	🔴			🔴	🔴	🔴	⚫				⚫		⚫			🔴	2, 3	1, 3
Manage the basin safe yield for the long-term viability and reliability of groundwater supply	🔴	⚫						🔴	🔴	🔴	🔴			🔴			⚫	⚫		🔴	2, 3	1, 3
Reassess the frequency of the safe yield recalculation	⚫				⚫												⚫				2, 3	3
Continue to model and track safe yield, but utilize other management strategies to address a decline.																	⚫				2, 3	1, 3
Develop recharge programs that maintain or enhance safe yield	🔴	⚫					⚫	⚫	🔴	⚫					⚫		⚫			⚫	3, 4, 9	1, 3
Develop more facilities to capture, store, and recharge water	⚫	🔴					🔴			⚫	⚫				⚫		⚫				4, 9	1, 2
Enhance recharge in northeast MZ-3	⚫		⚫						🔴								⚫				4, 9	1, 3
Maximize use of existing recharge facilities	⚫	⚫							🔴	⚫											4, 9	3
Establish incentives to encourage recharge of high-quality imported water	⚫		⚫																		1, 4, 9	2, 3
Develop an OBMP Update that is consistent with the Physical Solution and allows access to the basin for users to meet their requirements	🔴	⚫				🔴		🔴														3
Engage with regional water management planning efforts in the Upper Santa Ana River Watershed that have the potential to impact Chino Basin operations or safe yield	⚫														🔴		⚫			🔴		3

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Appendix C

Table 1
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Inability to Pump Groundwater with Existing Infrastructure																						
Pursue collaborative, regional partnerships to implement regional solutions to water management challenges	⚫			⚫	⚫			⚫							🔴	⚫	⚫	⚫	🔴	🔴	6, 7,12 13,16	3
Ensure that sufficient, reliable water supplies will be available to meet current and future water demands	🔴	🔴	🔴	🔴			⚫	🔴	⚫	⚫	⚫				🔴	⚫	⚫	🔴	⚫		7, 9, 12, 13	1, 3
Develop conjunctive use agreements that provide certainty in the ability to perform during put and take years by clearly defining facilities/infrastructure and operating plans, and that leverage the lessons learned from obstacles encountered during the implementation of the current Dry Year Yield program	⚫						⚫		⚫						⚫		⚫	⚫			1, 2	1, 2, 3
Develop management strategies that enable the parties to produce or leverage their respective water rights that may be impacted by physical basin challenges like land subsidence or water quality	🔴						⚫	🔴							⚫		⚫				1, 2, 8, 13	3
Design storage management and storage & recovery programs to raise funding to build infrastructure	⚫			⚫											⚫		⚫				1, 15	3, 4
Develop process to support/facilitate project implementation	⚫																					4
Design subsidence management plans to allow flexibility in the location and volume of groundwater production in MZ-1 and MZ-2	⚫						⚫	🔴		🔴				⚫	⚫							3

Appendix C

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Increased Cost of Groundwater Use																						
Seek supplemental financial resources to support the implementation of the OBMP Update	🔴	🔴		●			●	🔴	🔴	●					●	🔴	●		●		15, 16	4
Develop regional partnerships to help reduce costs	●			●			●		🔴						🔴	●	●			●	15, 16	4
Monetize agencies' unused water rights for equitable balance of basin assets			●																		15, 16	4
Decrease Watermaster assessment costs	●				●			●													15, 16	4
Support to develop a justification for increases in water rates and developer fees to invest in needed water infrastructure	🔴	●							●								●				14, 15	
Develop an equitable distribution of costs/benefits of the OBMP	●	●		●		🔴	●	🔴	🔴	●				🔴	●						14	4
Watermaster assessments for implementation of the OBMP should be allocated based on benefits received	●				●																14	4
Continue or enhance incentives to pump groundwater from the Chino Basin			🔴																		1, 2, 12	3, 4
Improve flexibility for parties to execute water rights transfers														🔴								4

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Appendix C

Table 1
Issues, Needs and Wants of the Chino Basin Stakeholders

Key: 🔴 Need ● Want/Unspecified

*The number in this column matches with the identification number of the stakeholder input in Table 2 (first column)

Needs and Wants Categorized by Basin Management Issues	Pool Parties														Others						Addressed by Activities in Table 2*	Alignment with 2000 OBMP Goals
	Appropriative										Agricultural											
	Pomona	Chino	Fontana	CVWD	SAWCO	MVWD	Chino Hills	Upland	JCSD	Ontario	Crops	Dairy	State of CA	Overlying Non-Ag	IEUA	TVMWD	WMWD	Metropolitan	CBWCD	CDA		
Chino Basin Water Quality Degradation																						
Develop a water quality management plan to ensure ability to produce groundwater rights	🔴	●		●			●	●	●	●				🔴	●		●	●			5, 6	2, 3
Develop regional infrastructure to address water quality contamination and treatment				●	●			●													5, 6	2
Plan for and be prepared for new drinking water quality regulations that may result in an increase in groundwater treatment and costs	●	●	🔴	🔴			🔴	●	🔴	●					🔴		●				5, 6	2
Be more proactive and engaged in the process to develop new drinking water quality regulations								●													5, 6	2
Recycled Water Quality Degradation																						
Maintain compliance with recycled water and dilution requirements pursuant to the Chino Basin groundwater recharge permit		●					●		🔴	🔴				🔴	🔴						1, 6, 9	2
Increased Cost of Basin Plan Compliance																						
Develop management strategy to ensure sufficient supplies to blend with recycled water and comply with Salt and Nutrient Management Plan	●	●									🔴				●		●				1, 6, 9	2
Perform the minimum amount of monitoring/reporting that is required for basin management and regulatory compliance	●			●			●	●														3, 4

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Appendix C

Table 1

Issues, Needs and Wants of the Chino Basin Stakeholders

Key: 🔴 Need ● Want/Unspecified

*The number in this column matches with the identification number of the stakeholder input in Table 2 (first column)

Needs and Wants Categorized by Basin Management Issues	Pool Parties														Others						Addressed by Activities in Table 2*	Alignment with 2000 OBMP Goals
	Appropriative										Agricultural			Overlying Non-Ag								
	Pomona	Chino	Fontana	CVWD	SAWCO	MVWD	Chino Hills	Upland	JCSD	Ontario	Crops	Dairy	State of CA		IEUA	TVMWD	WMWD	Metropolitan	CBWCD	CDA		
Reduced Recycled Water Availability and Increased Cost																						
Fully utilize IEUA recycled water resources		🔴		●			●	●		🔴					●						10	1
Maximize the use of recycled water for direct use or recharge	●	🔴		🔴			●	🔴	🔴	🔴					●						10, 11	1
Evaluate the potential for direct potable reuse of recycled water	●								●						●						10, 11	1
Develop alternative management strategies to comply with the recycled water discharge obligations to the Santa Ana River	●	●		●			●	●		●					●		●				10, 11	1, 3
Utilize non-IEUA sources of recycled water that are not being put to beneficial use	🔴	●					●	●	🔴	🔴					●		●				11	1
Other																						
Coordinate timing of agreements, grants, etc. to ensure implementation of the OBMP Update	●							●	🔴	●					●	●	●				17	
Improve communication between the parties	🔴			🔴										🔴	●		●				17	
Educate elected officials and decision makers on the need and urgency to address the water management challenges	●	🔴							🔴						●	●	●				17	
Consider a long-term planning horizon of up to 50 years	●								●	●					●							3

Appendix C

Table 1
Issues, Needs and Wants of the Chino Basin Stakeholders

Key: 🔴 Need ● Want/Unspecified

*The number in this column matches with the identification number of the stakeholder input in Table 2 (first column)

Needs and Wants Categorized by Basin Management Issues	Pool Parties														Others						Addressed by Activities in Table 2*	Alignment with 2000 OBMP Goals
	Appropriative										Agricultural											
	Pomona	Chino	Fontana	CVWD	SAWCO	MVWD	Chino Hills	Upland	JCSD	Ontario	Crops	Dairy	State of CA	Overlying Non-Ag	IEUA	TVMWD	WMWD	Metropolitan	CBWCD	CDA		
Reduced Imported Water Availability and Increased Cost																						
Ensure that there is a reliable local water supply to replace imported water during shut down of imported water delivery infrastructure for maintenance and longer-term emergency outages	🔴	●	●	🔴			●	🔴	●	●					🔴	🔴	🔴	🔴			7, 12, 13	1, 3
Identify and utilize new sources of supplemental water	🔴	●		●			🔴	●	●	●					●	●	●				7, 8, 11, 13	1, 3
Construct inter-basin and intra-basin connections for the benefit of regional water supply and conjunctive use	●	●		🔴			●	●	🔴			🔴			●	🔴	●	🔴			7, 8	1, 3
Understand how imported water reliability from Metropolitan Water District will be affected with and without the California Water Fix	●								🔴						●	●	●				8, 13, 16	1, 3
Develop management strategies that ensure parties will meet future desalter replenishment obligation and have the money to fund it	●	●		🔴			🔴		●								●			🔴	8, 13, 14	3
Increase water-supply reliability at the lowest possible cost	🔴			●			●	●				🔴		🔴	●		●				8, 9, 13, 14	3
Need a better understanding of the water management plans of the Parties to be able to better plan for imported water needs and to assure reliability of Metropolitan Water District water supply	●			●					🔴			🔴			●	●	●	🔴			8, 9, 13	3
Analyze water management scenarios that plan for unexpected challenges and emergencies	●								🔴	●					●	●	●				8, 9, 13	3
Ensure that sufficient supplemental water supplies will be available to meet future replenishment requirements							●		🔴	●		🔴		?	●					🔴	7, 8, 9, 13	1, 3
Despite the best efforts of the Parties to decrease reliance on imported water, the cost of the total water supply continues to increase	●																				7, 8, 9, 15, 16	3
Use more recycled water for replenishment obligation	●			🔴			🔴		🔴								●				10,11	3
Continue to build collaborative programs between the Metropolitan Water District and Chino Basin	🔴						●	●	●						●		●	●			13, 16	3

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Appendix C

Table 2
Stakeholder Input on Goals and Activities for the 2020 OBMP Update

	Stakeholder Input by Basin Management Issue	Alignment with 2000 OBMP Goal(s)*
Reductions in Chino Basin Safe Yield		
1	Design storage and recovery programs that augment safe yield, improve water quality and enhance recharge	1, 2, 3
2	Optimize management of groundwater storage to enhance/protect safe yield	1, 3
3	Increase safe yield [by 10,000 af by 2030]	1
4	Capture and store all permitted water [by 2040]	1, 2
Chino Basin Water Quality Degradation		
5	Develop a water quality management plan [to address current and future water quality issues] to ensure ability to produce high-quality groundwater [by 2022]. (high quality = readily useable)	2
6	Develop strategic compliance solutions that achieve multiple benefits in managing water quality (OBMP Update, Built in)	2, 3
Reduced Imported Water Availability and Cost		
7	Increase wet-water supplies to meet parties' demands without the need of imported water from Metropolitan	1, 3
8	Optimize [efficient] use of all water supplies sources, with ability to move water across basins/amongst stakeholders	1, 3
9	Enhance ability to capture and store water when it is available [enough to satisfy imported water demands for 3 years (100 - 200k af)]	1, 2
Reduced Recycled Water Availability and Increased Cost		
10	Put 100% of IEUA recycled water to beneficial use in the Chino Basin [x% by 2025; x% by 2030]	1
11	Utilize available non-IEUA sources of recycled water for beneficial use in the Chino Basin [8,000 afy by 2025]	1
Inability to Pump Groundwater with Existing Infrastructure		
12	Leverage existing local infrastructure for the benefit of the region	3
13	Ensure sufficient, reliable water supplies (local, regional, imported) to meet future water demands, without MPI	1, 3
Increased Cost of Groundwater Use		
14	Develop an equitable distribution of costs/benefits of the OBMP and include in the OBMP Update agreements	4
15	Develop a plan to obtain supplemental financial resources to support the implementation of the OBMP Update	4
16	Develop regional partnerships to implement the OBMP Update and reduce costs -- (The "O" in OBMP); include in the OBMP update agreement	3, 4
Other		
17	Approve OBMP update with full support from all stakeholders and elected officials by June 2020	

*The 2000 OBMP Goals are:
(1) - Enhance basin water supplies
(2) - Protect and enhance water quality
(3) - Enhance management of the basin
(4) - Equitably finance the OBMP

Appendix C

To: Chino Basin Watermaster Stakeholders
From: Watermaster 2020 OBMP Update Team
Subject: 2020 OBMP Update -- Listening Session #3 Memorandum
Date: May 9, 2019

The objectives of this memorandum are to summarize the information provided by the stakeholders during Listening Session #3 and provide information that will assist the stakeholders in reviewing the work products of Listening Session #3 and preparing for Listening Session #4.

Background

During 1998-2000, the Chino Basin Watermaster (Watermaster) conducted a process to develop the Chino Basin Optimum Basin Management Program (OBMP). The OBMP was developed in a collaborative public process that identified the needs and wants of all stakeholders; described the physical state of the groundwater basin; developed a set of management goals; identified impediments to those goals; described a series of actions that could be taken to remove those impediments and achieve the management goals; developed and executed agreements to implement the OBMP; and certified a programmatic Environmental Impact Report (PEIR) pursuant to CEQA.

By 2019, many of the projects and management programs envisioned in the 2000 OBMP have been implemented, while some have not. The understanding of the hydrology and hydrogeology of the Chino Basin has improved since 2000, and new water-management issues have been identified that necessitate that the OBMP be updated to protect the collective interests of the Chino Basin stakeholders and their water supply reliability. For these reasons, the Watermaster parties are updating the 2000 OBMP (2020 OBMP Update) to set the framework for the next 20 to 30 years of basin-management activities.

The 2020 OBMP Update is being conducted using a collaborative process like that employed for the development of the 2000 OBMP. A description of the development of the 2000 OBMP and the rationale for and process to prepare the 2020 OBMP Update is included in a white paper prepared for the Chino Basin stakeholders: *White Paper – 2020 Update to Chino Basin Optimum Basin Management Program* (OBMP White Paper). The OBMP White Paper, and all documents relevant to the 2020 OBMP Update, are available on the Watermaster's ftp site.[1]

A series of public listening sessions are being held by the Watermaster throughout 2019 to support the 2020 OBMP Update. The purpose of the listening sessions is to obtain information, ideas, and feedback from the Chino Basin stakeholders to define their collective goals, the impediments to achieving the goals, the management actions required to remove the impediments, and an implementation plan for the management actions. Watermaster staff is providing key information prior to and during each listening session to enable the stakeholders to provide their input on each topic discussed. The objective is for the ideas and opinions of every stakeholder to be heard. Participation in the listening sessions is critical to the development of the 2020 OBMP Update.

Watermaster held Listening Session #3 on March 21, 2019. Prior to Listening Session #3, the *Listening Session #2 Memorandum* was distributed which summarized: the feedback received during Listening Session #2, how the feedback will be used for 2020 OBMP Update, and the recommended preparation for Listening Session #3. The PowerPoint presentation given at the meeting is available on the Watermaster's ftp site.[1]

[1] https://cbwm.syncedtool.com/shares/folder/9abb162877b999/?folder_id=670

Summary of Listening Session #3

Listening Session #3 was a three-hour workshop broken down into two main agenda topics:

- Discussion and feedback on the observation that the 2020 OBMP Update goals are the same as the 2000 OBMP goals
- Update and refinement of the types of activities that will be considered for inclusion in the 2020 OBMP Update

2020 OBMP goals

As discussed in the *Listening Session #2 Memorandum*, the stakeholder input provided in Listening Sessions #1 and #2 indicated that the goals defined in the 2000 OBMP are still relevant today. Based on the assessment of stakeholder input, the 2020 OBMP Update Team proposed maintaining the 2000 OBMP goals in the 2020 OBMP Update and drafted a statement of intent for each goal. During Listening Session #3, the 2020 OBMP Update Team gave a presentation to explain how the stakeholder input was used to conclude the goals remain the same and explained that the next step was to obtain feedback on these recommended goals and intents. The goals and intents presented during Listening Session #3 were:

> ***Goal No. 1 - Enhance Basin Water Supplies.*** The intent of this goal is to increase available water supplies for all the stakeholders that rely on the Chino Basin and to improve supply reliability.
>
> This goal applies to Chino Basin groundwater, to other sources of water available to the OBMP stakeholders, and to the optimized use of Chino Basin storage to regulate the variability of the available water supplies and improve supply reliability.
>
> ***Goal No. 2 - Protect and Enhance Water Quality.*** The intent of this goal is to ensure the protection of the long-term beneficial uses of Chino Basin groundwater.
>
> ***Goal No. 3 - Enhance Management of the Basin.*** The intent of this goal is to encourage stable, creative, sustainable and fair water resources management for broad mutual benefit to all stakeholders and avoidance of undesirable results.
>
> ***Goal No. 4 - Equitably Finance the OBMP***. The intent of this goal is to identify and use efficient and equitable methods to fund OBMP implementation.

Following the presentation, the participants at Listening Session #3 participated in a live web-supported survey on the goals and their intents. There was a total of five questions on the survey. For each of the four goals, the participants were presented the following question and multiple-choice answers:

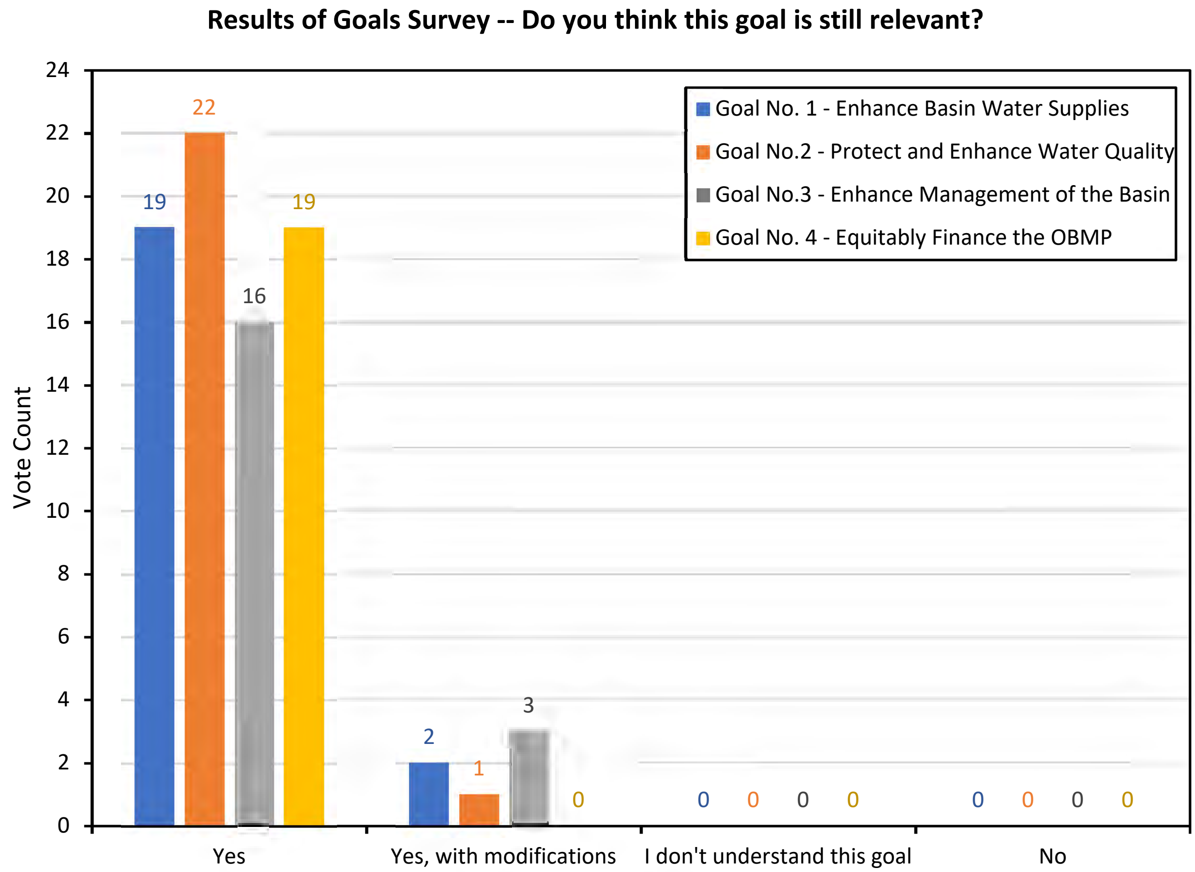
> Do you think this goal is still relevant?
>
> A) Yes B) Yes, with modifications C) No D) I don't understand this activity

The fifth survey question asked:

> Are there more goals that should be added?
>
> A) Yes B) No

Survey Results

The results of the survey for the first four questions are shown in the bar chart below.



As shown in the chart, all survey respondents indicated that the goals are still relevant today, and some respondents thought that Goals No. 1, 2 and 3 were still relevant but should be modified. The latter respondents were asked to explain their suggested modifications, resulting in a group discussion on the goal, the intent statement, and the respondents' concern. A summary of the discussion for each goal is summarized below:

Goal No. 1 - Enhance Basin Water Supplies. The meeting participants that spoke about potential modifications to Goal No. 1 voiced the following suggestions/concerns/questions:

- The goal could be construed as Watermaster attempting to manage water supplies outside Chino Basin groundwater, and therefore acting outside its purview.

Following explanation by two participants as to the consistency of the Watermaster's role in enhancing water supplies in the context of the Judgment and the 2000 OBMP, Watermaster legal counsel explained that Watermaster is responsible for ensuring that (1) the parties are able to meet their demands using Chino Basin groundwater and (2) sufficient water is available for replenishment if these demands result in overproduction; therefore, it is within Watermaster's purview to enhance water supplies outside Chino Basin groundwater. Another participant indicated that the implementation agreement will identify roles and responsibilities for implementing the OBMP activities and that through this agreement it could/will be made clear that Watermaster is not taking on a role that is beyond its purview.

- Should storage be listed as source of supply in the intent goal? It seems management of storage is a function of Goal No. 3.

There was no discussion about this question. Upon reflection and review of the 2000 OBMP, the OBMP Update Team agreed that storage was best highlighted as part of Goal No. 3 for consistency with the 2000 OBMP.

Goal No. 2 - Protect and Enhance Water Quality. The meeting participants who spoke about potential modifications to Goal No. 2 voiced the following suggestions/concerns/questions:

- Should the word "enhance" be added to the intent statement?

During the discussion, participants who spoke indicated that "enhance" was already explicitly used in the goal statement and it did not need to be added to the intent.

Goal No. 3 - Enhance Management of the Basin. The meeting participants who spoke about potential modifications to Goal No. 3 voiced the following suggestions/concerns/questions:

- The descriptors used in the intent statement, such as "fair" and "broad mutual benefit" were unclear and unnecessary.

During the discussion, the participants who spoke suggested: that words with imprecise meaning should not be used; that keeping the goals broader in scope by removing these qualifiers is the best approach; and that the specificity of "benefits" will be addressed in the activities or implementation plans.

Goal No. 4 - Equitably Finance the OBMP. The meeting participants who spoke about potential modifications to Goal No. 4 voiced the following suggestions/concerns/questions:

- Are the terms "efficient" and "equitable" in the intent statement at odds with each other? What is the definition of efficient?

The OBMP Update Team explained that an example of "efficient" method to fund OBMP implementation is partnering with IEUA to obtain grant funding to implement projects, and that this was done successfully in implementing the 2000 OBMP.

Consideration of Additional OBMP Goals. For the survey question regarding addition of new goals for the 2020 OBMP Update, two out of 19 survey respondents voted "Yes." The meeting participants who spoke offered the following input:

- Should we consider integrating the Sustainable Groundwater Management Act (SGMA) regulations with the 2020 OBMP Update goals?

  During the discussion, the participants who spoke suggested that Goal No. 3 is encompassing of the SGMA regulations, but that it may be helpful to include language about "maintaining local control" of the groundwater basin in the intent of Goal No. 3.

- Should there be a goal related to regional collaboration?

  During the discussion, the participants who spoke pointed out that regional collaboration is implied within Goals No. 1 and No. 3, so a separate goal is not needed.

- Participants also provided additional thoughts that should be considered by the stakeholders in the development of the 2020 OBMP Update, but not explicitly written as goals or intents of goals:

- o The OBMP Update activities should ensure Watermaster's engagement on issues related to the Santa Ana River, which is a significant source of supply to the Basin.
- o The participants should strive for collaboration and openness to avoid conflict.

Recommended 2020 OBMP Update goals

Based on the feedback from the goals survey during Listening Session #3, the recommended 2020 OBMP Update goals and intents are:

Goal No. 1 - Enhance Basin Water Supplies. The intent of this goal is to increase the water supplies available for Chino Basin parties and improve water supply reliability. This goal applies to Chino Basin groundwater and all other sources of water available for beneficial use.

Goal No.2 - Protect and Enhance Water Quality. The intent of this goal is to ensure the protection of the long-term beneficial uses of Chino Basin groundwater.

Goal No.3 - Enhance Management of the Basin. The intent of this goal is to encourage sustainable management of the Chino Basin to avoid material physical injury, promote local control, and improve water-supply reliability for the benefit of all Chino Basin parties.

Goal No. 4 - Equitably Finance the OBMP. The intent of this goal is to identify and use efficient and equitable methods to fund OBMP implementation.

2020 OBMP Update activities

During Listening Session #3, the meeting attendees participated in a breakout activity to review and provide feedback on the list of 10 new and revised activities for potential inclusion in the 2020 OBMP Update. The activities are shown in Table 2b, attached. These activities are based on the input provided by breakout groups during Listening Session #2, as documented in the Listening Session #2 memo. The Listening Session #3 participants were divided into six groups and each group was asked to:

1. Review a subset of the 10 activities (A through J) and suggest modifications to better address the needs and wants of the Chino Basin stakeholders, if necessary.
2. Review a subset of the issues, needs and wants (INWs) of the Chino Basin stakeholders to assess which of the ten activities address each need and want, and if any are not addressed by the activities, to suggest additional activities for consideration in the 2020 OBMP Update.

Table 1 shows the participants' assessment of which activities address each INW. Two new activities were defined by one of the breakout groups:

K. Develop a management strategy within the Salt and Nutrient Management Plan to ensure ability to comply with dilution requirements for recycled water recharge.

L. Perform the appropriate amount of monitoring and reporting required for basin management and regulatory compliance.

The 2020 OBMP Update Team compiled the feedback from the breakout session and revised the list of activities for consideration in the 2020 OBMP Update. The revised list of activities was distributed to the Chino Basin stakeholders in the form of a survey to obtain additional feedback. The results of the survey and the complete list of activities is described below.

Follow-up survey on 2020 OBMP activities

The objective of this survey was to obtain feedback on the revised list of activities for consideration in the 2020 OBMP Update. For each activity, the survey asked:

(1) Do you think this activity should be considered for inclusion in the 2020 OBMP Update?

A) Yes B) Yes, with modifications C) No D) I don't understand this activity

(2) If you answered C or D, please explain

Based on the feedback from the survey as of May 3, 2019, six out of six survey respondents answered "A) Yes" for all activities except Activity F: *Develop strategic regulatory-compliance solutions that achieve multiple benefits in managing water quality.*

For Activity F, five out of six survey respondents thought that it should be included in the 2020 OBMP Update, and one participant responded that they did not understand the meaning of "strategic regulatory compliance solution." Based on the input provided by the parties, the 2020 OBMP Update Team's understanding of the scope of Activity F is to develop solutions to comply with evolving and more stringent drinking-water standards. Specifically, that the 2020 OBMP Update should explore regional, collaborative solutions that have the potential to address multiple water-quality and water-supply issues.

Based on the feedback from the survey as of May 3, 2019, the recommended list of activities is:

A. Construct new facilities and improve existing facilities to increase the capacity to store and recharge surface water, particularly in areas of the basin that will promote the long-term balance of recharge and discharge

B. Develop, implement, and optimize storage-and-recovery programs to increase water-supply reliability, protect or enhance Safe Yield, and improve water quality

C. Identify and implement regional conveyance and treatment projects/programs to enable all stakeholders to exercise their pumping rights and minimize land subsidence

D. Maximize the reuse of recycled water produced by IEUA and others

E. Develop and implement a water-quality management plan to address current and future water-quality issues and protect beneficial uses

F. Develop strategic regulatory-compliance solutions that achieve multiple benefits in managing water quality

G. Optimize the use of all sources of water supply by improving the ability to move water across the basin and among stakeholders, prioritizing the use of existing infrastructure

H. Develop an equitable distribution of costs/benefits of the OBMP Update and include in the OBMP update agreements

I. Develop regional partnerships to implement the OBMP Update and reduce costs and include in OBMP Update agreement

J. Continue to identify and pursue low-interest loans and grants or other external funding sources to support the implementation of the OBMP Update. An example of such an effort is the Chino Basin Project

K. Develop a management strategy within the Salt and Nutrient Management Plan to ensure ability to comply with dilution requirements for recycled water recharge

L. Perform the appropriate amount of monitoring and reporting required for basin management and regulatory compliance

Nexus between the 2020 OBMP Update goals, their impediments, and the activities recommended for consideration

Thus far through the Listening Session process, the following has been completed:

- Defined the drivers, trends and implications for Basin management that identify the need for the 2020 OBMP Update (see attached Exhibit 1).
- Defined the needs and wants of the Chino Basin stakeholders, categorized by the Basin management issues derived from the drivers and trends analysis (see attached Table 1).
- Defined the goals of the 2020 OBMP Update, which are the same as the goals of the 2000 OBMP (refer to discussion above in this memo).
- Defined a set of activities for consideration in the 2020 OBMP Update that address the common needs and wants of the Chino Basin stakeholders (refer to discussion above in this memo).

There are physical, institutional, and financial impediments to achieving the goals of the 2020 OBMP. The issues, needs, and wants of the stakeholders shown in Table 1 explicitly recognize these impediments to achieving the goals and the stakeholders have identified the activities that could remove these impediments to achieve the goals.

Based on the feedback obtained from Listening Sessions #1 through #3, the 2020 OBMP Update Team drafted an exhibit to show the nexus of all this information. Table 3 lists the goals, the impediments to achieving these goals, the activities to remove the impediments, and the expected outcome or the implications of implementing those activities. Table 3 also shows the nexus of each activity to the Basin management issues defined in Exhibit 1. The statements of impediments and expected outcomes of the activities were developed by the 2020 OBMP Update Team and are based on the feedback obtained from stakeholders over the last three listening sessions.

Next Steps

The next step in the process to develop the 2020 OBMP Update is to (1) define the action plans required to perform the activities and (2) prepare reconnaissance-level engineering cost estimates of the action plans. This information will be documented in a technical memorandum (OBMP Update Technical Memorandum #1 [OBMP TM1]). OBMP TM1 will be circulated for review and subsequently refined and formulated into a recommended implementation plan (OBMP TM2) over a series of listening sessions with the stakeholders. The draft outline of OBMP TM1 and TM2 is attached herein.

Recommended Preparation for Listening Session #4

1. Review Table 3 and be prepared to provide feedback, specifically to suggest any changes or additions to the articulation of the impediments and expected outcomes of the 2020 OBMP Update activities. There will be a breakout session during Listening Session #4 to document all the feedback. The intent is to ensure that the feedback from the stakeholders over the last three Listening Sessions has been captured and is complete enough to prepare OBMP TM1.

2. Review the draft outline of OBMP TM1/TM2. The 2020 OBMP Update Team will provide an overview of the outline at Listening Session #4 and will provide an example of how the activities will be characterized in OBMP TM1.

Appendix C

Table 1

Issues, Needs and Wants of the Chino Basin Stakeholders

Key: 🔴 Need ⚫ Want/Unspecified

*The letter in this column corresponds with the letter ID of the Activities listed in Table 3

Needs and Wants Categorized by Basin Management Issues	Pool Parties														Others						Addressed by Activities in Table 3*	Alignment with 2000 OBMP Goals
	Appropriative										Agricultural											
	Pomona	Chino	Fontana	CVWD	SAWCO	MVWD	Chino Hills	Upland	JCSD	Ontario	Crops	Dairy	State of CA	Overlying Non-Ag	IEUA	TVMWD	WMWD	Metropolitan	CBWCD	CDA		
Reductions in Chino Basin Safe Yield																						
Develop a storage management plan to optimize the use of unused storage space in the basin, avoid undesirable results, and encourage storage and recovery programs	🔴	🔴		🔴	🔴			🔴	🔴	🔴	🔴		⚫		🔴		🔴				B, C	1, 2, 3
Design storage management and storage & recovery programs that maintain or enhance safe yield	🔴	⚫						🔴	🔴	⚫			🔴		⚫		⚫			⚫	B, C	1, 3
Maintain or enhance the safe yield of the basin without causing undesirable results	🔴	⚫		🔴	🔴			🔴	🔴	🔴	⚫				⚫		⚫			🔴	B, D	1, 3
Manage the basin safe yield for the long-term viability and reliability of groundwater supply	🔴	⚫						🔴	🔴	🔴	🔴			🔴			⚫	⚫		🔴	A, B, C	1, 3
Reassess the frequency of the safe yield recalculation	⚫				⚫												⚫				I	3
Continue to model and track safe yield, but utilize other management strategies to address a decline.																	⚫				B	1, 3
Develop recharge programs that maintain or enhance safe yield	🔴	⚫					⚫	⚫	🔴	⚫					⚫		⚫			⚫	A, B	1, 3
Develop more facilities to capture, store, and recharge water	⚫	🔴					🔴			⚫	⚫				⚫		⚫				A, B, D	1, 2
Enhance recharge in northeast MZ-3	⚫		⚫						🔴								⚫				A, C	1, 3
Maximize use of existing recharge facilities	⚫	⚫						⚫	🔴	⚫											A, C, F, G	3
Establish incentives to encourage recharge of high-quality imported water	⚫		⚫																		H, I	2, 3
Develop an OBMP Update that is consistent with the Physical Solution and allows access to the basin for users to meet their requirements	🔴	⚫				🔴		🔴													C, E	3
Engage with regional water management planning efforts in the Upper Santa Ana River Watershed that have the potential to impact Chino Basin operations or safe yield	⚫														🔴		⚫			🔴	I, D	3

Appendix C

Table 1
Issues, Needs and Wants of the Chino Basin Stakeholders

Key: 🔴 Need ● Want/Unspecified

*The letter in this column corresponds with the letter ID of the Activities listed in Table 3

Needs and Wants Categorized by Basin Management Issues	Pool Parties														Others						Addressed by Activities in Table 3*	Alignment with 2000 OBMP Goals
	Appropriative										Agricultural											
	Pomona	Chino	Fontana	CVWD	SAWCO	MVWD	Chino Hills	Upland	JCSD	Ontario	Crops	Dairy	State of CA	Overlying Non-Ag	IEUA	TVMWD	WMWD	Metropolitan	CBWCD	CDA		
Inability to Pump Groundwater with Existing Infrastructure																						
Pursue collaborative, regional partnerships to implement regional solutions to water management challenges	●			●	●			●							🔴	●	●	●	🔴	🔴	B, E, F, G, I	3
Ensure that sufficient, reliable water supplies will be available to meet current and future water demands	🔴	🔴	🔴	🔴			●	🔴	●	●	●				🔴	●	●	🔴	●		A, B, D, G	1, 3
Develop conjunctive use agreements that provide certainty in the ability to perform during put and take years by clearly defining facilities/infrastructure and operating plans, and that leverage the lessons learned from obstacles encountered during the implementation of the current Dry Year Yield program	●						●	●	●						●		●	●			B, G, I	1, 2, 3
Develop management strategies that enable the parties to produce or leverage their respective water rights that may be impacted by physical basin challenges like land subsidence or water quality	🔴						●	🔴							●		●				A, C, D, E, F, G, I	3
Design storage management and storage & recovery programs to raise funding to build infrastructure	●			●											●		●				B, D, I, J	3, 4
Develop process to support/facilitate project implementation	●																				F, H, J	4
Design subsidence management plans to allow flexibility in the location and volume of groundwater production in MZ-1 and MZ-2	●						●	🔴		🔴				●	●						A, C, G	3

Appendix C

Table 1
Issues, Needs and Wants of the Chino Basin Stakeholders

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Needs and Wants Categorized by Basin Management Issues	Pool Parties														Others						Addressed by Activities in Table 3*	Alignment with 2000 OBMP Goals
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Increased Cost of Groundwater Use																						
Seek supplemental financial resources to support the implementation of the OBMP Update	🔴	🔴		●			●	🔴	🔴	●					●	🔴	●		●		D, F, G, I, J	4
Develop regional partnerships to help reduce costs	●			●			●	●	🔴						🔴	●	●			●	F, G, I, J	4
Monetize agencies' unused water rights for equitable balance of basin assets			●																		G, H	4
Decrease Watermaster assessment costs	●				●			●													I, J	4
Support to develop a justification for increases in water rates and developer fees to invest in needed water infrastructure	🔴	●							●								●				F, G, H	
Develop an equitable distribution of costs/benefits of the OBMP	●	●		●		🔴	●	🔴	🔴	●				🔴	●						H, J	4
Watermaster assessments for implementation of the OBMP should be allocated based on benefits received	●				●																H	4
Continue or enhance incentives to pump groundwater from the Chino Basin			🔴																		G, I	3, 4
Improve flexibility for parties to execute water rights transfers														🔴							G, I	4

Appendix C

Table 1

Issues, Needs and Wants of the Chino Basin Stakeholders

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Chino Basin Water Quality Degradation																						
Develop a water quality management plan to ensure ability to produce groundwater rights	🔴	●		●			●	●	●	●				🔴	●		●	●			E, F, G, J	2, 3
Develop regional infrastructure to address water quality contamination and treatment				●	●			●													A, B, C, E, F, G, I, J	2
Plan for and be prepared for new drinking water quality regulations that may result in an increase in groundwater treatment and costs	●	●	🔴	🔴			🔴	●	🔴	●					🔴		●				E, F	2
Be more proactive and engaged in the process to develop new drinking water quality regulations								●													A, B, D, E, G, J	2
Recycled Water Quality Degradation																						
Maintain compliance with recycled water and dilution requirements pursuant to the Chino Basin groundwater recharge permit		●					●	●	🔴	🔴				🔴	🔴						A, B, D, E, G, J	2
Increased Cost of Basin Plan Compliance																						
Develop management strategy to ensure sufficient supplies to blend with recycled water and comply with Salt and Nutrient Management Plan	●	●									🔴				●		●				G, K	2
Perform the minimum amount of monitoring/reporting that is required for basin management and regulatory compliance	●			●			●	●													L	3, 4

Appendix C

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Reduced Recycled Water Availability and Increased Cost																						
Fully utilize IEUA recycled water resources		🔴		●			●	●		🔴					●						A, D, E, F, G	1
Maximize the use of recycled water for direct use or recharge	●	🔴		🔴			●	🔴	🔴	🔴					●						A, D, E, F, G	1
Evaluate the potential for direct potable reuse of recycled water	●								●						●						D, E, F	1
Develop alternative management strategies to comply with the recycled water discharge obligations to the Santa Ana River	●	●		●			●	●		●					●		●				D, E, F	1, 3
Utilize non-IEUA sources of recycled water that are not being put to beneficial use	🔴	●					●	●	🔴	🔴					●		●				D, E, F	1
Other																						
Coordinate timing of agreements, grants, etc. to ensure implementation of the OBMP Update	●							●	🔴	●					●	●	●				F, G, H, I, J	
Improve communication between the parties	🔴			🔴				●						🔴	●		●				F, H, I	
Educate elected officials and decision makers on the need and urgency to address the water management challenges	●	🔴							🔴						●	●	●				F, G, H, I, J	
Consider a long-term planning horizon of up to 50 years	●								●	●					●						F, G, H, I, J	3

Appendix C

Table 1

Issues, Needs and Wants of the Chino Basin Stakeholders

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Reduced Imported Water Availability and Increased Cost																						
Ensure that there is a reliable local water supply to replace imported water during shut down of imported water delivery infrastructure for maintenance and longer-term emergency outages	🔴	●	●	🔴			●	🔴	●	●					🔴	🔴	🔴	🔴			B, C, G	1, 3
Identify and utilize new sources of supplemental water	🔴	●		●			🔴	●	●	●					●	●	●				A, B	1, 3
Construct inter-basin and intra-basin connections for the benefit of regional water supply and conjunctive use	●	●		🔴			●	●	🔴			🔴			●	🔴	●	🔴			C, G	1, 3
Understand how imported water reliability from Metropolitan Water District will be affected with and without the California Water Fix	●							●	🔴						●	●	●				-	1, 3
Develop management strategies that ensure parties will meet future desalter replenishment obligation and have the money to fund it	●	●		🔴			🔴		●								●			🔴	H, I, J	3
Increase water-supply reliability at the lowest possible cost	🔴			●			●	●				🔴		🔴	●		●				A, B, D, J	3
Need a better understanding of the water management plans of the Parties to be able to better plan for imported water needs and to assure reliability of Metropolitan Water District water supply	●			●					🔴			🔴			●	●	●	🔴			A	3
Analyze water management scenarios that plan for unexpected challenges and emergencies	●							●	🔴	●					●	●	●				E, G	3
Ensure that sufficient supplemental water supplies will be available to meet future replenishment requirements							●		🔴	●		🔴		?	●					🔴	A	1, 3
Despite the best efforts of the Parties to decrease reliance on imported water, the cost of the total water supply continues to increase	●																				-	3
Use more recycled water for replenishment obligation	●			🔴			🔴		🔴								●				A, D, E, F	3
Continue to build collaborative programs between the Metropolitan Water District and Chino Basin	🔴						●	●	●						●		●	●			B, I	3

Appendix C

Table 2b
Draft Activities for Consideration in the 2020 OBMP Update,
Derived from the Activities Defined by Stakeholders in Listening Session #2**

ID	Activity
A	Construct new recharge facilities to increase the capacity for stormwater and recycled water recharge and provide recharge capacity in areas of the basin necessary to ensure long-term balance of recharge and discharge.
B	Develop and implement storage-and-recovery programs to increase water supply reliability, increase Safe Yield, and improve water quality.
C	Develop and implement regional conveyance and treatment programs to enable all stakeholders to exercise their pumping rights and minimize land subsidence.
D	Maximize the reuse of recycled water produced by IEUA and others.
E	Develop a water-quality management plan to address current and future water-quality issues and ensure the protection of beneficial uses, now and into the future.
F	Develop strategic regulatory-compliance solutions that achieve multiple benefits in managing water quality.
G	Optimize the use of all sources of water supply by developing the ability to move water across the basin and between stakeholders.
H	Develop an equitable distribution of costs/benefits of the OBMP Update and include in the OBMP update agreements.
I	Develop regional partnerships to implement the OBMP Update and reduce costs and include in OBMP Update agreement.
J	Continue to identify and pursue low-interest loans and grants to support the implementation of the OBMP Update. An example of such an effort is the Chino Basin Project.

***Note: See Table 2 of Listening Session #2 Memo*

Appendix C

Table 3
OBMP Update Goals, Impediments to the Goals, Activities to Remove the Impediments, Expected Outcomes of Activities, and Nexus to Addressing the Issues Needs and Wants of the Stakeholders

	Impediments		Activities to Remove Impediments	Potential Outcomes of Activities	Issues, Needs and Wants, as Categorized by Basin Management Issues, that are Addressed by Activities							
					Reductions in Chino Basin Safe Yield	Inability to Pump Groundwater with Existing Infrastructure	Increased Cost of Groundwater Use	Chino Basin Water Quality Degradation	Recycled Water Quality Degradation	Increased Cost of Basin Plan Compliance	Reduced Recycled Water Availability and Increased Cost	Reduced Imported Water Availability and Increased Cost
Goal 1 - Enhance Basin Water Supplies												
1a	• Not all of the stormwater runoff available to the Chino Basin is diverted and recharged. Failure to divert and recharge stormwater is a permanently lost opportunity. • The existing methodology to select recharge projects for implementation is based on the cost of imported water. There are currently no known projects with a unit cost lower than the cost of imported water, hindering expansion of stormwater capture and recharge • Pumping capacity in some areas of the basin is limited due to low groundwater levels and land subsidence.	A	Construct new facilities and improve existing facilities to increase the capacity to store and recharge surface water, particularly in areas of the basin that will promote the long-term balance of recharge and discharge	• Increases recharge of high-quality stormwater that will: • protect/enhance the Safe Yield, • improve water quality, • reduce dependence on imported water, • increase pumping capacity in areas of low groundwater levels and areas of subsidence concern, and • provide new supply of blending water to support the recycled-water recharge program. • Provides additional supplemental-water recharge capacity for replenishment and implementation of storage and recovery programs. • Provides additional surface water storage capacity.	✓	✓	✓	✓	✓	✓		✓
1b	• There is a surplus of recycled water available to the Chino Basin parties that is not being put to beneficial use, which is a loss of a low-cost, local water supply. • Existing infrastructure limits the reuse and recharge of recycled water in the Chino Basin. • Existing requirements to discharge recycled water to the Santa Ana River limit the amount of water available for reuse and recharge	D	Maximize the reuse of recycled water produced by IEUA and others	• Results in a new, consistent volume of in-lieu and/or wet water recharge that will: • protect/enhance the Safe Yield, • reduce dependence on imported water, • improve water-supply reliability, especially during dry periods, and • increase pumping capacity in areas of low groundwater levels and areas of subsidence concern.	✓	✓					✓	✓

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OBMP Update Goals, Impediments to the Goals, Activities to Remove the Impediments, Expected Outcomes of Activities, and Nexus to Addressing the Issues Needs and Wants of the Stakeholders

	Impediments		Activities to Remove Impediments	Potential Outcomes of Activities	Issues, Needs and Wants, as Categorized by Basin Management Issues, that are Addressed by Activities: Reductions in Chino Basin Safe Yield	Inability to Pump Groundwater with Existing Infrastructure	Increased Cost of Groundwater Use	Chino Basin Water Quality Degradation	Recycled Water Quality Degradation	Increased Cost of Basin Plan Compliance	Reduced Recycled Water Availability and Increased Cost	Reduced Imported Water Availability and Increased Cost
Goal 2 - Protect and Enhance Water Quality												
2a	• Areas of the basin are contaminated with VOCs and constituents of emerging constituents (CECs). • Water-quality regulations are evolving and becoming more restrictive, which limits the beneficial uses of groundwater. • Groundwater treatment may be necessary to meet beneficial uses, but can be expensive to build and operate. • The basin is hydrologically closed, which causes accumulation and concentration of salts, nutrients, and other contaminants. • Some stored water in the Chino Basin cannot be used due to water quality and insufficient treatment capacity	E F	Develop and implement a water-quality management plan to address current and future water-quality issues and protect beneficial uses Develop strategic regulatory-compliance solutions that achieve multiple benefits in managing water quality	• Proactively addresses new and near-future regulations. • Enables the parties to make informed decisions on infrastructure improvements for water-quality management. • Removes groundwater contaminants from the Chino Basin and thereby improves groundwater quality. • Enables the parties to produce or leverage their water rights that may be constrained by water quality. • Ensures that groundwater is pumped and thereby protects/enhances the Safe Yield.	✓	✓	✓	✓				✓
2b	• Water-quality regulations are evolving and generally becoming more stringent, which could limit the reuse and recharge of recycled water.	K	Develop management strategy within the Salt and Nutrient Management Plan to ensure ability to comply with dilution requirements for recycled water recharge	• Enables the continued and expanded recharge of recycled water, which will: • protect water quality, • improve water-supply reliability, especially during dry periods, and • protect/enhance the Safe Yield.	✓			✓	✓	✓		✓

Appendix C

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Goal 3 - Enhance Management of the Basin												
3a	• Existing infrastructure (pumping and treatment capacity and conveyance) is insufficient to conduct puts and takes under proposed storage programs. • There is unused storage space in the Basin the use of which is constrained by the storage limits defined in existing CEQA documentation. • Watermaster's current storage management plan is not optimized to protect/enhance basin yield, improve water quality, avoid new land subsidence, ensure balance of recharge and discharge, maintain hydraulic control, etc.	B	Develop, implement, and optimize storage-and-recovery programs to increase water-supply reliability, protect or enhance Safe Yield, and improve water quality.	• Storage programs that protect/enhance basin yield, improve water quality, avoid new land subsidence, ensure balance of recharge and discharge, maintain hydraulic control, etc. • Leverages unused storage space in the Basin. • Reduces reliance on imported water, especially during dry periods. • Potentially provides outside funding sources to implement the OBMP Update. • Improves water quality through the recharge of high quality water.	✓	✓	✓	✓				✓

Appendix C

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Impediments	Activities to Remove Impediments	Potential Outcomes of Activities	Issues, Needs and Wants, as Categorized by Basin Management Issues, that are Addressed by Activities							
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3b • Land subsidence in northwest MZ1 may limit the ability for parties to pump their respective rights in this area. • Poor water quality and increasingly restricting water quality regulations limits the ability for some parties to pump their respective rights.	C Identify and implement regional conveyance and treatment projects/programs to enable all stakeholders to exercise their pumping rights and minimize land subsidence. G Optimize the use of all sources of water supply by improving the ability to move water across the basin and amongst stakeholders, prioritizing the use of existing infrastructure.	• Enables producers in MZ1 to obtain water through regional conveyance, which supports management of groundwater levels to reduce the potential for subsidence and ground fissuring. • Enables the parties to increase production in areas currently constrained by poor water quality. • Removes groundwater contaminants from the Chino Basin and thereby improves water quality. • Protects/enhances the Safe Yield. • Maximizes the use of existing infrastructure, which will minimize costs. • Provides infrastructure that can also be used to implement storage and recovery programs.	✓	✓	✓	✓				✓
3d • Watermaster needs information to comply with regulations and its obligations under its agreements and Court orders, yet financial resources to collect this information are limited.	L Perform the appropriate amount of monitoring and reporting required for basin management and regulatory compliance	• Ensures full compliance with regulatory requirements. • Ensures full support of basin management initiatives. • Enables parties to monitor the performance of the OBMP Update.	✓	✓	✓	✓	✓	✓	✓	✓

Appendix C

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Goal 4 - Equitably Finance the OBMP											
4a	• The distribution of benefits associated with the OBMP Update is not defined. • Funding needed for the OBMP implementation activities of the Watermaster is not projected beyond the current year budget, which limits parties ability to plan required funding for the future. • There is currently no formal process to evaluate and adapt the OBMP implementation plan, schedule and cost.	H Develop an equitable distribution of costs/benefits of the OBMP Update and include in the OBMP update agreements.	• Provides transparency as to the benefits of the OBMP Update activities. • Provides information needed to plan financial resources. • Improves the likelihood that the OBMP will be implemented.			✓					
4b	• Limited financial resources constraint the implementation of the OBMP.	I Develop regional partnerships to implement the OBMP Update and reduce costs and include in OBMP Update agreement	• Lowers the cost of OBMP implementation. • Improves the likelihood that the OBMP will be implemented.			✓					
		J Continue to identify and pursue low-interest loans and grants or other external funding sources to support the implementation of the OBMP Update. An example of such an effort is the Chino Basin Project.				✓					

Appendix B

Response to Comments

Scoping Report Comments[1]

City of Chino – Comments on Scoping Report Part 1 Provided by Dave Crosley

1. ***Page 12, last paragraph, 1st sentence ends with a reference to footnote "3" which seems misplaced.***

   The reference to footnote 3 has been removed.

2. ***Page 31, Activity D. The described scope pertaining to Activity D could be reshaped to reflect a reduced level of effort by Watermaster.***

   The objectives of Activity D are to maximize recycled water reuse. As described in the Scoping Report, the IEUA would be the appropriate entity to lead the implementation of Activity D on behalf of all parties in the IEUA, TVMWD, and WMWD service areas. The draft report suggested that part of Watermaster's role would be to convene and lead a committee that could guide the process, however such a role is not required to implement the activity. Watermaster's role could be to team with the IEUA or other coordinating agency in the implementation of Activity D to ensuring its implementation is consistent with the Judgment, the Peace Agreements and other agreements, the maximum benefit SNMP, and the Watermaster Rules and Regulations. Specifically, Watermaster should ensure that the process to maximize recycled water is integrated with the goals of the OBMP and that the process includes projects to maximize the use of recycled water for replenishment purposes (Judgment ¶ 49(a)). Accordingly, the text has been modified to reflect this revised role. Note that this is consistent with the 2000 OBMP Implementation Plan for Program Element 5 - *Develop and Implement Regional Supplemental Water Program* in the 2000 OBMP, for which IEUA was the agency responsible for implementation of expanded recycled water reuse. The revised text can be found on page 36 of the final report.

3. ***Page 25, last paragraph, 3rd sentence states "[T]he recent decline in the direct use of recycled water is a result of reduced water use due to drought and state-mandated water conservation programs that required significant reductions in water use." What data supports this statement? The last sentence of the preceding paragraph describes conservation-related causation of reduced recycled water availability, but just because there is a reduced supply it does not necessarily follow that conservation caused less recycled water demand. We suggest clarification.***

   The text has been updated per discussions with the IEUA. Per the IEUA, the recent decline is due to the mindful reduction in use by the City of Chino to accommodate changes in IEUA policy related to the use of recycled water base entitlements and conversions of land from agricultural to urban uses. The new text appears on page 31, fourth full paragraph, third sentence.

4. ***Page 26, 2nd paragraph, 1st sentence states "…the IEUA is maximizing the reuse of recycled water given the constraint of meeting its obligations to discharge a minimum of 17,000 AFY to***

[1] Comments and questions about the OBMP process were addressed in a separate document that is available on Watermaster's website at: http://www.cbwm.org/docs/OBMP%20Update/20191017%20Watermaster%20Responses%20to%20comments%20on%20Process.pdf.

comply with the Santa Ana River Judgment and associated agreements with WMWD." This statement is misleading, as the IEUA discharge of recycled water to the river has generally exceeded the minimum 17,000 AFY flow requirement instead of directing excess supplies of recycled water to satisfy significant potential direct reuse demands throughout the IEUA service area. The 4th paragraph appearing on page 27 describes some of the circumstances that contribute to the challenge of maximizing reuse.

The text of this paragraph has been updated to more clearly articulate the challenge that the availability of recycled water poses for IEUA in meeting its obligations of the Santa Ana River Judgment, specifically that the increasing demand for recycled water for reuse will constrain the IEUA's ability to continue to use recycled water to meet its discharge obligations. The revised text is on page 34, first full paragraph of the final Scoping Report.

5. ***Page 28, 3rd full paragraph under the subheading Santa Ana River Judgment states "… discharge requirements of the Judgment preclude the IEUA from reusing 100 percent of its recycled water supply." This is an oversimplified and misleading characterization of the Judgment requirement. The subject Judgment (OC Judgment) describes an obligation of entities located upstream of Prado to provide for a minimum flow of water to downstream of Prado. IEUA and WMWD, as upstream entities, have a joint obligation. IEUA has utilized unclaimed recycled water produced via the treatment of wastewater generated within the service areas of its members in order to satisfy its share of the joint IEUA/WMWD obligation. However, the minimum flow need not necessarily be supplied from recycled water generated from wastewater treatment, and the agencies within whose jurisdictions the wastewater is generated possess a contractual entitlement to the recycled water. If those agencies claim their entitlement then IEUA, as a regional (Chino Basin) water supply agency (not a wastewater treatment service provider), still has a joint (along with WMWD) obligation to provide a minimum flow downstream of Prado. The OC Judgment does not preclude the recycled water entitlement holders from using 100 percent of the recycled water.***

The text of this paragraph has been updated to eliminate the statement that "… discharge requirements of the Judgment preclude the IEUA from reusing 100 percent of its recycled water supply." It was also modified to more clearly articulate the challenge that the availability of recycled water poses for IEUA in meetings its obligations of the Santa Ana River Judgment. The revised text is on page 34, first full paragraph of the final Scoping Report.

6. ***Page 30, Task 7 paragraph, 2nd sentence which states "ensure that Watermaster is maximizing the reuse of recycled water…" should probably be refined to indicate that Watermaster is enabling/accommodating/facilitating the reuse of recycled water.***

The text has been updated to reflect a reduction of Watermaster's role, as discussed in the response to comment number 2 above.

City of Ontario – Comments Provided by Katie Gienger

7. ***Activity B – Storage and Recovery Programs. The tasks of this activity are a duplication of efforts already underway by the Chino Basin Water Bank (CBWB). It is unclear what Watermaster will do above and beyond the activities already performed by the CBWB. The focus of this activity in***

the OBMP should be Watermaster's role in administering the Judgment, such as evaluating proposed Storage & Recovery programs for MPI.

The purpose of the Scoping Report is to provide the parties with an understanding of the work that would need to be performed to accomplish the desired outcomes of each of the 2020 OBMP Update activities. To the extent that the scopes of work described herein are already being partly or completely performed by Watermaster or others, the Scoping Report acknowledges such. The next steps in the process to prepare the 2020 OBMP Update will focus on the review and revision of the activities scoped herein and the integration of the ongoing activities with the existing OBMP. The recommended 2020 OBMP Implementation Plan, inclusive of ongoing and new activities will be documented in a subsequent report, *2020 Optimum Basin Management Program Update Report*, and will form the foundation for the parties to develop a final implementation plan and agreements to implement the OBMP Update. This purpose has been clarified in the report introduction on page 6, last paragraph.

Activity B is designed to obtain agreement on the specific objectives and desired benefits for Storage and Recovery (S&R) Programs, to identify "optimized" S&R programs that achieve the benefits while causing no material physical injury, and to help guide the development of future applications for S&R Programs. These outcomes are required for Watermaster to implement the Physical Solution of the Judgment and will support Watermaster approval of S&R applications. As such, Activity B is deemed necessary by Watermaster.

The second paragraph of the introduction to the Activity B scope of work (Page 27) acknowledges that prior work has been performed to describe and/or evaluate S&R programs for the Storage Framework Investigation, the Chino Basin Water Bank, and the Chino Basin Program. At such time that Activity B will be performed, the scope of work to will be updated to leverage this work.

8. ***Activity D – Maximize Reuse of Recycled Water. The tasks of this activity are a duplication of the IEUA recycled water efforts as described in our first general comment. It is unclear what Watermaster will do above and beyond the activities already performed by IEUA. For this reason, we recommend the parties discuss the best approach in scoping this activity to avoid a duplication of effort.***

   As to the first part of our comment on duplication, the introduction of Activity D scope of work acknowledges that the IEUA is performing a significant amount of work to evaluate opportunities to acquire surplus recycled water supplies for recharge as part of the CBP, and recommends that this work be leveraged to simplify the scope of Activity D. The description of IEUA's work has been expanded to reflect its various other efforts to analyze recycled water supply and demands.

   In the Scoping Report, the scope of work and costs to implement each OBMP Update activity were designed to achieve the desired outcomes defined by the stakeholders assuming that the activities could be implemented independently and that the planning efforts of others are not leveraged. The purpose of this assumption in the Scoping Report is to describe in detail the precise work required to achieve the outcomes. Additionally, the scopes of work and costs described in the Scoping Work leverage existing work being performed by Watermaster, but not by others. These assumptions are described on pages 14 and 15 of the Scoping Report under "Assumptions Applied in Defining the Scope of Work, Schedule, and Cost of the OBMP activities." There will be opportunities to leverage work done by other agencies to avoid duplication of effort and to reduce the costs.

As to the second part of your comment on Watermaster's role, please see the response to Comment 2 above. Additionally, it is important to note that not all aspects of the OBMP require direct involvement by the Watermaster. For example, in the 2000 OBMP Implementation Plan, there are several implementation actions in Program Elements 3 and 5 that were the responsibility of the Chino Desalter Authority or the IEUA.

9. ***Activity D – Maximize Reuse of Recycled Water, Page 28 – Santa Ana River Judgment – The TM states "The discharge requirements of the Judgment preclude the IEUA from reusing 100 percent of its recycled water supply." This statement is not accurate and should be revised to reflect that the SAR obligation is not required to be met with recycled water. The Santa Ana River Judgment states on page 9 "(1) At Prado. Base Flow shall: (i) include any water caused to be delivered by CBMWD or WMWD directly to OCWD, pursuant to its direction and control and not measured at the gages at Prado;" The Judgment anticipated using recycled water, but also allows for supplemental water to meet the SAR obligation, which was undertaken by Chino Basin Municipal Water District (now IEUA) on behalf of the Chino Basin producers***

   Please refer to the responses to Comments 4 and 5 above.

10. ***Activity EF – Each water purveyor tracks and monitors current and emerging constituents on its own behalf, including engaging in formal and informal discussions with other water purveyors facing similar challenges. Watermaster has historically provided an arena for data sharing and compilation as well as ideas on best practices which has been a valuable resource. Agencies are already required to perform the necessary monitoring for compliance of water systems permits; therefore a Groundwater Quality Management Plan (and the proposed monitoring program) may be a redundant effort. It is not clear what regulatory compliance Watermaster is subject to aside from its involvement in the Salt & Nutrient Management Plan related to hydraulic control.***

    The Judgment provides Watermaster the discretion to develop an OBMP, including both water quantity and water quality considerations. A groundwater quality management plan like the one scoped in the Scoping Report provides the parties with the comprehensive data and information, including best practices for monitoring, that are needed to understand and manage the future water quality challenges that could impact the parties' ability to fully utilize their pumping rights.

    Currently, water purveyors are not required by the State to perform monitoring of contaminants with State notification levels or other emerging contaminants of concern; the monitoring of these contaminants is voluntary until there is an established drinking water regulation or a mandated monitoring order. In the past monitoring of emerging contaminants in the Chino Basin was not prevalent, and often did not use the laboratory method detection limits low enough to understand the occurrence in relation to State notification levels, and the occurrence was not characterized well enough to prepare for compliance with potential drinking water regulations. As described in the Scoping Report, a recent example of this is 1,2,3-trichloropropane, which became regulated in late 2017. A groundwater quality management plan and associated monitoring program would not be a redundant effort as it will include strategies to investigate and analyze emerging contaminates in the Basin in a comprehensive and consistent way and that would leverage all existing groundwater monitoring performed by Watermaster and others. A groundwater quality management plan will ensure there is consistent and adequate monitoring of emerging contaminants as they are being identified to plan for potential water quality regulations, and if needed identify the most efficient means to address regional water-quality challenges.

As to concerns of duplication, please also refer to responses to Comments 7 and 8 above.

Inland Empire Utilities Agency – Comments on Scoping Report Part 1 Provided by Sylvie Lee and Joshua Aguilar

11. ***Page 1, regarding the title of Activity D, suggested edit to add direct use in the title, or does it not take into account direct use of recycled water?***

    The maximization of recycled water reuse in Activity D is meant to encompass all forms of recycled water reuse including: direct non-potable reuse (landscape irrigation or industrial uses), groundwater recharge or injection (indirect potable reuse), and direct potable reuse. See page 30 for description of Activity D's objective.

12. ***Page 2, regarding the title of Activity HIJ, should it reference subsequent implementation plan instead of the OBMP Update?***

    The term OBMP Update is not exclusive of the implementation plan or the agreements to implement it.

13. ***Page 14, in the summary of Activity A, third bullet. Can we say something to the effect of minimizing losses or is that covered under pumping sustainability?***

    The text of the bullet was expanded to include reference to the need to maintain hydraulic control. The revised text is on page 20, third bullet of the final Scoping Report.

14. ***Page 19, fourth bullet. External funding should be listed [as something that the Storage and Recovery Program Master Plan will enable the parties to do] as this has been very successful for the region in reducing the cost of successful programs (GWR, Desalter, RW, etc.).***

    Concur. As, described under the "Summary" section for Activity B, the Storage and Recovery Master Plan can provide support in the application for external funding (grants and low-interest loans). The term "external funding" has been added to the list of things that can offset Watermaster assessments and reduce OBMP assessments. The revised text is on page 24, first bullet of the final Scoping Report.

15. ***Page 21, first paragraph. Is this [Storage and Recovery Program Master Plan] a new one that needs to be created or is it the Storage Management Plan? What is the purpose and shelf life in addition to the SMP?***

    The 2020 Storage Management Plan is a set of rules by which to manage all storage in the Chino Basin, including the parties' local storage accounts and S&R Programs—it does not define how S&R programs should be designed to achieve the benefits desired by the parties. Activity B is designed to obtain agreement on the specific objectives and desired benefits for S&R Programs, to identify "optimized" S&R programs that achieve the benefits, to help guide the development of future applications for S&R Programs, and to help apply for grants and low-interest loans to implement S&R Programs. This work will be documented as the Storage and Recovery Master Plan, which may need to be updated to be consistent with periodic updates to the Storage Management Plan.

16. ***Page 21, first paragraph. Is that our goal, "to reference a common set of objectives for storage and recovery programs and align the objectives with requirements in grant applications and other funding opportunities"? Seems like "Master Plan" should be broader than individual S&R requirements.***

    Please refer to the response to Comment 15.

17. ***Page 38, under "Scope of Work for Activity EF." Are there recommendations for the "centralized" treatment options as suggested in the "needs"?***

    As described in the "Scope of Work for Activity EF" section, Task 5 of the scope of work for Activity EF is to identify groundwater quality treatment projects using existing and new facilities, to screen them using agreed upon criteria developed in Task 4, and to select a final list of projects for detailed evaluation in Task 6. The groundwater quality treatment projects can range from individual well-head treatment to regional treatment plants. Under Task 6, cost opinions for these projects will be developed and will include a comparison of the cost to implement treatment projects by individual municipal agencies to those of collaborative projects.

San Antonio Water Company – Comments Provided by Brian Lee

Monte Vista Water District – Comments Provided by Mark Kinsey (reiterative of SAWCo comments)

18. ***General Note of Duplication. A majority of the proposed activities duplicate existing planning efforts, as outlined in the below chart and further discussed per activity below:***

Proposed Activity	Existing Planning Efforts
Activity A	Recharge Master Plan; Recharge Investigations & Projects Committee
Activity B	Chino Basin Water Bank; Inland Empire Utilities Agency
Activity D	Inland Empire Utilities Agency and Contracting/Member Agencies; Jurupa Community Services District; City of Pomona
Activity E/F	Local Agencies; Water Quality Committee (existing authority to reconvene)
Activity K	Maximum Benefit Salt and Nutrient Management Plan
Activity C/G	Integrated Resource Plan

Please refer to the responses to Comments 7, 8, and 10. Please also note that in the next step of the 2020 OBMP Update process the OBMP Update activities described in the Scoping Report will be integrated with the 2000 OBMP Program Elements. If the implementation actions that arise from the OBMP Update activities are already encompassed by the existing actions in the 2000

OBMP IP, then no new implementation actions will be included in the 2020 OBMP Update. See responses to comments 19 through 24 for more detail about specific activities.

19. ***Activity A. We disagree with this activity and its implementation schedule because it duplicates an existing and active planning effort, the Recharge Master Plan (RMP). The RMP has been developed and updated consistent with the Peace Agreements. Watermaster's Recharge Investigations and Projects Committee (RIPCom)- open to all parties- meets quarterly to review the ongoing implementation of the latest RMP. The process of updating the RMP includes an exhaustive review of opportunities to improve Basin recharge, and each RIP Com meeting agenda includes a standing item for discussion and consideration of new recharge projects.***

    Watermaster staff has verbally confirmed with certain parties that there is no intent to duplicate the RMP process, and that this activity proposes instead to continue the existing process. However, the current draft of the technical memorandum lacks clarity on how newly proposed activities enhance existing activities. Overall, we believe there is no need to create a new process (with associated costs) that duplicates an existing, successfully implemented ongoing process.

    As described in the report on pages 16 and 17, based on the alignment of the objectives of Activity A with those of the RMPU, Activity A can be accomplished through the existing RMPU process. The scope of work summarized in the report is for developing the 2023 RMPU, not in addition to it. Please also refer to responses to Comments 7, 8, 10, and 18 regarding duplication of efforts.

20. ***Activity B. We disagree with this activity and its implementation schedule because it duplicates existing and active planning efforts to develop Storage and Recovery Programs. The Peace Agreement provides criteria for Watermaster to facilitate and regulate the development of Storage and Recovery Programs that "provide broad mutual benefits" to the Judgment parties (¶5.2(c)). We are aware of two entities, the Chino Basin Water Bank and the Inland Empire Utilities Agency (IEUA), that are actively engaged with Watermaster and their partners in developing Storage and Recovery Program proposals. We believe that these and other potential applicants should cover the cost of demonstrating how their proposed Storage and Recovery Programs may provide broad mutual benefits to the parties. Additionally, Watermaster's role in facilitating Storage and Recovery Programs necessitates a healthy division between the evaluating and approving entity (Watermaster) and the Program applicant(s).***

    The Peace Agreement assigns Watermaster as the evaluating and approving entity for S&R Programs. As such, Watermaster must have criteria upon which to define and evaluate “broad mutual benefits” of S&R Programs. Activity B includes a process for the parties and Watermaster to build and achieve consensus on the definition(s) of broad mutual benefits and the objectives of S&R Programs. These definitions are key to Watermaster’s ability to evaluate and rank S&R Programs when presented with applications. Activity B also helps guide the parties (or others) in the development of S&R Programs, so that the application and evaluation process is most efficient.

    As to duplication of efforts, the intention of Activity B is to leverage past and current work to the maximum extent. The description in Activity B states that: “Prior work has been performed for the Storage Framework Investigation, the Chino Basin Water Bank, and the Chino Basin Program.

These past efforts can be leveraged…" in the execution of Activity B. See also the responses to Comments 7, 10, and 18.

21. ***Activity D. We disagree with this activity and its implementation schedule because it duplicates existing and active planning efforts by IEUA, IEUA member agencies, Jurupa Community Service District, and the City of Pomona. These planning efforts seek to address the full and beneficial utilization of recycled water supplies available in the Chino Basin. We believe parallel planning processes are neither advisable nor cost-effective.***

    Please refer to the responses to Comments 8 and 18.

22. ***Activity E/F. We disagree with this activity and its implementation schedule because it proposes activities that are either outside of Watermaster's authority or already authorized under the existing OBMP Implementation Plan. Water quality compliance is the responsibility of water providers under their respective operating permits. Watermaster' s role under the OBMP Implementation Plan is to monitor water quality to ensure that parties' use of the basin meet Basin Plan objectives and do not cause material physical injury. The existing OBMP Implementation Plan already directs Watermaster to form a "water quality committee" to oversee and provide input on these activities; we see no reason why Watermaster cannot reconvene such a committee under its existing authority.***

    Please refer to the responses to Comments 10 and 18.

23. ***Activity K. We disagree with this activity and its implementation schedule because the Maximum Benefit Salt and Nutrient Management Plan already contains dilution compliance requirements that Basin parties must meet in order to continue recharging recycled water. As stated in the sixth listening session, Watermaster and IEUA are already implementing this activity through their work in developing a Basin Plan amendment proposal, and that the activity simply proposes to "do what we are doing."***

    Activity K will ensure that the evaluation of a future compliance challenge with the recycled water dilution requirements will be done on a routine basis hereafter and not just during the current investigation to support the Basin Plan amendment proposal – such a routine assessment will also be required by the Regional Board, as described in the discussion of Activity K. Please also refer to response to Comments 7, 8, 10, 18, and 21.

24. ***Activity C/G. We disagree with this activity and its implementation schedule because it duplicates IEUA's ongoing integrated resource planning process. All parties and Watermaster staff are participating in this planning process, which is focused on identifying projects to improve the reliability and resiliency of regional water supplies.***

    Please refer to the response Comments 7, 8, 10, and 18.

25. ***Activity L. This is a proposed review of Watermaster's current monitoring and reporting processes to ensure they are as efficient and cost-effective as possible. We consider this review an essential administrative best practice and fully support its immediate implementation and incorporation into Watermaster's Rules and Regulations and other procedural documents, as appropriate.***

Comment noted. Watermaster proposes that it be implemented in Fiscal Year 2020/21 and will present if for consideration in the budget at the appropriate time.

26. ***Activity H/I/J. The Chino Basin Judgment establishes the following requirement for basin management, inclusive of the OBMP: "In the process of implementing the physical solution for Chino Basin, Watermaster shall consider the following parameters: ... (c) Economic Considerations. - Financial feasibility, economic impact and the cost and optimum utilization of the Basin's resources and the physical facilities of the parties are objectives and concerns in equal importance to water quantity and quality parameters" (Exhibit "I" ¶(c), emphasis in original).***

    Here and elsewhere in the Court-approved management agreements, Watermaster is directed to consider economics - inclusive of equitable distribution of costs and benefits, reductions in costs, and funding opportunities - for all basin management activities tied to implementation of the Physical Solution. Therefore, we respectfully request that Watermaster fulfill this requirement to incorporate economic considerations into any agreed-upon activity in this and any other basin management process.

    Comment noted. As stated on pages 80 and 81 regarding economic considerations:

    "The objectives for Activities H, I, and J can be efficiently met by incorporating tasks within the other activities to characterize the benefits and costs of the projects produced by the activities."

    and

    "The steps to achieve an equitable allocation of benefits and costs should be addressed by in the agreement that will be developed by the parties to implement the 2020 OBMP Update. The 2020 OBMP implementation agreement could be designed to ensure that the desired extent of cost/benefit assessments are performed to support equitable cost allocations in the implementation of activity scopes of work, to anticipate and accommodate the development of project implementation agreements that define the project-specific cost/benefit allocation, and to periodically update cost projections for implementation of the 2020 OBMP Update activities and associated projects to support planning of financial resources."

Appendix D

Stakeholder Participation Log

Appendix D

Stakeholder Attendance at the OBMPU Listening Sessions

Name	Agency/Stakeholder	LS1	LS2	LS3	LS4	LS5	LS6	LS7	LS8
Bob Feenstra	Agricultural Pool		X	X				X	X
Jeff Pierson	Agricultural Pool	X	X	X				X	
Diana Frederick	Agricultural Pool - State of CA		X						
Craig Stewart	Agricultural Pool - State of CA/CIM				X				
Pete Hall	Agricultural Pool - State of CA/CIM		X	X					
John Schatz	Appropriative Pool		X		X				X
John Thornton	Arcadis (consultant to the Chino Basin Water Bank)					X	X	X	X
Brian Geye	Auto Club Speedway	X	X				X	X	X
Andrew Lazenby	Brown and Caldwell (consultant to IEUA)			X					
Tom O'Neill	Chino Basin Desalter Authority		X	X					
Elizabeth Skrzat	Chino Basin Water Conservation District							X	
Kristen Wegner	Chino Basin Water Conservation District	X		X	X				
Don Galeano	Chino Basin Watermaster Board			X					
Ron Craig	Chino Hills, City of	X	X	X	X	X	X	X	X
Amanda Coker	Chino, City of	X	X	X		X		X	X
Dave Crosley	Chino, City of	X	X			X	X		X
Eunice Ulloa	Chino, City of	X		X	X	X		X	
Bob Page	County of San Bernardino		X						
Eduardo Espinoza	Cucamonga Valley Water District	X	X	X	X	X		X	X
John Bosler	Cucamonga Valley Water District						X		
Praseetha Krishnan	Cucamonga Valley Water District	X	X			X	X	X	
Tracy Egoscue	EIG (representing the Agricultural Pool)	X	X	X		X	X	X	X
Shawnda Grady	Ellison, Schneider & Harris (representing JCSD)		X						
Eric Tarango	Fontana Union Water Company	X		X				X	
Josh Swift	Fontana Union Water Company				X	X		X	
Cris Fealy	Fontana Water Company	X		X	X	X	X		
Roger Putty	GEI (consultant to IEUA)				X				
Chris Berch	Inland Empire Utilities Agency	X	X	X	X				
Christiana Daisy	Inland Empire Utilities Agency							X	
Joshua Aguilar	Inland Empire Utilities Agency		X		X	X		X	X
Kirby Brill	Inland Empire Utilities Agency	X							
Liz Hurst	Inland Empire Utilities Agency			X	X				
Liza Muñoz	Inland Empire Utilities Agency					X	X	X	
Sylvie Lee	Inland Empire Utilities Agency	X	X	X	X		X	X	X
Abhi Singh	Intera (consultant to IEUA)		X						
Betty Anderson	Jurupa Community Services District				X				
Chris Berch	Jurupa Community Services District					X	X	X	X
Eldon Horst	Jurupa Community Services District			X	X				
Steven Popelar	Jurupa Community Services District		X						
Ed Means	MC (consultant to Chino Water Bank)					X			
Brandon Goshi	Metropolitan Water District	X		X	X			X	X
Justin Scott-Coe	Monte Vista Water District					X	X	X	
Van Jew	Monte Vista Water District		X			X			

Appendix D

Stakeholder Attendance at the OBMPU Listening Sessions

Name	Agency/Stakeholder	LS1	LS2	LS3	LS4	LS5	LS6	LS7	LS8
Bob Bowcock	Non-Agricultural Pool	X	X		X				
Wendy Sanders	NRG/ERM	X							
Courtney Jones	Ontario, City of	X	X	X	X	X			
Katie Gienger	Ontario, City of			X	X	X	X	X	X
Scott Burton	Ontario, City of		X						
Marsha Westropp	Orange County Water District	X					X		
Chris Diggs	Pomona, City of	X	X		X	X	X	X	X
Darron Poulsen	Pomona, City of	X	X			X	X	X	
Raul Garibay	Pomona, City of	X	X	X					
Brian Lee	San Antonio Water Company	X				X			
Teri Layton	San Antonio Water Company	X			X	X			X
James McKenzie	San Bernardino County Flood Control District				X	X		X	
Jorge Vela	San Bernardino County Flood Control District					X			
Marty Zvirbulis	San Gabriel Valley Water Company							X	
Tom Harder	TH&Co (representing the Appropriative Pool)	X		X	X		X	X	X
John Mendoza	Three Valleys Municipal Water District	X	X	X		X	X		X
Matt Litchfield	Three Valleys Municipal Water District		X	X		X			
Tim Kellett	Three Valleys Municipal Water District					X		X	X
Harrison Nguyen	Upland, City of	X							
Rosemary Hoerning	Upland, City of	X	X	X	X				
Steve Ledbetter	Upland, City of							X	
Steve Nix	Upland, City of					X	X		
Nadia Loukeh	West Valley Water District			X					
Jason Pivovaroff	Western Municipal Water District				X	X			X
Ryan Shaw	Western Municipal Water District	X	X	X			X	X	
Rick Rees	Wood (representing State of CA)	X	X	X		X	X	X	X
Individual Count		31	32	29	25	30	21	30	21
Stakeholder Count		19	17	19	18	17	17	21	16

Appendix E

2020 Storage Management Plan

2020 Storage Management Plan Final Report

December 11, 2019

Prepared for:

Chino Basin Watermaster

Partners in Basin Management

Prepared by:

WEI

Wildermuth Environmental, Inc.

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Acronyms, Abbreviations, and Initialisms

af	acre-feet
afy	acre-feet per year
DYYP	Dry Year Yield Program
IEUA	Inland Empire Utilities Agency
MPI	Material Physical Injury
MZ1	Management Zone 1
MZ2	Management Zone 2
MZ3	Management Zone 3
OBMP	Optimum Basin Management Program
OBMPU	Optimum Basin Management Program Update
SFI	Storage Framework Investigation
SMP	Storage Management Plan

Section 1 – Background

The objective of this report is to describe the 2020 Storage Management Plan (SMP).[1] The basis of the 2020 SMP was described in the *Final 2020 Storage Management Plan White Paper*,[2] which has been incorporated into this document as Appendix A. The Watermaster stakeholders reviewed and commented on the draft White Paper and participated in two workshops that occurred in June and July 2019. The final technical requirements of the 2020 SMP were developed in part from the work conducted in the 2018 *Storage Framework Investigation*[3] (SFI), the White Paper, and discussions with the Watermaster stakeholders. The draft versions 1 and 2 of the 2020 SMP were distributed to the Watermaster stakeholders on September 6, 2019 and October 24, 2019, respectively. The Watermaster stakeholders provided comments on these drafts and the complete set of comments and Watermaster staff responses are included in Appendices B1 and B2. Some of the comments resulted in updates to the to the 2020 SMP and they are included herein.

Groundwater pumping rights in the Chino Basin were adjudicated in the 1970s and settled in the 1978 stipulated agreement (Judgment). The Judgment[4] established a Watermaster to administer the decree under the court's continuing jurisdiction and empowered it to manage and control available storage capacity and to enter into agreements for the storage of water. As a prerequisite to implementing the Optimum Basin Management Program (OBMP) the Parties[5] executed the Peace Agreement, providing direction and guidance to Watermaster on how storage should be prioritized and managed. The OBMP addresses the management of groundwater pumping, recharge, storage and recovery, and the transfer of water. The prevailing standard for all operations is the avoidance of "Material Physical Injury" (MPI)[6,7] under Court-Approved Management Agreements executed contemporaneously.

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[1] The abbreviation "SMP" means Storage Management Plan. When referring specifically to the 2020 Storage Management Plan the year "2020" precedes SMP (i.e. 2020 SMP).

[2] Wildermuth Environmental, Inc. (2019). *Final 2020 Storage Management Program White Paper*. This report can be found here: https://cbwm.syncedtool.com/shares/folder/e83081106c3072/?folder_id=1847

[3] Wildermuth Environmental, Inc. (2018). *Storage Framework Investigation, Final Report*. This report can be found here: https://cbwm.syncedtool.com/shares/folder/e83081106c3072/?folder_id=1429

[4] Original Judgment in Chino Basin Municipal Water District vs. City of Chino, et al., signed by Judge Howard B. Weiner, Case No. 164327. File transferred August 1989, by order of the Court, and assigned new case number RCV51010. The Restated Judgment can be found here: https://cbwm.syncedtool.com/shares/folder/e83081106c3072/?folder_id=247

[5] The terms Party and Parties refer to a party to the Judgment, party to the Peace and or Peace II Agreement, or a party to all three.

[6] Defined terms in the Court Approved Management Agreements will appear with the first letter of each word capitalized; a footnote with their definitions is included at the first use of the defined term.

[7] "Material Physical Injury" means material injury that is attributable to the Recharge, Transfer, storage and recovery, management, movement or Production of water, or implementation of the OBMP, including, but not limited to, degradation of water quality, liquefaction, land subsidence, increases in pump lift (lower water levels), and adverse impacts associated with rising Groundwater. Material Physical Injury does not include "economic

Given the passage of twenty years since its approval, Watermaster has revisited the OBMP goals and objectives and plans to update the OBMP by June 2020 (hereafter, 2020 OBMPU). Updating the SMP is integral to the 2020 OBMPU. The 2020 SMP will be incorporated into the 2020 OBMPU and its implementation plan.

The term "managed storage" as used herein (and consistent with the 2018 SFI) refers to water stored by the Parties and other entities and includes Carryover,[8,9] Local Storage,[10] and Supplemental Water[11] held in storage accounts by the Parties and Storage and Recovery Programs.[12] Local Storage includes Excess Carryover[13] for the Overlying Non-Agricultural Pool Parties and Excess Carryover and Supplemental Waters for the Appropriative Pool and Overlying Non-Agricultural Pool Parties.

1.1 Storage Agreements and Transfers from Storage Accounts

Since the Judgment came into effect, Watermaster developed rules and regulations, standard storage agreements, and related forms. There are three types of storage agreements that result in five types of storage accounts: Excess Carryover, Local Supplemental-Recycled, Local Supplemental-Imported, Pre-2000 Quantified Supplemental, and Storage and Recovery. An Excess Carryover account includes a Party's unproduced rights in the Safe Yield (Safe Yield for Overlying Non-Agricultural Pool Parties and Operating Safe Yield for Appropriative Pool

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injury" that results from other than physical causes. Once fully mitigated, physical injury shall no longer be considered material. [Peace Agreement § 1.1(y).]

8 Defined terms in the Court Approved Management Agreements will appear with the first letter of each word capitalized and a footnote with their definitions is included at the first use of the defined term.

9 "Carry-Over Water" means the un-Produced water in any year that may accrue to a member of the Overlying Non-Agricultural Pool or the Appropriative Pool and that is Produced first each subsequent Fiscal Year or stored as Excess Carry-Over. (Judgment Exhibit H ¶ 12.)

10 "Local Storage" means water held in a storage account pursuant to a Local Storage Agreement between a party to the Judgment and Watermaster. Local Storage accounts may consist of: (i) a Producer's unproduced Excess Carry-Over Water or (ii) a party to the Judgment's Supplemental Water, up to a cumulative maximum of one hundred thousand (100,000) acre-feet for all Parties to the Judgment stored in the Basin on or after July 1, 2000 or (iii) that amount of Supplemental Water previously stored in the Basin on or before July 1, 2000 and quantified in accordance with the provisions and procedures set forth in Section 7.2 of these Rules and Regulations, or (iv) that amount of water which is or may be stored in the Basin pursuant to a Storage Agreement with Watermaster which exists and has not expired before July 1, 2010. [Peace Agreement § 1.1(x).]

11 "Supplemental Water" means water imported to Chino Basin from outside the Chino Basin Watershed and Recycled Water. [Judgment ¶ 4(bb) and Peace Agreement § 1.1(ww).]

12 "Storage and Recovery Program" means the use of the available storage capacity of the Basin by any person under the direction and control of Watermaster pursuant to a Court approved Groundwater Storage Agreement but excluding "Local Storage," including the right to export water for use outside the Chino Basin and typically of broad and mutual benefit to the Parties to the Judgment. [Peace Agreement §1.1(uu).]

13 "Excess Carry-Over Water" means Carry-Over Water which in aggregate quantities exceeds a party's share of Safe Yield in the case of the Non-Agricultural Pool, or the assigned share of Operating Safe Yield in the case of the Appropriative Pool, in any year.

Parties) and Basin Water acquired from other Parties. A Local Supplemental Water account includes imported and recycled water that is recharged by a Party and similar water acquired from other Parties. A Storage and Recovery account includes Supplemental Water and the Peace Agreement requires that Watermaster shall give first priority to Storage and Recovery Programs that produce a "broad and mutual benefit to the Parties to the Judgment."[14] Watermaster tracks the puts, takes, losses, and end of year storage totals for all of these storage accounts, and reports on this accounting in the annual assessment process. The losses assessed by Watermaster are based on the amount of water in managed storage (excluding Carryover) and they offset the increase in groundwater discharge to the Santa Ana River from the Chino Basin attributable to managed storage (excluding Carryover). Watermaster also assesses losses due to evaporation on the puts when water is recharged in spreading basins.

In evaluating applications for storage agreements, Watermaster must conduct an investigation to determine if the water stored and recovered under a proposed storage agreement has the potential to cause MPI to a Party or the basin. If Watermaster determines that implementation of the proposed storage agreement has the potential to cause MPI, the applicant must revise its application and demonstrate that there will be no MPI, or Watermaster must impose conditions in the storage agreement to ensure there is no MPI. Watermaster cannot approve a storage agreement that has the potential to cause MPI.

The Restated Judgment provides that the Basin's groundwater storage capacity may be utilized for the storage and conjunctive use of supplemental water only under Watermaster control and regulation and that no use of such capacity be made except pursuant to written agreement with Watermaster (Restated Judgment, ¶ 11, 12; see also Peace Agreement, § 5.2(a)). The Pooling Plans of the Overlying (Non-Agricultural) Pool (Restated Judgment Exhibit "G") and the Appropriative Pool (Restated Judgment Exhibit "H") each require agreement with Watermaster as a condition of storing Excess Carryover water within the Basin.

Consistent with ¶'s 14 and 28 of the Restated Judgment and the Chino Basin Watermaster Rules and Regulations ("Rules and Regulations"), storage of water within the Basin has been accomplished pursuant to Watermaster's existing Form 1 (Application for a Local Storage Agreement) and Form 8 (Standard Local Storage Agreement). The Board enters into storage agreements only after an application is noticed and considered by the Pool Committees, Advisory Committee, and Watermaster Board (see Rules and Regulations, Article X), and when a finding is made that storage will not result in MPI to any Party to the Judgment or the Basin. (Peace Agreement, § 5.2(b)(iv).)

The Form 1 Application for Local Storage Agreement was approved in 2001 and has not been amended since that time; it is the mechanism through which Parties may apply to enter into a Local Storage Agreement.

The Form 8 Local Storage Agreement, as it was similarly approved by the Court in 2001 and still exists today, provides for the storage of a set quantity of water for the duration of the Peace Agreement. While Watermaster tracks production on a quarterly basis and accounts for unproduced water and water entering storage annually, in the event that a Party wishes to increase its quantity of water in storage—either via recharge of Supplemental Water or the

[14] See §5.2(c)(iv)(b) of the Peace Agreement

accrual of Excess Carryover water—in order to ensure that that the additional quantity of water is stored in compliance with the provisions of the Restated Judgment, Peace Agreement, and Rules and Regulations, it must enter into a new storage agreement. In practice, this means that each of the members of the Overlying (Non-Agricultural) and Appropriative Pools must go through the application process each year in which their balances of stored water increase.

The Parties, amongst themselves, are actively involved in water transfers of annual unproduced rights in the Safe Yield and water in their storage accounts. Watermaster has an application and review process for transfers that is similar to the storage agreement application process. Transfers are one way that the Parties recover water held in storage accounts.

1.2 Existing Managed Storage and Proposed Storage and Recovery Programs

The Parties engage in conjunctive-use activities individually by storing Basin and Supplemental Waters that are in excess of their demands and subsequently recover that water as their individual needs arise. These activities collectively cause a temporary increase in managed storage. Table 1-1 summarizes the amount of water in managed storage by the Parties. Table 1-1 also shows the amount of water stored by the Metropolitan Water District of Southern California (Metropolitan) Dry-Year Yield Program (DYYP). The total volume of water in managed storage as of June 30, 2019 was 549,244 af.

Table 1-1 Ending balances in managed storage in the Chino Basin (af)

Fiscal Year ending June 30	Appropriative Pool				Overlying Non-Agricultural Pool			Total Managed Storage by Parties	Dry Year Yield Program Storage	Total Managed Storage
	Carryover (1)	Excess Carryover (2)	Local Supplemental Storage (3)	Subtotal (4)	Carryover (5)	Excess Carryover (6)	Subtotal (7)	(8) = (7) + (4)	(9)	(10) = (9) + (8)
2000	28,911	170,342		199,253	6,541	31,031	37,572	236,825	0	236,825
2001	15,940	77,907	92,813	186,660	5,301	32,330	37,631	224,291	0	224,291
2002	13,521	70,103	87,801	171,425	5,285	33,727	39,012	210,437	0	210,437
2003	18,656	71,329	81,180	171,165	6,743	36,850	43,593	214,758	7,738	222,496
2004	21,204	70,503	80,963	172,670	7,177	40,881	48,058	220,728	26,300	247,028
2005	21,289	76,080	88,849	186,218	7,227	45,888	53,115	239,333	38,754	278,087
2006	32,062	56,062	86,170	174,294	7,227	49,178	56,405	230,699	58,653	289,352
2007	34,552	50,895	83,184	168,631	7,084	51,476	58,560	227,191	77,116	304,307
2008	41,626	83,962	81,520	207,108	6,819	45,248	52,067	259,175	74,877	334,052
2009	42,795	101,908	79,890	224,593	6,672	46,600	53,272	277,865	34,494	312,359
2010	41,263	120,897	90,133	252,293	6,934	47,732	54,666	306,959	8,543	315,502
2011	41,412	146,074	98,080	285,566	6,959	49,343	56,302	341,868	0	341,868
2012	42,614	209,981	116,138	368,733	6,914	13,993	20,907	389,640	0	389,640
2013	39,413	225,068	116,378	380,859	7,073	15,473	22,546	403,405	0	403,405
2014	41,708	224,496	123,484	389,688	6,478	12,812	19,290	408,978	0	408,978
2015	40,092	239,517	127,994	407,603	6,823	12,225	19,048	426,651	0	426,651
2016	39,733	248,013	131,522	419,267	7,195	9,949	17,144	436,411	0	436,411
2017	38,340	260,682	143,552	442,575	7,226	8,292	15,519	458,093	6,315	464,408
2018	34,582	254,221	155,018	443,821	7,198	10,775	17,973	461,795	41,380	503,174
2019	38,605	279,033	166,406	484,044	7,227	12,004	19,231	503,275	45,969	549,244

The 2018 SFI projected that for the planned use of managed storage by the Parties up to 700,000 af that Hydraulic Control would be maintained, that there would be no MPI, and that there would be an adverse impact from the reduction of net recharge and Safe Yield attributable to the use of managed storage. The 2018 SFI made an identical finding for Storage and Recovery

Programs that would operate in an identical manner to the existing Metropolitan DYYP and using the managed storage space between 700,000 af and 800,000 af.

As of June 30, 2019, the Parties' aggregate amount of water in managed storage was 503,275 af (see Table 1.1). The Parties are projected to use in aggregate about 720,000 af of managed storage for their individual conjunctive-use operations based on the most recent planning information provided by them (See Appendix C). The projected average annual increase in managed storage by the Parties is about 21,600 afy through 2030, after which the aggregate amount of managed storage space used by the Parties is projected to decline through about 2070.

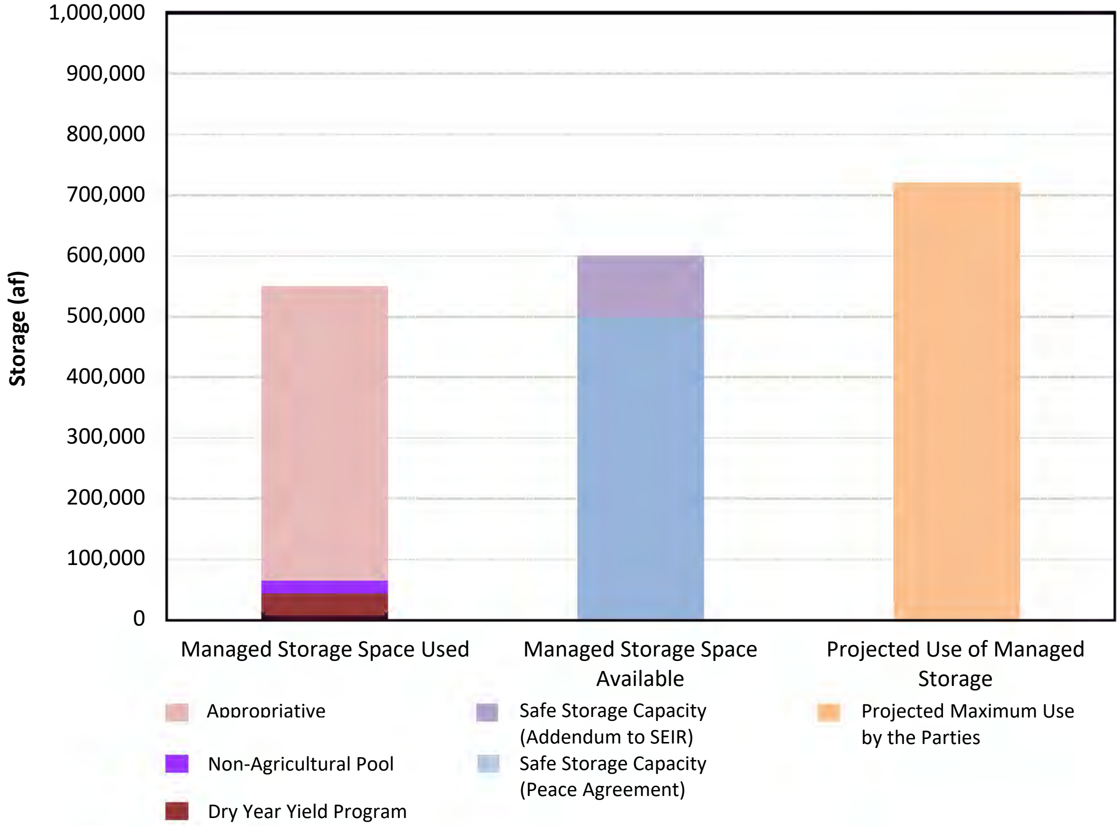
Metropolitan's DYYP is the only active Storage and Recovery Program in the basin. The DYYP can store up to 100,000 af with maximum puts of 25,000 afy and maximum takes of 33,000 afy. The DYYP Storage and Recovery Program agreement provides that puts and takes can exceed these values if agreed to by Watermaster (as was done in fiscal years 2018 and 2009, respectively). As of June 30, 2019, there was 45,969 af stored in the DYYP account. The agreement that authorizes the DYYP will expire in 2028.

The combined use of managed storage by the Parties and Metropolitan's DYYP is projected to reach a maximum of about 790,000 af assuming that the DYYP has 100,000 af in storage in 2028 and that subsequent to 2028 Metropolitan removes that water from managed storage at the contract rate of 33,300 afy starting in 2029.

Figure 1-1 compares the current amount of water in managed storage to the managed storage space available and the projected use of storage space by the Parties. The managed storage space used is 549,244 af. The amount of managed storage space available for use by the Parties pursuant the 2010 Peace II Project Subsequent Environmental Impact Report and its 2017 Addendum is 600,000 af. The storage space used by the Parties will exceed this 600,000 af limit by 120,000 af by 2030.[15]

[15] See Appendix C for updated groundwater pumping and managed storage projections.

Figure 1-1 Comparison of managed storage space used, managed storage space available, and projected maximum use of managed storage by the Parties



The IEUA and some of the Parties are considering Storage and Recovery Programs with yet-to-be proposed operational parameters. According to the discussions in the development of the 2018 SFI, the amount of storage space required in aggregate for all contemplated Storage and Recovery Programs, including the DYYP, is projected to range between 200,000 and 300,000 af.

Section 2 – Storage Management Plan Description

This section describes the 2020 SMP based on the requirements of the Judgment, the Peace Agreement, the conclusions of the 2018 SFI, the 2020 SMP White Paper, and Watermaster stakeholder input from the 2020 SMP workshop process during the period of June through December 2019.

2.1 Use of Storage Space by the Parties for Their Individual Conjunctive-Use Activities and by Entities Engaged in Storage and Storage and Recovery Programs

An aggregate amount of 800,000 af is reserved for the Parties' conjunctive-use activities (includes Carryover, Excess Carryover, and Supplemental Accounts) and Metropolitan's DYYP. This amount is referred to as the "First Managed Storage Band" (FMSB).

The managed storage space between 800,000 and 1,000,000 af is reserved for Storage and Recovery Programs. Storage and Recovery Programs that utilize the managed storage space above 800,000 af will be required to mitigate potential MPI as if the 800,000 af were fully used. Renewal or extension of the DYYP agreement will require the DYYP to use storage space above 800,000 af.

The allocation of storage space for use by Parties and for Storage and Recovery Programs may be revised in subsequent updates of the SMP.

Note that the use of managed storage greater than 1,000,000 af may be possible provided the storing entity submits a Storage and Recovery Program application, demonstrates that the program has broad mutual benefit, demonstrates that program's mitigation measures will meet the mitigation requirements of the Watermaster to ensure there will be no MPI and other adverse impacts[16], complies with CEQA, and obtains approval from the Watermaster.

2.2 Reservation of Existing Spreading Basin Facilities to Satisfy Watermaster Recharge and Replenishment Obligations

The Parties and IEUA, through the OBMP, have substantially increased storm and supplemental water recharge capacity in the Chino Basin. The increase in supplemental water recharge capacity was done to ensure that Watermaster could meet its future recharge and replenishment obligations pursuant to Court and Regional Board orders. Watermaster will include provisions in storage agreements to prioritize the use of spreading basins to satisfy Watermaster's recharge and replenishment obligations over the use of spreading basins for other uses subject to limitations provided in existing agreements with the owners of the facilities.

[16] Adverse impacts include reductions in net recharge and Safe Yield; and an increase in the groundwater discharge from the Chino North GMZ to the Santa Ana River contributing to a loss of Hydraulic Control.

2.3 Storage Management Activities of the Parties

2.3.1 Limitation of Transfers or Leases of Water Rights and Water Held in Managed Storage

Early in the OBMP implementation period, Watermaster determined that transfers or leases of water rights and water held in managed storage (hereafter transfers) from Parties that are situated such that they pump groundwater outside of MZ1 to Parties that pump in MZ1 for *the purpose of replenishment* have the potential to cause MPI.[17]

This limitation on transfers should be reconsidered if the land subsidence management plan for MZ1 includes consideration for such transfers, the land subsidence plan is implemented, and subsequent monitoring demonstrates the sufficiency of the land subsidence management plan.

2.3.2 Mitigation of Reduced Net Recharge and Safe Yield

The 2018 SFI demonstrated that storing water has the effect of reducing net recharge and Safe Yield. The reduction in net recharge caused by storage is an adverse impact. The Safe Yield, a prospective calculation, is based on projected estimates of net recharge that include the effects of managed storage on net recharge[18]. The reduction in Safe Yield due to projected storage management by the Parties is thus incorporated into the Safe Yield estimate. Watermaster considers this adverse impact to be mitigated by the prospective calculation of the Safe Yield.

2.4 Storage and Recovery Programs

2.4.1 Prioritization of Put and Take Operations in MZ2 and MZ3

Storage and Recovery programs are implemented through a series of "puts" and "takes" where water goes into storage during a put and is recovered from storage during a take. Based on the results of the 2018 SFI, these puts and takes should be prioritized to occur in MZ2 and MZ3 to avoid new land subsidence and interfering with land subsidence management in MZ1, to minimize pumping sustainability challenges, to minimize the impact of storage and recovery operations on solvent plumes, to preserve the state of Hydraulic Control, and to take advantage of the larger and more useful groundwater storage space in MZ2 and MZ3.

This spatial prioritization on puts and takes should be reconsidered if the land subsidence management plan for MZ1 includes consideration for Storage and Recovery programs, the land subsidence management plan is implemented, and subsequent monitoring demonstrates the sufficiency of the land subsidence management plan.

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[17] See the report entitled: Material Physical Injury analysis – Monte Vista Water District lease of West Valley Water District production rights in the Chino Basin for fiscal year 2006/07. Prepared by WEI in April 2007.

[18] Refer to the 2015 Reset Technical Memorandum and the April 2017 Court Order for additional information on the Safe Yield reset methodology. These documents can be found here: https://cbwm.syncedtool.com/shares/folder/e83081106c3072/?folder_id=1595.

2.4.2 Evaluation of Storage and Recovery Program Impacts, MPI, and Mitigation

The intent of this provision is to reaffirm the requirements of ¶ 12 of the Judgment and §5.2(c)(xiii) and 5.2(c)(ix) of the Peace Agreement, as to the review and approval of Storage and Recovery Program applications, and to require Storage and Recovery Program storage agreements to provide provisions that require Storage and Recovery Program participants to cease or modify their operations if Watermaster determines, subsequent to Watermaster and Court approval of a Storage and Recovery Program storage agreement, that the participant's storage and recovery operations are causing or threaten to cause MPI. The types of MPI to be addressed include but are not limited to land subsidence, pumping sustainability, water quality, shallow groundwater, and liquefaction.

Watermaster will review each Storage and Recovery Program application, estimate the surface and ground water systems response, prepare a report that describes the response and potential MPI, and develop mitigation requirements to mitigate MPI caused by the proposed Storage and Recovery Program. The Storage and Recovery Program applicant will develop mitigation measures pursuant to these requirements and incorporate them into their Storage and Recovery Program application. Upon approval by Watermaster, these mitigation measures will be incorporated into the Storage and Recovery Program storage agreement.

Watermaster will periodically review current and projected basin conditions, compare this information to the projected basin conditions assumed in the evaluation of the Storage and Recovery Program application process, compare the projected Storage and Recovery Program operations to actual Storage and Recovery Program operations, and make findings regarding the efficacy of related MPI mitigation requirements and measures in the Storage and Recovery Program storage agreements. And, based on its review and findings, Watermaster may require changes in the Storage and Recovery Program storage agreements to mitigate MPI.

2.4.3 Adverse Impacts Due to a Storage and Recovery Program Must Be Mitigated

Adverse impacts include but are not limited to reductions in net recharge and Safe Yield and an increase in the groundwater discharge from the Chino North GMZ to the Santa Ana River contributing to a loss of Hydraulic Control. Watermaster will, as part of the Storage and Recovery Program application review process, make a projection of the program's expected impact on net recharge and Safe Yield and on the state of Hydraulic Control.

The 2018 SFI concluded the that the net recharge and Safe Yield of the basin would be reduced annually by about 2.0 percent (ranged from 1.5 to 2.4 percent) of the volume of water stored in a Storage and Recovery Program storage account. Watermaster will estimate the reduction in net recharge and Safe Yield for each Storage and Recovery Program and deduct it from water stored in each Storage and Recovery Program storage account to compensate for its impact on net recharge and Safe Yield.

Watermaster will review these impacts and develop mitigation requirements for the proposed Storage and Recovery Program. The Storage and Recovery Program applicant will develop mitigation measures pursuant to these requirements and incorporate them into their Storage and Recovery Program application. Upon approval by Watermaster, these mitigation measures will be incorporated into the Storage and Recovery Program storage agreement.

Watermaster will periodically review the current and projected net recharge loss rate and the state of Hydraulic Control, compare this information to the projected basin conditions assumed in the evaluation of the Storage and Recovery Program application process, compare the projected Storage and Recovery Program operations to actual Storage and Recovery Program operations, and make findings regarding the efficacy of the related mitigation measures and requirements in the Storage and Recovery Program storage agreement. And, based on its review and findings, Watermaster may require changes in the Storage and Recovery Program storage agreements to mitigate impacts on net recharge and Safe Yield and on the state of Hydraulic Control.

2.5 Storage Agreement Application Process

As part of the development of an updated Storage Management Plan, environmental review will be conducted as to the impacts of a planned quantity of storage space reserved for the Parties' conjunctive-use activities and Metropolitan's DYYP. As a means of streamlining the process through which Parties apply for, receive approval of, and enter into storage agreements with Watermaster, the existing Form 8 Local Storage Agreements will be modified to be consistent with an "evergreen agreement" paradigm.

Within an "evergreen agreement" paradigm, the forms of the agreements, as revised, will allow for the quantities stored pursuant to the agreements to increase, during the term of the agreements, to cover the amount of water that each Party to an agreement places into storage, as shown in each Watermaster-approved annual Assessment Package. The evergreen agreements will be valid for the duration of the Peace Agreement and will be automatically adjusted upon Watermaster's approval of each subsequent Assessment Package so long as the cumulative amount of water in storage is less than the quantity reserved for the Parties' conjunctive-use operations and Metropolitan's DYYP (cumulatively, the FMSB) and Watermaster has made no finding that MPI is threatened to occur as a result of the increase in the quantity of water in storage.

2.6 Storage Management Plan Update

Watermaster will periodically review and update the SMP based on monitoring information obtained since the previous SMP was adopted, technology changes, and the "needs and requirements of the lands overlying the Chino Basin and the owners of the rights in the Safe Yield or Operating Safe Yield of the Basin."[19] The periodic review and update of the SMP will require the use of updated planning and hydrologic data and models, and it should be completed: at no less than a five-year frequency, when the Safe Yield is recalculated, or when Watermaster determines a review and update is warranted based new information and/or the needs of the Parties or the Basin.

The projected aggregate amount of water in managed storage by the Parties in 2056 (planning horizon of the 2018 SFI) is about 340,000 af. The impacts to the Basin and the Parties from

[19] Judgment, ¶12.

reducing managed storage below 340,000 af has not been estimated. Notwithstanding the SMP update frequency stated above, Watermaster should update the SMP at least five years before the aggregate amount of managed storage by the Parties is projected to fall below 340,000 af.

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Appendix A

2020 Storage Management Plan White Paper

Final 2020 Storage Management Plan White Paper

The objective of the 2020 Storage Management Plan white paper is to provide a concise compilation of technical storage management issues developed from the Storage Framework Investigation that should be considered in the 2020 Storage Management Plan. The draft 2020 Storage Management Plan white paper was distributed by the Chino Basin Watermaster on June 8, 2019 and it was reviewed at the June 20, 2019 Storage Management Plan workshop. The stakeholders were asked to provide comments on the draft white paper by July 5, 2019. These comments and Watermaster staff responses to them are included in Exhibit A attached herein. Some of those responses resulted in changes in the final white paper.

Background

Groundwater pumping rights in the Chino Basin were adjudicated in the 1970s and settled in the 1978 stipulated agreement (Judgment). The Judgment established a Watermaster to administer the decree under the court's continuing jurisdiction and empowered it to manage and control available storage capacity and to enter into agreements for the storage of water. As a prerequisite to implementing the Optimum Basin Management Program ("OBMP") the parties executed the Peace Agreement providing direction and guidance to the Watermaster on how storage should be prioritized and managed. The OBMP addresses the management of extraction, recharge, storage, recovery, and transfer of water. The prevailing standard for all operations is the avoidance of "undesirable results"—defined as "material physical injury"—under court approved management agreements executed contemporaneously and subsequent to the adoption of the OBMP Update in June 2020.[1]

Given the passage of twenty years since its approval, Watermaster has revisited the OBMP goals and objectives and plans to update the OBMP by June 2020. Updating the OBMP storage management plan is integral to the OBMP update. This background section provides the historical and institutional background for Watermaster's storage management activities, managed storage conditions, and groundwater management challenges impacted by managed storage activities.

Judgment

There is a significant amount of unused storage space in the Chino Basin. Groundwater in storage was estimated to have declined by about 1,600,000 af over the period 1922 through 1978, the starting point of the Judgment implementation. This decline of groundwater in storage was recognized in the Judgment,[2] and it requires that the use of this space be undertaken only under Watermaster control and regulation. Specifically, Judgment paragraphs 11 and 12 state:

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[1] The Optimum Basin Management Program can be found here: http://www.cbwm.org/rep_engineering.htm.

[2] Original judgment in Chino Basin Municipal Water District vs. City of Chino, et al., signed by Judge Howard B. Weiner, Case No. 164327. File transferred August 1989, by order of the Court, and assigned new case number RCV51010. The Restated Judgment can be found here:

"11. Available Ground Water Storage Capacity. There exists in Chino Basin a substantial amount of available ground water storage capacity which is not utilized for storage or regulation of Basin Waters[3]. Said reservoir capacity can appropriately be utilized for storage and conjunctive use of Supplemental Water[4] with Basin Waters. It is essential that said reservoir capacity utilization for storage and conjunctive use of Supplemental Water be undertaken only under Watermaster control and regulation, in order to protect the integrity of both such Stored Water[5] and Basin Water in storage and the Safe Yield[6] of Chino Basin.

12. Utilization of Available Ground Water Capacity. Any person or public entity, whether a party to this action or not, may make reasonable beneficial use of the available ground water storage capacity of Chino Basin for storage of Supplemental Water; provided that no such use shall be made except pursuant to written agreement with Watermaster, as authorized by Paragraph 28. In the allocation of such storage capacity, the needs and requirements of lands overlying Chino Basin and the owners of rights in the Safe Yield or Operating Safe Yield[7] of the Basin shall have priority and preference over storage for export."

These paragraphs establish Watermaster's control over the use of the storage space in the basin, require the accounting of Stored Water and Basin Water in storage, require accounting for the impacts of managed storage on Safe Yield and the prevention of unauthorized overdraft, require storing entities to obtain a storage agreement from Watermaster, and prioritize the use of storage space to meet the needs and requirements of the lands overlying the Chino Basin and of the Judgment parties over the use storage space to store water for export.

Judgment paragraphs 28 and 29 state:

"28. Ground Water Storage Agreements. Watermaster shall adopt, with the approval of the Advisory Committee, uniformly applicable rules and a standard form of agreement for storage of Supplemental Water, pursuant to criteria therefore set forth in Exhibit "I". Upon appropriate application by any person, Watermaster shall enter into such a storage agreement; provided that all such storage agreements shall first be approved by written order of the Court, and shall by their terms preclude operations which will have a substantial adverse impact on other producers.

29. Accounting for Stored Water. Watermaster shall calculate additions, extractions and losses and maintain an annual account of all Stored Water in Chino

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https://cbwm.syncedtool.com/shares/folder/e83081106c3072/?folder_id=247

[3] Basin Water is a defined term. Please see Storage Framework Appendix D for its definition.

[4] Supplemental Water is a defined term. Please see Storage Framework Appendix D for its definition.

[5] Stored Water is a defined term. Please see Storage Framework Appendix D for its definition.

[6] Safe Yield is defined term. Please see Storage Framework Appendix D for its definition.

[7] Operating Safe Yield is a defined term. Please see Storage Framework Appendix D for its definition.

Basin, and any losses of water supplies or Safe Yield of Chino Basin resulting from such Stored Water."

These paragraphs require that Watermaster develop storage agreements for entities (Judgment parties and others) to store supplemental water in the basin, have the storage agreements approved by the Court, include terms in the storage agreements to ensure that storage "operations" do not cause "substantial adverse impact on other producers," and collect information to enable it to account for "all Stored Water in Chino Basin, and any losses of water supplies or Safe Yield of Chino Basin resulting from such Stored Water." Losses of water supplies or Safe Yield refer to storage losses and changes in Safe Yield caused by the management of storage.

Optimum Basin Management Program and the Peace Agreements

The Chino Basin OBMP[8] set forth agreed goals and objectives in 1999. A year later, the Peace Agreement[9] and the OBMP Implementation were approved by the Court in 2000. Many of the operable features of the OBMP were incorporated into the OBMP Implementation Plan,[10] conditioned on compliance with the Peace Agreement. The OBMP Implementation Plan is Exhibit B to the Peace Agreement. The Peace Agreement is an agreement among the Judgment parties to implement the OBMP and was reviewed in a programmatic environmental impact report (PEIR), certified by the Inland Empire Utilities Agency (IEUA) in July 2000. The OBMP Implementation Plan contains a storage management plan that was developed to allow the parties and other entities to utilize the unused storage space in the basin and mitigate potential Material Physical Injury[11] (MPI) from its use.

The OBMP storage management plan consists of managing groundwater production, replenishment, recharge, and storage such that total storage within the basin ranges from a low of 5,300,000 af to a high of 5,800,000 af. The following definitions are included in the OBMP Implementation Plan:

- Operational storage requirement (OSR) is the storage or volume in the Chino Basin that is necessary to maintain the Safe Yield. The OSR was estimated in the development of the OBMP to be about 5.3 million af. This storage value was set as the estimated storage in the basin in 1997.[12]
- Safe storage is an estimate of the maximum amount of storage space in the basin that can be used and not cause significant water-quality and/or high-groundwater related

[8] The OBMP report is located here: http://www.cbwm.org/docs/engdocs/obmpphas1rep/Text/OBMP_Ph1_Report.pdf

[9] The Peace Agreement is located here: http://www.cbwm.org/docs/legaldocs/Peace_Agreement.pdf

[10] The OBMP Implementation Plan is Appendix B to the Peace Agreement, and it is located here: http://www.cbwm.org/docs/legaldocs/Implementation_Plan.pdf

[11] Material Physical Injury is a defined term. Please see Storage Framework Appendix D for its definition.

[12] Page 2-11, Optimum Basin Management Program, Phase I Report.

problems. Safe storage was estimated in the development of the OBMP to be about 5.8 million af.
- Safe storage capacity (SSC) is the difference between safe storage and the OSR. The allocation and use of storage space in excess of the SSC will preemptively require mitigation; that is, mitigation must be defined and resources committed to mitigation prior to its allocation and use.

Safe storage is equal to the OSR plus the SSC. The SSC was estimated during the development of the OBMP to be equal to the calculated decline in storage (400,000 af) during the base period (1965 through 1974) used to estimate the Safe Yield[13] in the Judgment plus an assumed additional decline in storage (100,000 af) in the intervening period up to the filing of the Judgment (1974 to 1978). The assumption underlying SSC was that it would be safe to store water in storage space that was recently created prior to implementing the Judgment.

Water occupying the SSC includes Carryover,[14] Excess Carryover,[15] Local Storage,[16] and Supplemental Waters stored by the parties. Water stored for Storage and Recovery Programs is also included in the SSC.[17] Carryover, Excess Carryover, Local Storage, and Supplemental Waters are referred to herein collectively as managed storage.

Subsequent to the approval of the PEIR in 2000, Watermaster and the Judgment parties developed revisions to the OBMP based on: new monitoring and borehole data collected since 1998, an improved hydrogeologic conceptualization of the basin and new numerical models that have improved the understanding of basin hydrology since 2000, and the need to expand the Chino Basin Desalters' (desalters) capacity to the 40,000 afy of groundwater pumping required in the OBMP Implementation Plan. Concurrently, the IEUA and Watermaster worked with the Santa Ana Regional Water Quality Control Board (Regional Board) to revise the total dissolved solids (TDS) and nitrate objectives for the Chino North Management Zone[18] to enable the reuse of the IEUA's recycled water without desalting it for a period estimated to be at least 30 years and without impairing the beneficial use of Chino Basin groundwater. One of the Regional Board's conditions for raising the TDS and nitrate objectives was the achievement of Hydraulic Control.[19]

Hydraulic Control is the reduction of groundwater discharge from the Chino North Management Zone to the Santa Ana River to less than 1,000 afy. Hydraulic Control is a goal of the OBMP with the intent of maintaining and enhancing the Safe Yield of the basin by ensuring that agricultural

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[13] Ibid, page 2-28 and Table 2-13

[14] Carryover Water is a defined term. Please see Storage Framework Appendix D for its definition.

[15] Excess Carryover Water is a defined term. Please see Storage Framework Appendix D for its definition.

[16] Local Storage Water is a defined term. Please see Storage Framework Appendix D for its definition.

[17] Storage and Recovery Program is a defined term. Please see Storage Framework Appendix D for its definition.

[18] The Chino North Management Zone consists of the combination of OBMP Management Zones 1, 2, and 3, exclusive the Prado Basin flood pool area.

[19] Hydraulic Control is a defined term. Please see Storage Framework Appendix D for its definition.

groundwater production in the southern half of the basin would be replaced by groundwater production for municipal uses as the land use in that area transitions from agricultural uses to urban uses. Through extensive investigations, it was determined that Hydraulic Control and the maintenance of Safe Yield required the expansion of desalter groundwater production to 40,000 afy and the reduction of basin water in storage by 400,000 af. These investigations included a recalculation of the total water in storage in the basin, based on the improved hydrogeologic understanding. The total storage in the Chino Basin for 2000 was estimated to be about 5,935,000 af, which is 635,000 af greater than that estimated for the OSR and 135,000 af greater than safe storage.[20]

The OBMP Implementation Plan was amended in 2007, and the Peace II Agreement enabled the expansion of the Chino Desalter pumping capacity from 20,000 afy to 40,000 afy. The technical investigations conducted to support the expansion of desalter groundwater production to 40,000 afy and the use of 400,000 af[21] of groundwater to partially meet the Replenishment Obligation for desalter production also indicated that the Safe Yield of the Chino Basin, at that time, was likely less than that stated in the Chino Basin Judgment and that it was projected to decline further in the future due to changes in cultural conditions in the watersheds overlying and tributary to the Chino Basin. The IEUA completed and subsequently certified a supplemental environmental impact report (SEIR) for the Peace II Agreement in 2010.

Starting in 2011, Watermaster began the technical effort to recalculate the Safe Yield. This work involved updating the hydrogeologic conceptual model of the basin, updating the historical hydrology, updating and recalibrating numerical models that simulate the surface and ground water hydrology of the Chino Basin area, and projecting the surface and groundwater response of the basin to future management plans that included storage management. This work is documented in *2013 Chino Basin Groundwater Model Update and Recalculation of Safe Yield Pursuant to the Peace Agreement* (WEI, 2015; hereafter, Safe Yield report). The results of that work yielded a reassessment of the hydrology of the basin from 1961 through 2011 and projections of basin hydrology through 2050, based on the best available planning information. The conclusions of the Safe Yield report, related to storage management, are:

- On July 1, 2000, the total water in storage in the basin was about 5,935,000 af, inclusive of the 236,000 af of managed storage. This is about 635,000 af greater than the OSR of 5,300,000 af that was established in the OBMP Implementation Plan.

- Managed storage was projected to increase from 487,000 af in 2016 to about 663,000 af by 2030 (exceeding the SSC by 163,000 af) and decline thereafter to zero af by 2051. Managed storage was projected to be used to meet future replenishment obligations.

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[20] Wildermuth Environmental, Inc., 2007. 2007 CBWM Groundwater Model Documentation and Evaluation of the Peace II Project Description.

[21] The 400,000 af of groundwater used for desalter replenishment is referred to as Re-Operation.

- Total storage was projected to fall below the OSR of 5.3 million af in 2041.

In 2017, the IEUA adopted an addendum to the Peace II SEIR, that provided a temporary increase in the SSC to 600,000 af through June 30, 2021 to provide time for Watermaster and the Judgment parties to update the OBMP storage management plan. The Storage Framework Investigation (2018) was conducted to provide technical support to update the storage management plan. In the absence of developing and adopting a new storage management plan by June 30, 2021, the SSC would again be limited to 500,000 af.

Storage Agreements

Since the Judgment came into effect, Watermaster developed rules and regulations, standard storage agreements, and related forms. There are three types of storage agreements that result in several types of storage accounts: Excess Carryover, Local Supplemental, Local Storage and Storage and Recovery. An Excess Carryover account includes a party's unproduced rights in the Safe Yield (Safe Yield for Overlying Non-Agricultural Pool[22] parties and Operating Safe Yield for Appropriative Pool[23] parties) and Basin Water acquired from other parties. A Local Supplemental Water account includes imported and recycled water that is recharged by a party and similar water acquired from other parties. A Storage and Recovery account includes Supplemental Water and is intended to produce a "broad and mutual benefit to the Parties to the Judgment." Watermaster tracks the puts, takes, losses, and end of year storage totals for all of these storage accounts, and reports on this accounting in the annual assessment process.

In evaluating applications for storage agreements, Watermaster must conduct an investigation to determine if the water stored and recovered under a proposed storage agreement will cause potential MPI to a party or the basin. If Watermaster determines that implementation of the proposed storage agreement will cause potential MPI, the applicant must revise its application so there is no MPI, or Watermaster must impose conditions in the storage agreement to ensure there is no MPI. Watermaster cannot approve a storage agreement that will result in MPI.

The parties, amongst themselves, are actively involved in water transfers of annual unproduced rights in the Safe Yield and water in their storage accounts. Watermaster has an application and review process for transfers that is similar to the storage agreement application process. Transfers are one way that the parties recover water held in storage accounts.

Existing Managed Storage and Proposed Storage and Recovery Programs

The Watermaster parties engage in conjunctive-use activities individually by storing Basin and Supplemental Waters that are in excess of their demands and subsequently recover that water as their individual needs arise. These activities collectively cause a temporary increase in managed storage. Table 1 summarizes the amount of water in managed storage by the Parties. Table 2-1 also shows the amount of water stored by the Metropolitan Water District of Southern California (Metropolitan) Dry-Year Yield Program (DYYP). The total volume of water in managed

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[22] Overlying Non-Agricultural Pool is a defined term. Please see Storage Framework Appendix D for its definition.

[23] Appropriative Pool is a defined term. Please see Storage Framework Appendix D for its definition.

storage as of June 30, 2018 was about 581,100 af. Table 1 does not reflect the anticipated reductions in managed storage that will occur to offset unassessed desalter replenishment obligations.[24]

[24] The reconciliation of the water held in managed storage and the desalter replenishment obligation should be complete by the end of calendar year 2019, and the final Storage Management Plan report will include an updated version of this table that reflects these changes.

Table 1 Ending Balances in Managed Storage in the Chino Basin[1]

(af)

Fiscal Year Ending June 30	Appropriative Pool				Overlying Non-Agricultural Pool			Total Managed Storage by Parties	Dry Year Yield Program Storage[6]	Total Managed Storage
	Carryover[2]	Excess Carryover (ECO)[3]	Local Supplemental Storage[4]	Subtotal	Carryover[2]	Local Storage[5]	Subtotal			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8) = (7) + (4)	(9)	(10) = (9) + (8)
2000	28,911	170,342		199,253	6,541	31,031	37,572	236,825	0	236,825
2001	15,940	77,907	92,813	186,660	5,301	32,330	37,631	224,291	0	224,291
2002	13,521	70,103	87,801	171,425	5,285	33,727	39,012	210,437	0	210,437
2003	18,656	71,329	81,180	171,165	6,743	36,850	43,593	214,758	7,738	222,496
2004	21,204	70,503	80,963	172,670	7,177	40,881	48,058	220,728	26,300	247,028
2005	21,289	76,080	88,849	186,218	7,227	45,888	53,115	239,333	38,754	278,087
2006	32,062	56,062	86,170	174,294	7,227	49,178	56,405	230,699	58,653	289,352
2007	34,552	50,895	83,184	168,631	7,084	51,476	58,560	227,191	77,116	304,307
2008	41,626	83,962	81,520	207,108	6,819	45,248	52,067	259,175	74,877	334,052
2009	42,795	101,908	79,890	224,593	6,672	46,600	53,272	277,865	34,494	312,359
2010	41,263	120,897	90,133	252,293	6,934	47,732	54,666	306,959	8,543	315,502
2011	41,412	146,074	98,080	285,566	6,959	49,343	56,302	341,868	0	341,868
2012	42,614	209,981	116,138	368,733	6,914	13,993	20,907	389,640	0	389,640
2013	39,413	225,068	116,378	380,859	7,073	15,473	22,546	403,405	0	403,405
2014	41,708	231,679	125,052	398,439	6,478	12,812	19,290	417,729	0	417,729
2015	44,437	254,643	132,791	431,871	6,823	12,225	19,048	450,919	0	450,919
2016	45,683	279,757	144,012	469,452	7,195	9,949	17,144	486,596	0	486,596
2017	43,314	308,100	157,628	509,043	7,226	11,343	18,569	527,612	6,315	533,927
2018	40,390	308,056	170,168	518,614	7,198	13,894	21,092	539,706	41,380	581,086

1. Account balances are from Watermaster Assessment Packages and do not account for the desalter replenishment obligation or the change in Safe Yield.
2. The un-produced water in any year that may accrue to a member of the Non-Agricultural Pool or the Appropriative Pool and that is produced first each subsequent Fiscal Year or stored as Excess Carryover
3. Carryover Water which in aggregate quantities exceeds a party's share of Safe Yield in the case of the Non-Agricultural Pool, or the assigned share of Operating Safe Yield in the case of the Appropriative Pool, in any year.
4. Water imported to Chino Basin from outside the Chino Basin Watershed and recycled water.
5. Water held in a storage account pursuant to a Local Storage Agreement between a party to the Judgement and Watermaster. "Local Storage Agreement" means a Groundwater Storage Agreement for Local Storage.
6. Ending balance in the Dry Year Yield Program storage account.

Metropolitan's DYYP is the only active Storage and Recovery Program in the basin. The DYYP can store up to 100,000 af with maximum puts of 25,000 afy and maximum takes of 33,000 afy. As of July 1, 2018, there were 41,380 af stored in the DYYP account. The agreement that authorizes the DYYP will expire in 2028.

The IEUA and some of the parties are proposing the implementation of Storage and Recovery Programs, including the Chino Basin Water Bank and the Chino Basin Program (CBP). The operational parameters of these proposed programs are not yet defined; that said, the amount of storage space required has been identified to range between 200,000 and 300,000 af.

Current Groundwater Management Challenges and Their Relationship to Current Storage Management

The results of the groundwater modeling work reported in the Safe Yield report projected, based on the best planning information available at that time, that the total storage in the basin will likely be relatively stable through the mid to late 2020s, and by 2050, groundwater levels were projected to decline over a broad area ranging from about 65 feet in the Pomona area to 50 feet in the Jurupa Community Services District (JCSD) and Desalter II well field areas.[25] This decline in groundwater levels was projected to occur because managed storage was used to replenish desalter production and over-production by Appropriative Pool parties.

During the development of the *2013 Amendment to the 2010 Recharge Master Plan Update* (2013 RMPU), the JCSD asserted that declining groundwater levels in the areas around and in the JCSD and Chino Basin Desalter Authority (CDA) well fields contributed to declining groundwater pumping capacity at JCSD and CDA wells. Loss in production capacity in this area is likely due to hydraulic interference among the wells and could be mitigated by reducing pumping at these wells, spreading out production over a greater area, and/or by increased recharge located proximate and tributary to the JCSD and CDA well fields. The projected decline in groundwater levels after the mid to late 2020s is projected to further exacerbate pumping sustainability challenges in this part of the basin.

The existing storage management plan is based on fixed amounts of water in storage, and its technical basis is not supported by new information available after the storage management plan was first developed (1999). Review of this new information (developed since 1999), indicates that it is possible to expand the SSC to enable greater use of storage space. This new information includes an updated hydrogeologic conceptual model; 20 years of intensive monitoring of basin operations (not available in 1999), including monitoring the basin response as managed storage approached the SSC of 500,000 af; and groundwater model-based projections of the basin response to future management plans where the managed storage exceeded 500,000 af. Re-Operation will reduce the amount of Basin Water in storage by 400,000 af. The current storage management plan does not account for Re-Operation.

The new information developed since 1999 suggests that the unanticipated use of managed storage to meet future desalter and other replenishment obligations could cause potential MPI: it has the potential to exacerbate land subsidence and pumping sustainability challenges, impact net recharge and Safe Yield, increase groundwater discharge through the CCWF, cause a loss of Hydraulic Control, and change the direction and speed of the contaminant plumes. The OBMP storage management plan needs to be updated to include features that will ensure there is no MPI to a party or the basin caused by the conjunctive-use activities of the parties and Storage and Recovery Programs.

Storage Management Plan Requirements

This section describes the technical features of the recommended storage management plan, based on the requirements of the Judgment, the Peace Agreement, and the conclusions of the Storage Framework Investigation.

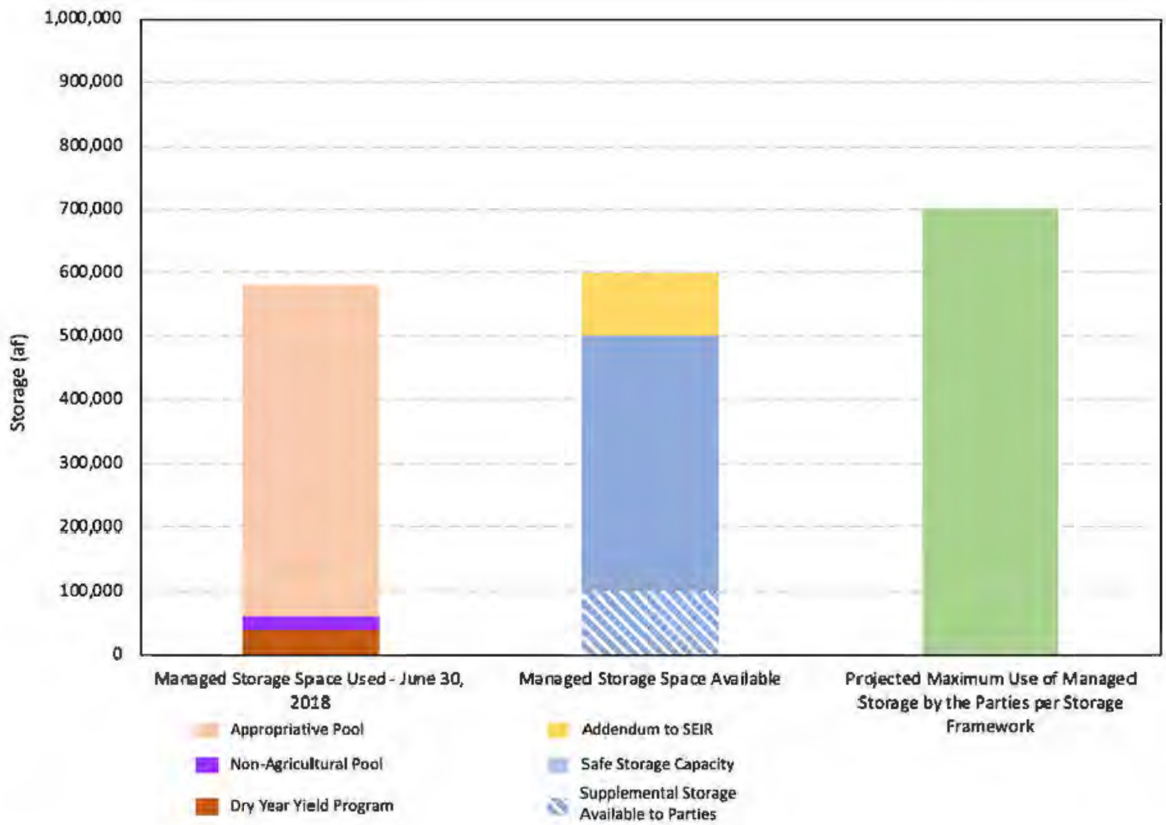
[25] See Figure 2-2 in the Storage Framework Investigation or Figure 7-5d from the Safe Yield report.

Allocation of Storage Space to the Parties Use of Managed Storage and Storage and Recovery Programs

The stakeholders desire to reserve storage space for the parties' individual uses and for Storage and Recovery Programs to provide certainty to their water supply planning and operations.

Based on the best available planning information provided by the parties in the Storage Framework Investigation, the parties' use of managed storage was projected to reach about 700,000 af in 2030 and decline monotonically thereafter. Therefore, it is logical to consider starting discussions for the parties use of managed storage with a limit of 700,000 af in the Storage Management Plan, and this will be adjusted in accordance with stakeholder input. Therefore, it is logical to consider establishing a limit for the parties' use of managed storage at 700,000 af in the Storage Management Plan. Figure 1 below compares the current use of managed storage to the storage space permitted per the Peace Agreement and the expected maximum use of managed storage by the parties.

Figure 1 Comparison of Managed Storage Space Used, Managed Storage Space Available and Projected Maximum Use of Managed Storage by the Parties



Alternatively, the Watermaster and the parties could establish a lower or higher limit, but additional engineering work will be required to assess the basin response and potential MPI for a higher limit.

The Storage Framework Investigation evaluated the use of 300,000 af of storage for Storage and Recovery Programs that was superimposed on the storage management activities of the parties. Therefore, it is logical to consider establishing an aggregate limit for all Storage and Recovery Programs at 300,000 af in the Storage Management Plan, and this limit will be adjusted in accordance with stakeholder input.

Reservation of Existing Spreading Basin Facilities to Satisfy Watermaster Recharge and Replenishment Obligations

The Judgment parties and IEUA, through the OBMP, have substantially increased the storm and supplemental water recharge capacity in the Chino Basin. The increase in supplemental water recharge capacity was done to ensure that Watermaster could meet its future recharge and replenishment obligations. Watermaster will include provisions in storage agreements that Watermaster will prioritize the use of spreading basins to satisfy Watermaster's recharge and replenishment obligations over the use of spreading basins for other uses.

Storage Management Activities of the Parties

Limitation of Transfers or Leases of Water Rights and Water Held in Managed Storage

Early in the OBMP implementation period Watermaster determined that transfers or leases of water rights and water held in managed storage (hereafter transfers) from parties that are situated such that they pump groundwater outside of MZ1 to parties that pump in MZ1 for *the purpose of replenishment* have the potential to cause MPI.

This limitation on transfers should be reconsidered if the land subsidence management plan for MZ1 includes consideration for such transfers, the land subsidence plan is implemented, and subsequent monitoring demonstrates the sufficiency of the land subsidence management plan.

Mitigation of Reduced Net Recharge and Safe Yield

Currently, Watermaster assesses a 0.07 percent loss to storage accounts based on the estimated groundwater discharge from the Chino North Management Zone to the Santa Ana River. The Storage Framework Investigation demonstrated that storing water has the effect of reducing net recharge and Safe Yield. The Storage Framework Investigation estimate of reduced net recharge is inclusive of discharge from the Chino North Management Zone to the Santa Ana River. The reduction in net recharge caused by storage is an adverse impact.

There are two fundamental approaches to mitigate the reduction in net recharge caused by the parties' storage management activities:

- In the first approach, the reduction net recharge would be embedded in Safe Yield, and it would be implicitly allocated to Appropriative Pool parties, based on their pro rata share of Operating Safe Yield.

- In the second approach, the reduction in net recharge would be debited to the storage accounts of the storing parties in the Appropriative and Overlying Non-agricultural pools, based on each parties' amount of water in storage.

Watermaster and the parties need to determine which of the above approaches or variant of them to include in the storage management plan to ensure that the impact from the parties' storage management activities are considered and addressed.

Storage and Recovery Programs

Prioritization of Put and Take Operations in MZ2 and MZ3

Storage and Recovery programs are implemented through a series of "puts" and "takes" where water goes into storage during a put and is recovered from storage during a take. Based on the results of the Storage Framework Investigation, these put and takes should be prioritized to occur in MZ2 and MZ3 to avoid new land subsidence and interfering with land subsidence management in MZ1, to minimize pumping sustainability challenges, to minimize the impact of storage and recovery operations on solvent plumes, to preserve the state of Hydraulic Control, and to take advantage of the larger and more useful groundwater storage space in MZ2 and MZ3.

This spatial prioritization on puts and takes should be reconsidered if the land subsidence management plan for MZ1 includes consideration for Storage and Recovery programs, the land subsidence plan is implemented, and subsequent monitoring demonstrates the sufficiency of the land subsidence management plan.

Evaluation of Storage and Recovery Program Impacts, MPI, and Mitigation

The intent of this provision is to reaffirm the requirements of Paragraph 12 of the Judgment and the Peace Agreement, as to the review of Storage and Recovery Program applications, and to require Storage and Recovery Program agreements to provide provisions that require Storage and Recovery Program proponents to cease or modify their operations if Watermaster determines, subsequent to Watermaster and Court approval of a Storage and Recovery Program storage agreement, that the proponent's storage and recovery operations are causing or threaten to cause potential MPI. The potential MPIs to be addressed include but are not limited to: land subsidence, pumping sustainability, reductions in net recharge and safe yield, water quality impacts, shallow groundwater, and liquefaction.

Watermaster will review each Storage and Recovery Program application, estimate the surface and groundwater system response, prepare a report that documents the response and potential MPI, and develop mitigation measures to mitigate MPI caused by the proposed Storage and Recovery Program. Watermaster will incorporate these mitigation measures into the Storage and Recovery Program storage agreement.

Watermaster will periodically review current basin conditions, compare this information to the projected basin conditions prepared in the evaluation of the Storage and Recovery Program application process, compare the projected Storage and Recovery Program operations to actual Storage and Recovery Program operations, and make findings regarding the efficacy of related MPI mitigation requirements in the Storage and Recovery Program storage agreement. And, based on its review and findings, Watermaster may require changes in the Storage and Recovery Program operations to mitigate MPI.

Hydraulic Control Impacts Due to a Storage and Recovery Program Must Be Mitigated

Watermaster will, as part of the Storage and Recovery Program application review process, make a projection of the program's expected impact on the state of Hydraulic Control. Watermaster will review these impacts and develop mitigation requirements for the proposed Storage and

Recovery Program. These mitigation requirements will be incorporated into the Storage and Recovery Program storage agreement.

Watermaster should periodically review the state of Hydraulic Control and update projections of the state of Hydraulic Control, compare this information to the projected Hydraulic Control assessment prepared in the evaluation of the Storage and Recovery Program application process, compare the projected Storage and Recovery Program operations to actual Storage and Recovery Program operations, and make findings regarding the efficacy of the related mitigation requirements in the Storage and Recovery Program storage agreement. And, based on its review and findings, Watermaster may require changes in the Storage and Recovery Program operations to mitigate impacts on the state of Hydraulic Control.

Storage Agreement Application Process

Watermaster and the parties should consider updating the storage agreement application process to incorporate changes in the technical features of storage management and to improve the efficiency of the application process.

Storage Management Plan Update

Watermaster should periodically review and update the storage management plan based on: monitoring information obtained since the previous storage management plan was adopted, technology changes, and the "needs and requirements of the lands overlying the Chino Basin and the owners of the rights in the Safe Yield or Operating Safe Yield of the Basin." The assessment of technical storage management concerns and opportunities requires the use of updated hydrologic data and models and can be completed efficiently with the recalculation of Safe Yield on a ten-year frequency or more frequently.

The projected aggregate amount of managed storage by the parties in 2050 (planning horizon of the Storage Framework Investigation) is about 340,000 af. Notwithstanding the update frequency recommended above, Watermaster should consider updating the storage management plan before the aggregate amount of managed storage by the parties falls below 340,000 af if not done earlier in a periodic update of the storage management plan.

Exhibit A

Comments and Responses on the June 8, 2019 Storage Management Plan White Paper

Monte Vista Water District

Comment No. 1. Page 1, first full paragraph, text that reads: "As a prerequisite to implementing the Optimum Basin Management Program ("OBMP") the parties executed an *agreement* providing direction and guidance to the Watermaster on how storage should be prioritized and managed." Emphasis added. ***MVWD comment reads: "please state agreement and year."***

Response. The agreement referred to is the 2000 Peace Agreement. Text modified to refer to the Peace Agreement.

Comment No. 2. Page 1, third full paragraph, , text that reads: "*Groundwater storage* was estimated to have declined by about 1,600,000 af over the period 1922 through 1978, the starting point of the Judgment implementation. This decline in *groundwater storage* was recognized in the Judgment, and it requires that the use of this space be undertaken only under Watermaster control and regulation." Emphasis added. ***MVWD comment reads: Storage did not decline, groundwater in storage declined" and "change to "groundwater in storage", respectively.***

Response. Text changed as requested.

Comment No. 3. Page 7, second full paragraph, text that reads: "The IEUA and some of the parties are proposing the implementation of Storage and Recovery Programs, including the Chino Basin Water Bank, the Santa Ana River Conservation and Conjunctive-Use Program (SARCCUP), and the Chino Basin Program (CBP). ***MVWD comment reads: " It may be more contemporary to now delete the reference to SARCCUP."***

Response. Text changed as requested.

Comment No. 4. Page 7, last paragraph continuing to top of page 8, text that reads: "The results of the groundwater modeling work reported in the Safe Yield report projected, based on the best planning information available at that time, that the total storage in the basin will likely be relatively stable through the mid to late 2020s, and by 2050, groundwater levels were projected to decline over a broad area ranging from about -65 feet in the Pomona area to -50 feet in the Jurupa Community Services District (JCSD) and Desalter II well field areas." ***MVWD comment reads: "Described as a decline, the negative signs cause a double negative."***

Response. Text changed to remove the negative signs.

Comment No. 5. Page 8, third full paragraph, text that reads: "The new information developed since 1999 suggests that the unanticipated use of managed storage to meet future desalter and other replenishment obligations could cause potential MPI: it has the potential to exacerbate land subsidence and pumping sustainability challenges, impact net recharge and Safe Yield, increase groundwater discharge through the CCWF, cause a loss of Hydraulic Control, and change the direction and speed of the contaminant plumes." ***MVWD comment reads: "Based on my 6/20 discussion with Andy I think he understands that it may be more clear if the phrase 'to meet future desalter and other replenishment obligations' is removed".***

Response. The text was not changed.

Comment No. 6. Page 9, last paragraph, text that reads: "Therefore, it is logical to consider establishing a limit for the parties' use of managed storage at 700,000 af in the Storage Management Plan." ***MVWD comment reads: "Change 'logical' to "conducive". 'Logical' seems to give an 700k an aura of certainty higher that it deserves."***

Response. The text was changed to read: "Therefore, it is logical to consider starting discussions for the parties use of managed storage with a limit of 700,000 af in the Storage Management Plan, and this will be adjusted in accordance with stakeholder input."

Comment No. 7. Page 10, second full paragraph, text that reads: "Therefore, it is logical to consider establishing an aggregate limit for all Storage and Recovery Programs at 300,000 af, provided that the aggregate storage limit for parties does not exceed 700,000 af." ***MVWD comment reads: "This sentence/conclusion should probably be put on hold pending on how Watermaster stakeholders decide to be addressed, including mitigation measures."***

Response: Note that the subsequent sentence in the text reads: "Watermaster and the parties could establish a lower or higher aggregate storage limit for Storage and Recovery Programs, but additional engineering work will be required to assess the basin response and MPI for a higher aggregated storage limit." This sentence responds to the comment. That said, the text was changed to read: "Therefore, it is logical to consider establishing an aggregate limit for all Storage and Recovery Programs at 300,000 af in the Storage Management Plan, and this limit will be adjusted in accordance with stakeholder input."

Comment No. 8. Page 11, first paragraph, text that reads: "Watermaster has the right to the use existing spreading basins to meet its recharge and replenishment obligations over the use of these facilities by any party or person to accomplish supplemental water recharge." ***MVWD comment reads: "Is it WM or WM stakeholders who have invested into the basins that have this right?"***

Response: The OBMP identified that there was not enough supplemental water recharge capacity to meet future replenishment obligations. OBMP implementation led to the construction of recharge improvements that increased supplemental water recharge capacity for replenishment. The intent of constructing the recharge improvements is specific to increasing storm water recharge and providing Watermaster recharge capacity for replenishment. The text has been changed to read that Watermaster will include provisions in storage agreements that Watermaster will prioritize the use of spreading basins to satisfy Watermaster's recharge and replenishment obligations over the use of spreading basins for other uses.

Comment No. 9. Page 11, second paragraph, text that reads: "Early in the OBMP implementation period Watermaster determined that transfers or leases of water rights and water held in managed storage (hereafter transfers) from parties that are situated such that they pump groundwater outside of MZ1 to parties that pump in MZ1 have the potential to cause MPI." ***MVWD comment reads: "Transfers/leases into MZ1 do not have the potential to cause MPI. It can be said that physical pumping/production to some level has the potential to cause MPI. Transfer/leases and pumping/production are not one in the same."***

Response: The text will be revised to improve clarity and will read: "Early in the OBMP implementation period Watermaster determined that transfers or leases of water rights and water held in managed storage (hereafter transfers) from parties that are situated such that they pump groundwater outside of MZ1 to parties that pump in MZ1 *for the purpose of replenishment* have the potential to cause MPI."

San Antonio Water Company

Comment No. 1. Page 1, first full paragraph, text that reads: "As a prerequisite to implementing the Optimum Basin Management Program ("OBMP") the parties executed an *agreement* providing direction and guidance to the Watermaster on how storage should be prioritized and managed." Emphasis added. ***SAWC comment reads: "Would you please direct me to document and page where this is referenced?"***

Response. The agreement referred to is the 2000 Peace Agreement. Text will be modified to refer to the Peace Agreement.

Comment No. 2. Page 2, citation to Judgment Paragraph 28. ***SAWC comment reads: "Storage agreements are currently not going to court...correct? Are there concerns at this time because of that?"***

Response: There are no concerns at time. The present storage agreement, procedures, and forms have been approved by the Court through the approval of the Peace Agreement and Watermaster Rules and Regulations.

Comment No. 3. Page 8, third full paragraph, text that reads: "The new information developed since 1999 suggests that the unanticipated use of managed storage to meet future desalter and other replenishment obligations could cause potential MPI: it has the potential to exacerbate land subsidence and pumping sustainability challenges, impact net recharge and Safe Yield, increase groundwater discharge through the CCWF, cause a loss of Hydraulic Control, and change the direction and speed of the contaminant plumes. The OBMP storage management plan needs to be updated to include features that will ensure there is no MPI to a party or the basin caused by the conjunctive-use activities of the parties and Storage and Recovery Programs. ***" SAWC comment reads: "I need further understanding. If the parties are not pumping the water and utilizing it as a transfer, why is there a problem? Wasn't this thought about when the desalter replenishment obligation was discussed? Didn't WEI do a study on the impact of this decision? Is it because the re-op schedule was changed?***

Response: The original storage management plan was developed for the OBMP in 1999, based on the best available information available to Watermaster. The overlying land and water use practices have evolved over time, and we have continued to refine our understanding of the Basin and its responsiveness to all known variables. Even since Re-Operation was approved by the Court in 2007, the collection and analysis of new data and the application of technology improvements have provided Watermaster and the parties the ability to develop a more refined evaluation of the potential the impacts to the basin from specific recharge, pumping, and storage activities. It is true, the length of time water is held in storage and the rate and location of its withdrawal have implications. Potential impacts attributable to proposed changes in the current baseline will be addressed using our improved knowledge and analytical tools and incorporated into the 2020 Storage Management Plan.

Comment No. 4. Page 11 first full paragraph, text that reads: "Watermaster has the right to the use existing spreading basins to meet its recharge and replenishment obligations over the use of these facilities by any party or person to accomplish supplemental water recharge." ***SAWC comment reads: "Why does Watermaster get first use of basin? Didn't the parties pay for the basin. Why is SAWCo's water not given priority over someone pumping rights they don't have?"***

Response: As to priority of use of the recharge basins, please see response to MVWD Comment No. 8. As to the question: "*Why is SAWCo's water not given priority over someone pumping rights they don't have?"* This is not a storage management plan question

Comment No. 5. Page 11, first bulleted item following the fifth paragraph, text that reads: "In the first approach, the reduction net recharge would be embedded in Safe Yield, and it would be implicitly allocated to Appropriative Pool parties, based on their pro rata share of Operating Safe Yield." SAWC's comment reads : ***"Other options need to be considered such as time frame for storage if it makes sense."***

Response: The white paper refers to bookends on the approach to identify and mitigate a reduction in Safe Yield caused by the use of managed storage. The impact on Safe Yield from the duration that water is held in managed storage is included the bookend approaches and any variants of them.

Overlying Agricultural Pool

Comment No. 1. Page 1, first paragraph, text that reads: " The prevailing standard for all operations is the avoidance of "undesirable results"—defined as "material physical injury"—under court approved management agreements executed contemporaneously and subsequent to the adoption of the OBMP Update in June 2020. " ***Ag pool comment reads: "MPI is legally defined by Watermaster legal documents (court approved management agreements) and it does not include "undesirable results." Ag Pool supports this concept however and recommends that WM bolster this in light of the defined term."***

No response required.

Comment No. 2. Page 3, first bullet after the second full paragraph, text that reads: "Operational storage requirement (OSR) is the storage or volume in the Chino Basin that is necessary to maintain the Safe Yield. The OSR was estimated in the development of the OBMP to be about 5.3 million af. This storage value was set as the estimated storage in the basin in 1997. " ***Ag Pool comment reads: "Should there be a discussion on the relevance of OSR and SSC for the OBMP Update?"***

Response: The relevancy of the original OBMP storage management plan will be described in the 2020 Storage Management Plan. The 2020 Storage Management Plan will be incorporated into the OBMP update.

Comment No. 3. Page 4, first full paragraph, text that reads: "Water occupying the SSC includes Carryover, Excess Carryover, Local Storage, and Supplemental Waters stored by the parties. Water stored for Storage and Recovery Programs is also included in the SSC. Carryover, Excess Carryover, Local Storage, and Supplemental Waters are referred to herein collectively as managed storage. " ***Ag Pool comment reads: "Why is this (managed storage) defined that way?"***

Response: Managed storage refers to all water that is stored by virtue of the management activities of the parties and Storage and Recovery Program entities, and it includes carryover water.

Comment No. 4. Page 4 last paragraph continuing onto Page 5, text that reads: "These investigations included a recalculation of the total water in storage in the basin, based on the improved hydrogeologic understanding. The total storage in the Chino Basin for 2000 was estimated to be about 5,935,000 af, which is 635,000 af greater than that estimated for the OSR and 135,000 af greater than safe storage." ***Ag Pool Comment reads: "This should be explained. Consider adding a technical rationale for the revised total storage and reference where this rationale was developed."***

Response: The engineering work for the Peace II Agreement produced a new hydrogeologic conceptual model that resulted in an updated estimate of the water in storage in 2000. A footnote will be added to state this and provide a reference to the documentation for it.

Comment No. 5. Page 5, second bullet after the second full paragraph, text that reads: "Managed storage was projected to increase from 487,000 af in 2016 to about 663,000 af by 2030 (exceeding the SSC by 163,000 af) and decline thereafter to zero af by 2051. Managed storage was projected to be used to meet future replenishment obligations." ***Ag Pool comment: "When and how will the storage be used? Should there be a schedule?"***

Response. The cited text refers to description of how managed storage is projected to change based on the work done to recalculate the Safe Yield and reported in *2013 Chino Basin Groundwater Model Update and Recalculation of Safe Yield Pursuant to the Peace Agreement* (WEI, 2015). The water in managed storage was assumed to be used for replenishment purposes based on the projected aggregate replenishment obligation. No schedule was recommended for the use of managed storage in the report. The concept of a schedule should be addressed by the parties in the development of the 2020 Storage Management Plan.

Comment No. 6. Page 6, first paragraph, text that reads: "Since the Judgment came into effect, Watermaster developed rules and regulations, standard storage agreements, and related forms. There are three types of storage agreements that result in several types of storage accounts: Excess Carryover, Local Supplemental, Local Storage and Storage and Recovery. An Excess Carryover account includes a party's unproduced rights in the Safe Yield (Safe Yield for Overlying Non-Agricultural Pool parties and Operating Safe Yield for Appropriative Pool parties) and Basin Water acquired from other parties. A Local Supplemental Water account includes imported and recycled water that is recharged by a party and similar water acquired from other parties. A Storage and Recovery account includes Supplemental Water and is intended to produce a "broad and mutual benefit to the Parties to the Judgment." Watermaster tracks the puts, takes, losses, and end of year storage totals for all of these storage accounts, and reports on this accounting in the annual assessment process." ***Ag Pool comment reads: "Should the different storage accounts be valued and used appropriately?"***

Response: This question should be addressed by the parties in the development of the 2020 Storage Management Plan.

Comment No. 7. Page 6, second paragraph, text that reads: "In evaluating applications for storage agreements, Watermaster must conduct an investigation to determine if the water stored and recovered under a proposed storage agreement will cause MPI to a party or the basin. If Watermaster determines that implementation of the proposed storage agreement will cause MPI, the applicant must revise its application so there is no MPI, or Watermaster must impose conditions in the storage agreement to ensure there is no MPI. Watermaster cannot approve a storage agreement that will result in MPI." ***Ag Pool comment reads: "What about storage absent agreements? Is it assumed that is MPI?"***

Response: The paragraph describes an agreement approval process. Currently, all storage accounts have agreements in place.

Comment No. 8. Page 6, third paragraph, text reads: "The parties, amongst themselves, are actively involved in water transfers of annual unproduced rights in the Safe Yield and water in their storage accounts. Watermaster has an application and review process for transfers that is similar to the storage agreement application process. Transfers are one way that the parties recover water held in storage accounts." ***Ag Pool comment reads: "Should the management plan curtail these? Should the parties be on notice that the ability to use a transfer is conditional on Watermaster's continued finding that removal of water held in storage will not cause MPI?"***

Response: Watermaster has an application and review process for transfers that is similar to the storage agreement application process. If Watermaster determines that a proposed transfer will cause MPI, the applicant must revise its application so there is no MPI, or Watermaster must impose conditions on the transfer to ensure there is no MPI. Watermaster cannot approve a transfer that will result in MPI. These questions should be addressed by the parties in the development of the 2020 Storage Management Plan.

Comment No. 9. Page 6, fourth paragraph, text that reads: "Table 1 does not reflect the anticipated reductions in managed storage that will occur to offset unassessed desalter replenishment obligations.[23]" ***Ag Pool comment reads: "Why not? Where is that analysis?"***

Response. See footnote 23 in the June 8th initial draft of the 2020 Storage Management Plan White Paper (footnote 24 in the July 18th final draft). Watermaster is the process of updating assessment packages from prior years pursuant to the Court order that approved the Safe Yield for the period 2011 through 2020. It is anticipated that the assessment package update will be completed within the calendar year. Table 1 will be updated after the assessment packages are updated.

Comment No. 10. Page 7, first paragraph, text that reads: "Metropolitan's DYYP is the only active Storage and Recovery Program in the basin. The DYYP can store up to 100,000 af with maximum puts of 25,000 afy and maximum takes of 33,000 afy. As of July 1, 2018, there were 41,380 af stored in the DYYP account. The agreement that authorizes the DYYP will expire in 2028." ***Ag Pool comment reads: "Should all storage be managed like this one? Why or why not?"***

Response: These questions should be addressed by the parties in the development of the 2020 Storage Management Plan.

Comment No. 11. Page 7, second paragraph, text that reads: "The IEUA and some of the parties are proposing the implementation of Storage and Recovery Programs, including the Chino Basin Water Bank, the Santa Ana River Conservation and Conjunctive-Use Program (SARCCUP), and the Chino Basin Program (CBP). The operational parameters of these proposed programs are not yet defined; that said, the amount of storage space required has been identified to range between 200,000 and 300,000 af." ***Ag Pool comment reads: "What would be the impact. What are the proposed best management practices for this type of use?"***

Response: Absent specific proposals for these proposed Storage and Recovery Programs, the Ag Pool questions cannot be answered. The CBP is currently being formulated, and the Ag Pool questions will be answered in detail in early 2020.

Comment No. 12. Page 8, first full paragraph, text that reads: "During the development of the 2013 Amendment to the 2010 Recharge Master Plan Update (2013 RMPU), the JCSD asserted that declining groundwater levels in the areas around and in the JCSD and Chino Basin Desalter Authority (CDA) well fields contributed to declining groundwater pumping capacity at JCSD and CDA wells. Loss in production capacity in this area is likely due to hydraulic interference among the wells and could be mitigated by reducing pumping at these wells, spreading out production over a greater area, and/or by increased recharge located proximate and tributary to the JCSD and CDA well fields. The projected decline in groundwater levels after the mid to late 2020s is projected to further exacerbate pumping sustainability challenges in this part of the basin." ***Ag Pool comment: "Will these types of techniques be required in the plan?"***

Response. This question should be addressed by the parties in the development of the 2020 Storage Management Plan.

Comment No. 12. Page 8, second full paragraph that reads: "The existing storage management plan is based on fixed amounts of water in storage, and its technical basis is not supported by new information available after the storage management plan was first developed (1999). Review of this new information (developed since 1999), indicates that it is possible to expand the SSC to enable greater use of storage space. This new information includes an updated hydrogeologic conceptual model; 20 years of intensive monitoring of basin operations (not available in 1999), including monitoring the basin response as managed storage approached the SSC of 500,000 af; and groundwater model-based projections of the basin response to future management plans where the managed storage exceeded 500,000 af. Re-Operation will reduce the amount of Basin Water in storage by 400,000 af. The current storage management plan does not account for Re-Operation. ***Ag Pool comment reads: "Detail of this is warranted."***

Response: Additional detail will be provided in draft Storage Management Plan document when it is prepared.

Comment No. 13. Page 8, third full paragraph that reads: "The new information developed since 1999 suggests that the unanticipated use of managed storage to meet future desalter and other replenishment obligations could cause potential MPI: it has the potential to exacerbate land subsidence and pumping sustainability challenges, impact net recharge and Safe Yield, increase groundwater discharge through the CCWF, cause a loss of Hydraulic Control, and change the direction and speed of the contaminant plumes. The OBMP storage management plan needs to be updated to include features that will ensure there is no MPI to a party or the basin caused by the conjunctive-use activities of the parties and Storage and Recovery Programs." ***Ag Pool comment reads: "What are the proposed management techniques to avoid this?"***

Response: The management features/requirements to avoid MPI are described in the 2020 Storage Management Plan White Paper, following the cited text, and they will be included in the Storage Management Plan.

Comment No. 14. Page 9, second paragraph that reads: "Based on the best available planning information provided by the parties in the Storage Framework Investigation, the parties' use of managed storage was projected to reach about 700,000 af in 2030 and decline monotonically thereafter. Therefore, it is logical to consider establishing a limit for the parties' use of managed storage at 700,000 af in the Storage Management Plan." ***Ag Pool comment reads: "This seems a bit high and not specific enough to each pumper. An itemized list of each parties desire for storage would be useful. What the parties lay claim to cannot be used by water bankers including IEUA for their grant funding. Water bankers are going to want absolute certainty in what they can bank.***

Response: These comments should be addressed by the parties in the development of the 2020 Storage Management Plan.

Comment No. 15. Page 10, first paragraph that reads: "Alternatively, the Watermaster and the parties could establish a lower or higher limit, but additional engineering work will be required to assess the basin response and MPI for a higher limit." ***Ag Pool comment reads: "Why wouldn't we do that now?"***

Response: This question should be addressed by the parties in the development of the 2020 Storage Management Plan.

Comment No. 16. Page 10, second paragraph, text that reads: "The Storage Framework Investigation evaluated the use of 300,000 af of storage for Storage and Recovery Programs that was superimposed on the storage management activities of the parties. Therefore, it is logical to consider establishing an aggregate limit for all Storage and Recovery Programs at 300,000 af, provided that the aggregate storage limit for parties does not exceed 700,000 af. Watermaster and the parties could establish a lower or higher aggregate storage limit for Storage and Recovery Programs, but additional engineering work will be required to assess the basin response and MPI for a higher aggregated storage limit." ***Ag Pool comment reads: "Again, should we do pumper and location specific analysis?"***

Response: An MPI analysis is required for each Storage and Recovery Program proposal, and they will include a "pumper and location-specific analysis."

Comment No. 17. Page 11, first paragraph, text that reads: "The Judgment parties and IEUA, through the OBMP, have substantially increased the storm and supplemental water recharge capacity in the Chino Basin. The increase in supplemental water recharge capacity was done to ensure that Watermaster could meet its future recharge and replenishment obligations. Watermaster has the right to the use existing spreading basins to meet its recharge and replenishment obligations over the use of these facilities by any party or person to accomplish supplemental water recharge." ***Ag Pool comment reads: "Why is this important and should it be developed further?"***

Response: This is important because Storage and Recovery Program agreements need to specify that Watermaster has priority use of the existing spreading basins for its recharge and replenishment obligations over the use of these facilities for storage and recovery operations. The intent is to avoid conflicts between the recharge capacity required by Watermaster to fulfill its obligations under the Judgment and the desire of Storage and Recovery Program proponents to use the same existing recharge facilities to conduct recharge for their storage and recovery programs. The need to develop this further should be addressed by the parties in the development of the 2020 Storage Management Plan.

Comment No. 18. Page 11, Second and third paragraphs, text that reads: "Early in the OBMP implementation period Watermaster determined that transfers or leases of water rights and water held in managed storage (hereafter transfers) from parties that are situated such that they pump groundwater outside of MZ1 to parties that pump in MZ1 have the potential to cause MPI. No such transfers have occurred since the OBMP was implemented in 2000. This limitation on transfers should be reconsidered if the land subsidence management plan for MZ1 includes consideration for such transfers, the land subsidence plan is implemented, and subsequent monitoring demonstrates the sufficiency of the land subsidence management plan." ***Ag Pool comment reads: "Why not include these requirements and potential uses in this plan? Additional details, analyses and monitoring would be needed to evaluate."***

Response: This requirement will be included in the 2020 Storage Management Plan. The ongoing monitoring and analysis for land subsidence and the implementation of future land subsidence plans will provide the information necessary to update the requirement.

Comment No. 19. Page 11, last paragraph, text that reads: "Watermaster and the parties need to determine which of the above approaches or variant of them to include in the storage management plan to ensure their storage management activities do not cause MPI." ***Ag Pool comment reads: "What does Wildermuth (the expert) recommend? Should those that benefit the most pay the most?***

Response: The specific approach in allocating mitigation liability for storage induced changes in net recharge and Safe Yield should be discussed and addressed by the parties.

Comment No. 20. Page 12, second paragraph, text that reads: "This limitation on puts and takes should be reconsidered if the land subsidence management plan for MZ1 includes consideration for Storage and Recovery programs, the land subsidence plan is implemented, and subsequent monitoring demonstrates the sufficiency of the land subsidence management plan." ***Ag Pool comment reads: "What does Wildermuth recommend as the tool to accomplish this? This needs further evaluation during development of the plan and continued validation and adjustment during operations on annual basis."***

Response: This management requirement will be described in greater detail in the draft 2020 Storage Management Plan.

Comment No. 21. Page 12, third paragraph, text that reads: "The intent of this provision is to reaffirm the requirements of Paragraph 12 of the Judgment and the Peace Agreement, as to the review of Storage and Recovery Program applications, and to require Storage and Recovery Program agreements to provide provisions that require Storage and Recovery Program proponents to cease or modify their operations if Watermaster determines, subsequent to Watermaster and Court approval of a Storage and Recovery Program storage agreement, that the proponent's storage and recovery operations are causing or threaten to cause MPI. The potential MPI to be addressed include but are not limited to: land subsidence, pumping sustainability, reductions in net recharge and safe yield, water quality impacts, shallow groundwater, and liquefaction." ***Ag Pool comment reads: "Propose abandonment of the Watermaster rebuttable presumption of no MPI."***

Response: This comment should be addressed by the parties in the development of the 2020 Storage Management Plan.

Comment No. 22. Page 12, third paragraph, text that reads: "Watermaster will review each Storage and Recovery Program application, estimate the surface and groundwater system response, prepare a report that documents the response and potential MPI, and develop mitigation measures to mitigate MPI caused by the proposed Storage and Recovery Program. Watermaster will incorporate these mitigation measures into the Storage and Recovery Program storage agreement." ***Ag Pool comment reads: "How will this requirement be reflected in the plan?"***

Response: It will be explicitly stated. This requirement is in the Peace Agreement.

Comment No. 23. Page 12, fifth paragraph, text that reads: "Watermaster will periodically review current basin conditions, compare this information to the projected basin conditions prepared in the evaluation of the Storage and Recovery Program application process, compare the projected Storage and Recovery Program operations to actual Storage and Recovery Program operations, and make findings regarding the efficacy of related MPI mitigation requirements in the Storage and Recovery Program storage agreement. And, based on its review and findings, Watermaster may require changes in the Storage and Recovery Program operations to mitigate MPI." ***Ag Pool comment reads: Will this be required by the plan?***

Response: Yes.

Comment No. 24. Page 13, first full paragraph, text that reads: "Watermaster should periodically review the state of Hydraulic Control and update projections of the state of Hydraulic Control, compare this information to the projected Hydraulic Control assessment prepared in the evaluation of the Storage and Recovery Program application process, compare the projected Storage and Recovery Program operations to actual Storage and Recovery Program operations, and make findings regarding the efficacy of the related mitigation requirements in the Storage and Recovery Program storage agreement. And, based on its review and findings, Watermaster may require changes in the Storage and Recovery Program operations to mitigate impacts on the state of Hydraulic Control." ***Ag Pool comment: "Define "periodically." The Ag Pool proposes that this be done on an annual basis and no less than every two years.***

Response: This management requirement will be described in greater detail in the draft 2020 Storage Management Plan.

Comment No. 25. Page 13, second full paragraph, text that reads: "Watermaster and the parties should consider updating the storage agreement application process to incorporate changes in the technical features of storage management and to improve the efficiency of the application process." ***Ag Pool comment reads: "Why not require it now and include it in the plan?"***

Response: This comment should be addressed by the parties in the development of the 2020 Storage Management Plan.

Comment No. 26. Page 13, third full paragraph, text that reads: "Watermaster should periodically review and update the storage management plan based on: monitoring information obtained since the previous storage management plan was adopted, technology changes, and the "needs and requirements of the lands overlying the Chino Basin and the owners of the rights in the Safe Yield or Operating Safe Yield of the Basin." The assessment of technical storage management concerns and opportunities requires the use of updated hydrologic data and models and can be completed efficiently with the recalculation of Safe Yield on a ten-year frequency or more frequently." ***Ag Pool comment reads: "Propose that Wildermuth define when this would be necessary and provide advice. Define "periodically."***

Response: This management requirement will be described in greater detail in the draft 2020 Storage Management Plan.

Comment No. 27. Page 13, fourth full paragraph, text that reads: "The projected aggregate amount of managed storage by the parties in 2050 (planning horizon of the Storage Framework Investigation) is about 340,000 af. Notwithstanding the update frequency recommended above, Watermaster should consider updating the storage management plan before the aggregate amount of managed storage by the parties falls below 340,000 af if not done earlier in a periodic update of the storage management plan." ***Ag Pool comment reads: "Consider adding a buffer of additional AF to provide time to adjust. Consider other potential factors as well, such a rate of decline and projected time of reaching this untested threshold. Repeat that the periodic update should be conducted on an annual basis. not on a regular basis to ensure that it does not fall below. How will storage be allocated among the parties. What happens if everyone wants 100k AF? Where is the substance of the plan?***

Response: As to the direct comment, the intent of the periodic review and update of the Storage Management Plan is to track the amount of water in managed storage, update the plan as necessary to avoid MPI, and to test the efficacy of the 340,000 af threshold. The frequency of the Storage Management Plan review and update will be established to ensure no MPI from the use of managed storage. This management requirement will be described in greater detail in the draft 2020 Storage Management Plan. The answers to the questions "How will storage be allocated among the parties. What happens if everyone wants 100k AF?" and "Where is the substance of the plan?" should be addressed by the parties in the development of the 2020 Storage Management Plan.

Overlying Non-Agricultural Pool

Comment No. 1. Background section, ***Overlying Non-ag Pool comment reads: "In this section, the report says that as a prerequisite to implementing the OBMP, "the parties executed an agreement." Which agreement does this refer to? Which parties executed it?***

Response. The agreement referred to is the 2000 Peace Agreement. Text will be modified to refer to the Peace Agreement.

Comment No. 2. Judgment section, ***Overlying Non-ag Pool comment reads: "In this section, the draft says that groundwater storage "was estimated" to have declined by about 1,600,000 af over the period from 1922 through 1978. Who made this estimate? When? What is the source for this statement?***

Response: The change in storage was reported in *2013 Chino Basin Groundwater Model Update and Recalculation of Safe Yield Pursuant to the Peace Agreement* (WEI, 2015).

Comment No. 3. Judgment section, ***Overlying Non-ag Pool comment reads: "In this section, the draft says that Section 11 and Section 12 of the Judgment require that use of storage be undertaken only under Watermaster control and regulation. Section 11 and Section 12 apply only to Supplemental Water. Is there a basis in the Judgment*** **for control or regulation by Watermaster of carryover water? What is the basis?**

Response: Watermaster does not require agreements for carryover. Paragraph 7 of Exhibit "G" (Overlying (Non-Agricultural) Pool Pooling Plan) and Paragraph 12 of Exhibit "H" (Appropriative Pool Pooling Plan) to the Restated Judgment both require a storage agreement with Watermaster as a condition of storing excess carryover.

Comment No. 4. Judgment section, **Overlying Non-ag Pool comment reads: "In this section, the draft says that Section 28 requires Watermaster to develop and administer storage agreements for Supplemental Water. Section 28 requires Watermaster to administer Supplemental Water, but does not require or authorize Watermaster to develop or administer storage agreements for carryover water. Is there a basis in the Judgment for storage agreements for carryover water? What is the basis?**

Response: See response to Comment No. 3 above.

Comment No. 5. Storage Agreement section, **Overlying Non-ag Pool comment reads: "In this section, the report says that an Excess Carryover account includes a party's unproduced rights in the Safe Yield *"and Basin Water acquired from other parties."* What is intended by the words in italics? Should the italicized words be replaced with "and Excess Carryover acquired from other parties"?**

Response: It includes a party's unproduced safe yield rights and the unproduced rights acquired from other parties.

Comment No. 6. Storage Agreement section, **Overlying Non-ag Pool comment reads: "In this section, the report says that, in evaluating applications for storage agreements, Watermaster must conduct an investigation to determine if the water stored and recovered under a proposed storage agreement will cause MPI to a party or the basin. As stated above, the Judgment appears to authorize control and regulation by Watermaster of Supplemental Water, but not carryover water. Is there a basis in the Judgment for investigations of MPI for storage of excess carryover? What is the basis?**

Response: Paragraph 7 of Exhibit "G" (Overlying (Non-Agricultural) Pool Pooling Plan) and Paragraph 12 of Exhibit "H" (Appropriative Pool Pooling Plan) to the Restated Judgment both require a storage agreement with Watermaster as a condition of storing excess carryover.

Comment No. 7. Existing Managed Storage and Proposed Storage and Recovery Programs section. ***Overlying Non-ag comment reads: "In this section, the report introduces the term "managed storage" for the first time. Prior to this section, all storage was referred to as "storage." The implication is that "managed storage" is a subset of "storage." What is the difference between "storage" and "managed storage"?***

Response: Managed storage is the aggregate of Carryover, Excess Carryover, Local Storage, and Supplemental Waters. This term was used throughout the Storage Framework Investigation presentations and report.

Comment No. 8. Storage Management Plan Requirements section. ***Overlying Non-ag comment reads: "In this section, the report says that it is "logical" to consider establishing an aggregate limit for all storage at 700,000 af. As stated above, the Judgment appears to authorize control and regulation by Watermaster of Supplemental Water, but not carryover water. Should limits on storage apply to Supplemental Water and perhaps other water, but not apply to carryover water?"***

Response: The limits suggested in this section are intended to apply to all water held in managed storage, which includes carryover water.

Comment No. 9. Mitigation of Reduced Net Recharge and Safe Yield section***. Overlying Non-ag comment reads: "In this Section, the report says that Watermaster assesses a 0.07 percent loss to storage accounts based on estimated losses of water in the Basin to the Santa Ana River. As stated above, the Judgment appears to authorize control and regulation by Watermaster of Supplemental Water, but not carryover water. Should such losses be assessed on Supplemental Water and perhaps other water, but not on carryover water?***

Response: Watermaster assesses these losses on excess carryover and supplemental water in storage.

Comment No. 10. Mitigation of Reduced Net Recharge and Safe Yield section. ***Overlying Non-ag comment reads: "In this Section, the report says that the "Storage Framework Investigation" demonstrated that storing water has the effect of reducing net recharge and Safe Yield. Where on Watermaster's website can the Storage Framework Investigation currently be found? Where in the report is this effect "demonstrated." If storage has this effect, should such reduction be attributed to Supplemental Water and perhaps other water, but not to carryover water?***

Response. Please see the Storage Framework Investigation Report located here:
https://cbwm.syncedtool.com/shares/folder/e83081106c3072/?folder_id=1429

The effect of managed storage on net recharge was presented and discussed at several workshops that were conducted during the preparation of the Storage Framework Investigation and pdfs of the PowerPoint presentation from these workshops are located here: https://cbwm.syncedtool.com/shares/folder/e83081106c3072/?folder_id=1406

Comment No. 11. Mitigation of Reduced Net Recharge and Safe Yield section. ***Overlying Non-ag comment reads: "In this Section, the report says that reduction in net recharge caused by storage is an MPI. Carryover water is unproduced water, and unproduced water is a natural condition pre-dating existing development of the basin. How can a natural condition be an MPI?***

Response: In a truly natural condition, basin storage will be maximized and <u>all</u> recharge to the basin is lost to rising groundwater and evapotranspiration by riparian vegetation. In a truly natural condition, net recharge is zero. Increasing the volume of water in managed storage has the effect of suppressing net recharge regardless of how you label the water that is included in the managed storage. That said, the text has been changed substituting the term "adverse impact" for MPI.

City of Ontario

Comment No. 1. Page 10, second paragraph. ***The City's comment reads: "Paragraph 2 contemplates establishing an aggregate limit of 300kaf for all Storage & Recovery (S&R) programs, "provided that the aggregate storage limit for parties does not exceed" 700kaf. This is different from establishing an aggregate limit equal to the total space (1M af) less the volume used by parties (700kaf or less). In the case that parties use less than 700kaf, while S&R programs remain limited to 300kaf, how will the difference between the actual volume of stored water and 1M af be addressed?"***

Response: The suggested aggregate allocation of 700 kaf to the parties for their individual conjunctive-use activities and the 300 kaf for Storage and Recovery Programs is based on the results of the Storage Framework Investigation. The allocation of managed storage space for these two types of uses should be discussed and agreed upon by the parties for inclusion in the 2020 Storage Management Plan.

Comment No. 2. Page 11, "Limitation of Transfers or Leases of Water Rights and Water Held in Managed Storage section." ***The City's comment reads: " The second paragraph in this section states that the limit on certain transfers "should be reconsidered" under certain conditions. It seems logical that these conditions could also include mitigation such as may be required for S&R programs. In addition, S&R programs may be designed such that puts and takes aid in addressing land subsidence, plumes, etc."***

Response: This management requirement will be described in greater detail in the draft 2020 Storage Management Plan

Comment No. 3. Page 11, Mitigation of Reduced Net Recharge and Safe Yield section***. City's comment reads: "This section identifies "two fundamental approaches to mitigate the reduction in net recharge" caused by stored water. Are there additional approaches that can be explored? One such approach may be preemptive mitigation rather than allocation of effects."***

Response: The white paper refers to bookends on the approach to identify and mitigate a reduction in Safe Yield caused by the use of managed storage. The specific approach in allocating mitigation liability for storage induced changes in net recharge and Safe Yield should be discussed and addressed by the parties.

Comment No. 4. Page 12, Evaluation of Storage and Recovery Program Impacts, MPI, and Mitigation section. ***City's comment reads: "The second paragraph in this section states that "Watermaster will review each Storage and Recovery Program application, estimate the surface and groundwater system response...." (emphasis added) It is unclear why it is necessary for Watermaster to evaluate surface water system responses."***

Response: The use of existing recharge facilities for Storage and Recovery Programs may conflict with the use of the same facilities for stormwater recharge and may reduce net recharge. The intent to is characterize this conflict and to subsequently develop conditions on the Storage and Recovery Program to mitigate it.

Comment No. 5. ***The City's comment reads: "General: Please provide citations for all references to guidance documents, particularly when quotation marks are used. Example: Page 13, 1st paragraph under "Storage Management Plan Update."***

Response: This request will be incorporated into the final version of the White Paper.

Appendix B1

Comments and Responses on the draft 2020 Storage Management Plan Report, Version 1

Appendix B1 -- Comments and Responses on the Draft 2020 Storage Management Plan Report, Version 1

October 1, 2019 letter from the Overlying Agricultural Pool

Comment No. 1**.** Page 1, fourth paragraph. Ag pool comment reads: ***"In regard to use of storage space by the Parties and other entities, the Ag Pool proposes that a schedule be developed to dictate when, how and by whom storage will be used. The Ag Pool also proposes that different storage accounts be valued and used appropriately."***

Response. Please see Section 2.1 of the draft 2020 SMP, Version 2.

Comment No. 2. Page 1, fifth paragraph. Ag pool comment reads: ***"The Draft 2020 SMP introduces "three types of storage agreements that result in four types of storage accounts," but only describes three of those four types of storage accounts. (Draft 2020 SMP, Section 1.1.) It also does not explain which type(s) of accounts are available to which Parties or Pools. Although this information is available in other documents, adding this information to the SMP would make for a more complete description of the types and ownerships of current and potential future accounts and would make this section more consistent with Table 1-1."***

Response. In Table 1-1, the column heading in the Overlying Non-Agricultural accounts for "Local Storage" has been changed to "Excess Carryover."

Comment No. 3. Page 1, fifth paragraph. Ag pool comment reads: ***"This paragraph also states that the Watermaster tracks "losses" and reports its accounting in the annual assessment process. Would it be helpful to expand on the types of "losses" that Watermaster tracks? Are there losses other than storage losses?***

Response. The text has been revised to include a description of the losses referred to in Section 1.1.

Comment No. 4. Page 1, sixth paragraph. Ag pool comment reads: ***"The Draft 2020 SMP also states that Watermaster must conduct an investigation to determine if the water stored and recovered under the proposed storage agreement will cause "potential MPI," and that the Watermaster cannot approve a storage agreement that will "result in MPI." (Draft 2020 SMP, Section 1.1.) Is the difference in wording intentional? If so, it would be helpful to explain the***

difference in meaning/use and maybe add this clarification to Note 7 on page 1-1. "Potential MPI" is also used in the first paragraph of Section 2.3.3.2."

Response The text was updated and now reads:

> "In evaluating applications for storage agreements, Watermaster must conduct an investigation to determine if the water stored and recovered under a proposed storage agreement has the potential to cause MPI to a Party or the basin. If Watermaster determines that implementation of the proposed storage agreement has the potential to cause potential MPI, the applicant must revise its application and demonstrate that there will be no MPI, or Watermaster must impose conditions in the storage agreement to ensure there is no MPI. Watermaster cannot approve a storage agreement that has the potential to cause MPI. "

Comment No. 5. Page 2 first full paragraph. Ag pool comment reads: ***"The Draft 2020 SMP recommends that the Watermaster's current limitation on transfers or leases of water rights and water held in managed storage from Parties that are situated such that they pump groundwater outside of MZ1 to Parties that pump in MZ1 for the purpose of replenishment "should be reconsidered if the land subsidence management plan for MZ1 includes consideration for such transfers, the land subsidence plan is implemented, and subsequent monitoring demonstrates the sufficiency of the land subsidence management plan." (Draft 2020 SMP, Section 2.3.1.) The Watermaster has indicated that "[t]he ongoing monitoring and analysis for land subsidence and the implementation of future land subsidence plans will provide the information necessary to update the requirement." (Comments and Responses on the June 8, 2019 Storage Management Plan White Paper, p. 10) However, the Draft 2020 SMP does not identify or discuss any parameters that will be used to determine whether the subsequent monitoring demonstrates the sufficiency of the land subsidence management plan. The Draft 2020 SMP also does not identify when such an evaluation would be made or if the limitation would be reinstated if conditions change in the future. Accordingly, the Draft 2020 SMP should be revised to include more detail on when and how the "sufficiency" of the plan will be determined."***

Response. Consider the timeline to reach a point where a land subsidence management plan for MZ1 has been functioning and monitoring and analysis can provide reliable information to assess the ability to allow transfers from Parties outside of MZ1 to Parties inside MZ1 that will not cause land subsidence. Given the present state of knowledge, it could take at least ten years to develop this plan and an agreement to implement it. It could take ten or more years of implementation and monitoring to assess the efficacy of the land subsidence management plan and additional investigations after that to determine if transfers from Parties outside of MZ1 to Parties inside MZ1 could be done without contributing to land subsidence. In sum, more than 20 years. Given this timeline, it is not appropriate to *"identify or discuss any parameters that will be used to determine whether the subsequent monitoring demonstrates the sufficiency of the land* *subsidence management plan."* Rather, the land subsidence management plan should include monitoring and analysis to demonstrate whether or not these transfers could occur and the conditions under which transfers could occur pursuant to the Peace Agreement. The land subsidence management plan should include monitoring and analysis that will provide information to determine if Storage and Recovery Programs can be operated in MZ1 without causing land subsidence.

Comment No. 6. Page 2 second paragraph. Ag pool comment reads***: "The Draft 2020 SMP identifies the two potential approaches to mitigate the reduction in net recharge caused by the Parties' storage management activities but does not further discuss the approaches. Regarding the second identified potential approach, the Ag Pool maintains that working through this issue will require consideration of factors that may/may not be known at the time a storage agreement is proposed or executed, versus uncertainties that could affect the availability, quantity, or cost of water under future continued storage or take conditions. For example, might a Party's interest in executing a storage agreement be affected if the debit associated with reduction in net recharge could not be quantified in advance?"***

Response. A proposed approach has been incorporated into the draft 2020 SMP, Version 2.

Comment No. 7. Page 2 third paragraph. Ag pool comment reads: ***"The Draft 2020 SMP states that storage "put" and "takes" should be prioritized to occur in MZ2 and MZ3 to avoid new land subsidence and interfering with land subsidence management in MZ1, to minimize pumping sustainability challenges, to minimize the impact of storage and recovery operations on solvent plumes, to preserve the state of Hydraulic Control, and to take advantage of the larger and more useful groundwater storage space in MZ2 and MZ3. Nonetheless, the Draft 2020 SMP again recommends that such prioritization "should be reconsidered if the land subsidence management plan for MZ1 includes consideration for such transfers, the land subsidence plan is implemented, and subsequent monitoring demonstrates the sufficiency of the land subsidence management plan" without further detail. (Draft 2020 SMP, Section 2.3.3.1.) The Draft 2020 SMP should be revised to include more detail on when and how the "sufficiency" of the plan will be determined."***

Response. See response to comment No. 5.

Comment No. 8. Page 2 fourth paragraph. Ag pool comment reads***: "Section 1.2, paragraph 1 identifies MWD's "Dry-Year Yield Program (DYYP)." The Ag Pool suggests adding a definition for MWD's DYYP that is more robust than the brief description contained in the paragraph under Table 1-1. Additionally, the paragraph indicates a maximum put of 25,000 afy and a maximum take of 33,000 afy under the DYYP. However, Table 1-1 shows the maximums were***

exceeded twice, in 2009 (40,383 take) and 2018 (35,065 put). An explanation of these apparent exceedances would be helpful."

Response. The text has been modified to explain the put exceeding 25,000 afy in fiscal year 2018 and the take exceeding 33,000 af in fiscal year 2009.

Comment No. 9. Page 2 fifth paragraph. Ag pool comment reads***: "Section 1.2, paragraph 4 refers to "managed storage space available." The Ag Pool suggests that Watermaster consider clarifying whether this is physical space available (without resulting in MPI), space available through existing approvals, both, or something else."***

Response. It's physical space available to the Parties and it was authorized in the 2010 Peace II Project Subsequent Environmental Impact Report and its 2017 Addendum. Other than the impact from the use of managed storage on net recharge and Safe Yield, no MPI is projected to occur.

Comment No. 10. Page 2 sixth paragraph. Ag pool comment reads: ***"The Draft 2020 SMP states that the "Watermaster will periodically review current and projected basin conditions, compare this information to the projected basin conditions prepared in the evaluation of the Storage and Recovery Program application process, compare the projected Storage and Recovery Program operations to actual Storage and Recovery Program operations, and make findings regarding the efficacy of related MPI mitigation measures and requirements in the Storage and Recovery Program storage agreement. And, based on its review and findings, Watermaster may require changes in the Storage and Recovery Program agreements to mitigate MPI." (Draft 2020 SMP, Section 2.3.3.2.) The Ag Pool proposes that Watermaster's review of Hydraulic Control be conducted on an annual basis and no less than every two years."***

Response. Presently Watermaster evaluates the state of hydraulic control on a one- to two-year frequency and reports the results of the evaluation to the Regional Board pursuant to its Maximum Benefit commitments.

Comment No. 11. Page 3 first full paragraph. Ag pool comment reads: ***"Sections 2.3.3.2 and 2.3.3.3 refer to Watermaster developing mitigation measures and incorporating such measures into a storage agreement. Is it appropriate that Watermaster develop the mitigation measures (given that doing so might affect the feasibility or cost of a Party's storage program) or should Watermaster simply identify the potential MPI that must be mitigated and leave it to the Party to develop and propose mitigation measures that Watermaster finds sufficient and acceptable?"***

Response. The text in Section 2.3.3.2 was modified to read:

> "Watermaster will review each Storage and Recovery Program application, estimate the surface and groundwater system response, prepare a report that describes the response and potential MPI, and develop mitigation requirements to mitigate MPI caused by the proposed Storage and Recovery Program. The Storage and Recovery Program applicant will develop mitigation measures pursuant to these requirements and incorporate them into their Storage and Recovery Program application. Upon approval by Watermaster, these mitigation measures will be incorporated into the Storage and Recovery Program storage agreement."

The text in Section 2.3.3.3 was modified to read:

> "Watermaster will, as part of the Storage and Recovery Program application review process, make a projection of the program's expected impact on the state of Hydraulic Control. Watermaster will review these impacts and develop mitigation requirements for the proposed Storage and Recovery Program. The Storage and Recovery Program applicant will develop mitigation measures pursuant to these requirements and incorporate them into their Storage and Recovery Program application. Upon approval by Watermaster, these mitigation measures will be incorporated into the Storage and Recovery Program storage agreement."

Comment No. 12. Page 3 second paragraph. Ag pool comment reads***: "The Draft 2020 SMP states that the Watermaster will "periodically" update the SMP and suggests "it can be completed efficiently with the recalculation of Safe Yield on a ten-year frequency." The Draft 2020 SMP also suggests that Watermaster should consider updating the SMP at least five years before the aggregate amount of managed storage by the Parties falls below 340,000 af if not done earlier in a periodic update of the SMP. The Ag Pool proposes that a projection of anticipated managed storage should be made at least every 5 years if the SMP is updated every 10 years. This will facilitate identification of an interim trigger to update the SMP based on managed storage falling below the 340,000 af threshold."***

Response. The text was modified to read:

> "Watermaster will periodically review and update the SMP based on: monitoring information obtained since the previous SMP was adopted, technology changes, and the "needs and requirements of the lands overlying the Chino Basin and the owners of the rights in the Safe Yield or Operating Safe Yield of the Basin." The periodic review and update of the SMP will require the use of updated planning and hydrologic data and models, and it should be completed: at no less than a five-year frequency; when the Safe Yield is recalculated; or when Watermaster determines a review and update is warranted based new information and/or the needs of the Parties or the Basin.

> The projected aggregate amount of water in managed storage by the Parties in 2056 (planning horizon of the 2018 SFI) is about 340,000 af. The impacts to the Basin and the Parties from reducing managed storage below 340,000 af has not been estimated. Notwithstanding the SMP update frequency stated above, Watermaster should update the SMP at least five years before the aggregate amount of managed storage by the Parties is projected to fall below 340,000 af."

Comment No. 13. Page 3 third paragraph. Ag pool comment reads: ***"The storage agreement application process section of the Draft 2020 SMP was left blank to be filled by Watermaster staff in the next draft. The Ag Pool proposes that the storage agreements include limits for the parties' use of managed storage. The storage agreements should also include a provision that places applicants on notice that water transfers between parties and its storage and extraction are subject to the continued finding of no MPI by Watermaster. The pumping sustainability issues should also be addressed in the storage agreements by including identification and analysis of production locations. The Draft 2020 SMP also did not address Ag Pool's proposed abandonment of the Watermaster rebuttable presumption of no MPI. Accordingly, Ag Pool restates its proposal to abandon the Watermaster's rebuttable presumption of no MPI."***

Response. Watermaster will present its proposed storage application process in the draft 2020 SMP Report, Version 3 in November.

October 1, 2019 annotated version of the draft 2020 SMP, Version 1 provided by the Inland Empire Utilities Agency

Comment No. 1. Comment refers to Section 2.2 referenced immediately above. IEUA comment reads: ***"Will there be a prioritization of Basins and resulting operation scheme?"***

Response. There is an existing hierarchal scheme for the use of spreading basins that includes the following: (1) flood control, (2) maximizing storm water recharge, (3) Watermaster replenishment and recharge, (4) IEUA recycled water recharge, and (5) maintenance. Use of spreading basins by Storage and Recovery Programs would come after the five higher priority uses have been satisfied.

Comment No. 2. Comment refers to Section 2.3.2 on page 2-2: "Two potential approaches were identified in the 2019 SFI and 2020 SMP White Paper to mitigate the reduction in net recharge caused by the Parties storage management activities." IEUA comment reads: ***"Should this include S&R programs or is it implicit?"***

Response. Section 2.3.2 refers to mitigation of the reduction in net recharge and Safe Yield due to the use of managed storage by the Parties. Mitigation for the reduction of net recharge and Safe Yield due to the use of managed storage by a Storage and Recovery Program is explicitly described in Section 2.3.3.2 of the draft 2020 SMP Report, Version 2.

Comment No. 3. Comment refers to Section 2.3.4 on page 2-3 and refers to a future section of the 2020 SMP that is not yet written. IEUA comment reads: ***"A flow chart may be helpful for this section once it is prepared?"***

Response. A flow chart may be included in the draft 2020 SMP, Version 3.

Comment No. 4. Comment refers to Section 2.3.4 on page 2-3 and refers to a future section of the 2020 SMP that is not yet written. IEUA comment reads: ***So are the S&R Programs going to be analyzed with boundary conditions of managed storage between 720kaf and 340kaf? Or based on annual projections as provided herein?"***

Response. No. Storage and Recovery Programs will be evaluated for their use of storage space in excess of that used by the Parties. Presently, the managed storage use by the Parties is projected to reach a maximum value of 720,000.

Appendix B2

Comments and Responses on the draft 2020 Storage Management Plan Report, Version 2

Appendix B2 – Comments and Responses on the October 24, Draft 2019 Storage Management Plan Report, Version 2

November 19, 2019 comment letter from the Overlying Agricultural Pool (OAP)

Comment No. 1**.** Section 1.1. OAP comment reads: ***"The introduction and descriptions of storage agreements and accounts remain unclear. The text refers to three types of agreements and four types of accounts. The text names four types of accounts, but only describes three. The relationship between types of accounts and their corresponding agreements should be clarified."***

Response. The text of SMP document was revised and it now reads:

> "Since the Judgment came into effect, Watermaster developed rules and regulations, standard storage agreements, and related forms. <u>There are three types of storage agreements that result in five types of storage accounts: Excess Carryover, Local Supplemental-Recycled, Local Supplemental-Imported, Pre-2000 Quantified Supplemental, and Storage and Recovery.</u> An Excess Carryover account includes a Party's unproduced rights in the Safe Yield (Safe Yield for Overlying Non-Agricultural Pool Parties and Operating Safe Yield for Appropriative Pool Parties) and Basin Water acquired from other Parties. Local Supplemental Water accounts includes imported and recycled water that is recharged by a Party and similar water acquired from other Parties. A Storage and Recovery account includes Supplemental Water and is intended to produce a "broad and mutual benefit to the Parties to the Judgment." Watermaster tracks the puts, takes, losses, and end of year storage totals for all of these storage accounts, and reports on this accounting in the annual assessment process. <u>The losses assessed by Watermaster are based on the amount of water in managed storage (excluding Carryover) and they offset the increase in groundwater discharge to the Santa Ana River from the Chino Basin attributable to managed storage (excluding Carryover). Watermaster also assesses losses due to evaporation on the puts when water is recharged in spreading basins</u>." (emphasis added)

Comment No. 2**.** Section 1.1. OAP comment reads: ***"The response to OAP Comment No.3 indicates the "text has been revised to include a description of the losses referred to in Section 1.1." (Appendix B Response to Comments on 2020 SMP V1, p. B-1.) The noted revisions and description are not apparent. Where in the text can they be found? There is a storage loss factor***

for flow out of the Chino North Management Zone (described in the White Paper). Are other losses calculated and tracked?"

Response. See text revision in the response to Comment No. 1 above.

Comment No. 3**.** Section 1.1. OAP comment reads: ***Details, such as the date it was approved by the court and its purpose, are provided for Form 8, however, corresponding information about Form 1 is not provided. Consider adding such information or explaining why the information is not relevant for Form 1."***

Response. The text of SMP document was revised to include the following paragraph in Section 1.1:

> "The Form 1 Application for Local Storage Agreement was approved in 2001 and has not been amended since that time; it is the mechanism through which Parties may apply to enter into a Local Storage Agreement."

Comment No. 4. Section 2.1. OAP comment reads: ***"This section does not describe how storage may be allocated among the Parties. Watermaster counsel has indicated Watermaster has no priority for allocation of storage but what will happen if it becomes a limited resource? Is it first come first serve until fully allocated with the hope that it will not be fully allocated?"***

Response. Watermaster anticipates, based on the Parties' projections, that 800,000 AF would be adequate to satisfy the Parties' storage activities and the DYYP until 2030. Watermaster plans to evaluate projections periodically and update the SMP no less frequently than every 5 years having the opportunity to adjust and avoid limiting the Parties use.

Comment No. 5. Section 2.1. OAP comment reads: ***"It is clear that a storing entity must prepare an evaluation of managed storage above 1,000,000 acre-feet (af) "to ensure that there will be no material injury." The OAP suggests making it clear (as we understand from the workshops) that the evaluation will be both a technical evaluation in addition to CEQA compliance. The OAP suggests including clarification that the evaluation needs to address potential Material Physical Injury (MPI) as well as adverse impacts (Safe Yield reduction and loss of hydraulic control)."***

Response: The text of SMP document was revised and it now reads:

> "Note that the use of managed storage greater than 1,000,000 af may be possible provided the storing entity submits a bona fide Storage and Recovery Program application, demonstrates that the program has broad mutual benefit,

> demonstrates that program's mitigation measures will meet the mitigation requirements of the Watermaster to ensure there will be no <u>MPI and other adverse impacts, complies with CEQA </u>and obtains approval from the Watermaster." (emphasis added)

Comment No. 6. Section 2.3.2. *OAP comment reads:* ***"Future evaluations of storage impacts to Safe Yield will be done in the Safe Yield reset or interim corrections. It may be helpful in this section to reference the 2015 Reset Technical Memorandum and the April 2017 Court order for additional information on the Safe Yield reset methodology."***

Response. A footnote was added to this section that reads:

> "Refer to the 2015 Reset Technical Memorandum and the April 2017 Court Order for additional information on the Safe Yield reset methodology. These documents can be found here: https://cbwm.syncedtool.com/shares/folder/e83081106c3072/?folder_id=1595."

Comment No. 7. Section 2.4.2. OAP comment reads: ***"The Draft SMP Version 2 states, "…recharge loss rate… may be adjusted from time-to time…" What is the mechanism for developing and approving this adjustment, and can it only be done under the condition of additional evaluation of Safe Yield?"***

Response. Watermaster may adopt uniform rules to address triggers, notice, opportunity to respond and to implement corrective actions. Moreover, as part of the Storage and Recovery application and approval process, each Storage and Recovery application may have customized conditions responsive to the characteristics of the specific project.

Comment No. 8. Section 2.4.2. OAP comment reads: ***"The Draft SMP Version 2 states, "Watermaster will periodically review current and projected basin conditions…" Periodically is subject to interpretation. Will this review be done at a minimum frequency, based on threshold changes in amounts of water in storage, or combined with other reviews (e.g., SMP updates, additional Safe Yield evaluations"***

Response. Watermaster will periodically review current and projected basin conditions when it updates the SMP as described in Section 2.6. Watermaster could conduct additional reviews if routine assessments of monitoring and planning data indicate changed conditions from that which was assumed in the evaluation of existing Storage and Recovery Program, when the Safe Yield is recalculated and when new Storage and Recovery Program applications are submitted to Watermaster.

Comment No. 9. Section 2.4.3. OAP comment reads: ***"The Draft SMP Version 2 states, "Watermaster will periodically review current and projected state of Hydraulic Control…" Periodically is subject to interpretation. Will this review be done at a minimum frequency, based on threshold changes in amounts of water in storage, or combined with other reviews (e.g., SMP updates, additional Safe Yield evaluations)?"***

Response. Hydraulic Control is evaluated annually in the Max Benefit Report to the Regional Board.

Comment No. 10. Section 2.4.3. OAP comment reads: ***"Please clarify that loss of Hydraulic Control is not an MPI, if that is what is intended. Loss of Hydraulic Control appears to have a higher threshold of impact than impacts to Safe Yield in the SMP because loss of Hydraulic Control "must be mitigated" as indicated in the section heading. The OAP suggests additional discussion of this need for a higher level of mitigation in the text of this section."***

Response. The text of SMP document was revised in multiple locations to state that loss of Hydraulic Control is an adverse impact and not MPI.

Comment No. 11. Section 2.6. OAP comment reads: ***"This section identifies the need for Watermaster to "update the SMP at least five years before the aggregate amount of managed storage by the Parties is projected to fall below 340,000 af." Watermaster has indicated in its response to comments that this threshold of 340,000 af includes Storage and Recovery programs. The 340,000 af threshold was established because impacts to the basin (e.g. subsidence induced by groundwater withdrawal) due to reducing managed storage below this threshold have not been evaluated. It could be termed "the band of storage management untested for MPI." We suggest that it may be appropriate to discuss this issue in Section 2.4.2 because there is additional risk in any storage and recovery program that relies on this untested band of storage management."***

Response. The 340,000 af threshold includes managed storage by the Parties and does not include Storage and Recovery programs.

November 21, 2019 comment email from the Overlying Non- Agricultural Pool (ONAP)

Comment No. 1. Page 1-2 – Last sentence of Background section. ONAP comment reads: ***"This sentence omits that Non-Agricultural Pool Parties can have Supplemental Waters. Please make the correction."***

Response: The text of SMP document was revised and it now reads:

> "Local Storage includes Excess Carryover for the Overlying Non-Agricultural Pool Parties and Excess Carryover and Supplemental Waters for the Appropriative Pool and Overlying Non-Agricultural Pool Parties."

Comment No. 2. Page 1-4 and Page 2-1 – Conjunctive-Use. ONAP comment reads: ***"Section 1.2 and Section 2.1 talk about conjunctive-use. How is conjunctive-use defined? What is included and excluded?"***

Response: First sentence of Section 1.2 describes conjunctive use.

Comment No. 3. Page 2-3 & 2-4 – Local Storage Applications/Agreements. ONAP comment reads: ***"Section 2.5 addresses the evergreen concept and the need for a revised Form 8. Will a new Form 1 also be needed? Will input from the Pools be considered in crafting revised forms?"***

Response: Proposed revised Forms, to the extent desired, will be considered and approved through the Pool Committee, Advisory Committee, and Board process.

Comment No. 4. Section 2.5. ONAP comment reads: **"Section 2.5 also comments that the evergreen agreements would be valid for the duration of the Peace Agreement. What happens upon expiration and how much advance notice will Parties have?"**

Response: The expiration of the Peace Agreement will be known at least five years in advance. Accordingly, the effect of the expiration of the Peace Agreement and storage agreements can be considered and addressed at the time an intervening SMP update is undertaken.

Comment No. 5. Page 2-4 – MPI. ONAP comment reads: ***"The last sentence in Section 2.5 discusses MPI. Please provide a summary of what MPI may be caused by water in storage if***

the Parties do not exceed the proposed First Managed Storage Band of 800,000 AF. What MPI could be caused over 800,000 AF?"

Response: The Storage Framework Investigation indicated there is no MPI within the FMSB; storage used above 800,000 AF will need to be evaluated for MPI (land subsidence, water quality, and pumping sustainability) and other adverse effects (e.g. reduction in Safe Yield, loss of Hydraulic Control).

November 19, 2019 comment letter from the City of Chino

Comment No. 1. Section 1.2 (Page 1-5 2nd paragraph) and Section 2.1 (page 2-1 paragraphs 1 and 2). City's comment reads: ***"Section 1.2 indicates the combined use of managed storage and the existing Dry Year Yield (DYY) conjunctive use program is projected to reach a maximum of ~790,000 AF, assuming there is 100,000 AF in the DYY in 2028. Section 2.1 paragraph 1 indicates the First Managed Storage Band (FMSB, upper threshold = 800,000 AF) includes the DYY. Section 2.1 paragraph 2 indicates that extension of the DYY (beyond 2028) will require the DYY to use storage space above the 800,000 AF band threshold.*** (a) ***Does this mean that if the DYY is extended (beyond 2028) that the 100,000 AF of space below the 800,000 AF threshold (within FMSB) previously reserved for DYY use prior to 2028 is immediately available for managed storage use in 2029 and no longer available for the DYY?*** (b) ***Does this mean that any extension of the DYY program beyond 2028 would likely be required to mitigate impacts in-advance?*** (c) ***Do the terms of the existing DYY agreement require that the water in the DYY account be entirely depleted (withdrawn) prior to 2028 agreement expiration?"***

Response. (a) – Yes. (b) – Any Storage and Recovery Program would be approved only if any projected MPI and adverse impacts are addressed such that the Program could be undertaken without MPI or adverse impacts. (c) – The storage agreement does not address this issue; the Operating Committee is currently reviewing. The SMP is planned to be updated at a frequency no less than every 5 years so any changes regarding the DYYP agreement could be addressed in later updates if necessary.

Comment No. 2. City's comment reads: ***"Expanding on Comment No. 1 (above), the possibility of adjusting the FMSB upper threshold up or down, based on the Parties' needs, was discussed at the November 6th SMP Workshop #3. Please expand on the timing of the modifications to the FMSB and what the process would be to make changes to the FM SB. For example, would changes to the FMSB upper threshold require consent from all three Pools and would unanimous consent be required from the Appropriative and Overlying Non-Agricultural Pool members?"***

Response. The Restated Judgment gives Watermaster control over storage; Watermaster plans to update the SMP as described in Section 2.6 and at that time will seek input including water demand and supply projections from the Parties. The FMSB was defined based on the Parties' input, which would be considered again at the time of any SMP update.

Comment No. 3. Section 2.3.2. City's comment reads: ***"Section 2.3.2 indicates that reduction in Safe Yield (SY) due to projected managed storage volume is incorporated into the SY estimate, and that this adverse impact (i.e. reduced Safe Yield) is mitigated by the prospective calculation***

of SY. (a) ***Please provide a tabulation or other form of explanation that illustrates the impact/mitigation below the FMBS threshold of 800,000 AF. Presumably, other factors (besides managed storage) may also have the effect of reducing Safe Yield.*** (b) ***Can it be determined what portion of estimated SY reduction is due to storage management and what portion of estimated SY reduction is due to other factors?*** (c) ***If yes, then how can these factors (i.e. managed storage and other cultural condition factors) be described in separate quantitative terms to allow for a practical means to reconcile the associated impacts on an annual basis?***

For example, if SY (net recharge) is reduced as a result of increasing storage volumes (assuming no corresponding implementation of a plan for optimizing production that would be necessary to maintain SY), can this cause & effect be expressed algebraically? (d) ***If yes, then what is the algebraic formula? If no, then what practical method(s) may be used to quantify the cause & effect on an annual basis as storage volumes fluctuate?"***

Response. (a) – This information has not been developed by Watermaster or its consultants. (b) – Theoretically, yes. (c) – Technical work could be done to develop methods to allocate the projected changes in net recharge and Safe Yield based on changes in cultural conditions and the individual Parties pumping, recharge and the storage activities. (d) – This would be determined in the work described in (c). This scope of work is highly impractical as there are many variables to consider and thus has not been considered or budgeted.

Comment No. 4. City's comment reads: ***"Expanding on Comment No. 3 (above), Storage Framework Investigation (SFI) Figure 5-7 depicts a projected inflection point at approximately Year 2040 when the net recharge begins to steadily increase. SFI Figure 6-3 describes managed storage volumes in Year 2040 to be well above 500,000 AF (depending on assumed operating scenario), and then dropping to approximately 340,000 AF in the Year 2056. Please provide an explanation of the circumstances depicted by these two figures, and how/why Safe Yield (net recharge) is projected to increase in the future when there is a significant amount of managed storage."***

Response. As to Figure 5-7, the following observations can be made from the review of 2018 SFI report Tables 3-4 and 3-5. In Scenario 1A, total groundwater pumping is projected to increase from about 146,000 afy in 2018 to about 154,000 afy in 2030 (~ 8,000 afy increase) and thereafter gradually increase to about 177,000 afy by 2040 (~23,000 afy increase). Projected pumping is less than pumping rights through 2030 and storage is projected to increase through 2030. After 2030, pumping exceeds pumping rights and storage is projected to decrease. The net recharge projection generally declines with increasing storage and increases with decreasing storage. There is a time lag between the onset of the decrease in storage and increase in net recharge that is attributable to the basin dynamics – in 2032 the rate of decline in net recharge declines and by about 2040 the net recharge starts to increase. Inspection of the water budget shown in Table 3-5 indicates that the total recharge during the 2018 through 2050 period is fairly consistent and averages about 200,000 afy; and that the total discharge increases gradually over the same period from about 190,000 afy to 218,000 afy tracking the projected pumping. Cultural conditions have some effect in that the deep infiltration of precipitation and applied water decreased by about 5,000 afy from 2018 to 2050 and however this effect has been offset by a projected increase in storm water recharge in 2021.

As to Figure 6-3 the projected decline in managed storage occurs because 80 percent of the projected replenishment obligation, estimated to be about 17,000 afy after 2030, is satisfied from managed storage.

Comment No. 5. . Sections 2.4.2 and 2.4.3. City's comment reads: ***"Both discussions end with an indication that Watermaster may require changes in Storage and Recovery (S/R) agreements to mitigate impacts. What processes of Watermaster notification and S/R Party response are contemplated to allow S/R Parties to modify their behavior to avoid or minimize further mitigation after they have presumably already provided mitigation at the time their S/R agreements were initially approved?"***

Response. Watermaster may adopt uniform rules to address triggers, notice, opportunity to respond and to implement corrective actions. Moreover, as part of the Storage and Recovery application and approval process, each Storage and Recovery application may have customized conditions responsive to the characteristics of the specific project.

Comment No. 6. White Paper. City's comment reads: ***"The SFI (page 1-5) indicates the Chino Basin Groundwater Model and Recalculation of Safe Yield Pursuant to the Peace Agreement {Safe Yield report) assessed the hydrology of the Chino Basin, and concluded that managed storage was projected to increase from 487,000 AF in Year 2016 to approximately 663,000 AF by Year 2030 and then decline thereafter to zero (0.0) AF by Year 2051. This was restated in the White Paper at the bottom of page 5. However, as described in Comment No. 4 (above), the subsequent SFI analysis (Figure 6-3) indicates managed storage is projected to be approximately 340,000 AF in Year 2056.*** (a) ***Does the SFI analysis update/replace the conclusion of the Safe Yield report with respect to the projected volume of managed storage in future years? Please explain."***

"The White Paper (page 3) indicates the Operational Storage Requirement (OSR) is the volume of storage necessary to maintain the Safe Yield (SY), and that during the development of the Optimum Basin Management Program (OBMP ~ Year 2000) the OSR was estimated to be 5.3 MAF. The White Paper also indicates the Safe Storage Capacity {SSC} in addition to the OSR was estimated (~ Year 2000) to be 500,000 AF (the SSC is the amount of storage for which it was believed significant water quality impacts would not be triggered by groundwater level). More recent Storage Framework Investigation (SFI) analyses seem to indicate that the SSC is~ 800,000 AF. SMP Section 2.6 indicates it is projected that the aggregate amount of managed storage by the Parties is approximately 340,000 AF in Year 2056 and that impacts resulting from an aggregate managed storage volume less than 340,000 AF has not been estimated.

However, recent SMP workshop discussions seem to suggest that if the aggregate managed storage volume is less than 340,000 AF, then it is believed that new land subsidence may result. (b) ***What relationships exist between the originally estimated 5.3 MAF OSR, the originally estimated 500,000 AF SSC, the 800,000 AF SFI FMSB, and the projected 340,000 AF managed storage volume?"***

Response. (a) – Yes. The 2018 SFI uses updated water demand and supply projections. (b) – The estimated 5,300,000 af OSR and 500,000 af SSC described in the Peace Agreement IP have no relationship to 800,000 af FMSB described in the 2020 SMP. The storage management plan in the 2020 SMP is a completely different management paradigm than that described in the Peace Agreement IP. The 2018 SFI and 2020 SMP are based on 20 years of monitoring, a significantly updated hydrogeologic understanding of the basin and improved modeling.

Comment No. 7. Section 2.3.2. City's comment reads: ***"Comment No. 3 (above), pertaining to Section 2.3.2, describes a circumstance that might generally be regarded as an adverse impact since SY is reduced. Maintenance of the 340,000 AF threshold described in Comment No. 6 (above) would seem to represent a positive impact i.e. prevents triggering the "onset of new land subsidence" that would likely occur when managed storage falls below that critical managed storage volume. If true, then how might this positive impact be quantified?"***

Response. Quantification of a benefit on preventing the occurrence of new land subsidence by maintaining managed storage in excess of 340,000 af is beyond the scope of the 2018 SFI.

November 19, 2019 comment letter from the City of Ontario

1. **Storage Bands**

   a. ***Section 1.2 describes end conditions for the volume of water in the DYYP account in 2028 and the subsequent extraction. This paragraph (the second paragraph on page 1-5) does not accurately characterize the agreement between Metropolitan Water District and the Parties to the DYYP. Parties are not obligated to perform (i.e. remove water from the DYYP storage account) after 2028.***

   Response. The DYYP agreement does not address this issue; the Operating Committee is currently reviewing. The SMP is planned to be updated at a frequency no less than every 5 years so any changes regarding the DYYP agreement could be addressed at later updates if necessary.

   b. ***Section 2.1 states that "the managed storage space between 800,000 and 1,000,000 af is reserved for Storage and Recovery Programs" (emphasis added).***

      i. ***If, due to changing conditions or water resource management, Parties desire to store more than 800,000 af, will Watermaster authorize storage agreements for Parties to do so?***

      Response. Yes, but this will require future technical evaluations and an SMP revision that would occur in periodic update of the SMP as described in Section 2.6.

      ii. ***Does this statement indicate that Watermaster intends to reserve space above 800,000 af for Storage and Recovery Programs which may never come to fruition?***

      Response. No, Watermaster anticipates, based on Parties' projections, that 800,000 AF would be adequate to satisfy Parties' storage activities and the DYYP until 2030. Watermaster plans to evaluate projections periodically and update the SMP no less frequently than every 5 years having the opportunity to adjust and avoid limiting the Parties use.

   c. ***Section 2.1 states that "renewal or extension of the DYYP agreement will require the DYYP to use storage space above 800,000 af." It is unclear why this is required.***

   Response. The FMSB for the 2020 SMP includes the projected managed storage requirement of the Parties and the DYYP. The DYYP is included in the FMSB because it is an existing Storage and Recovery Program, it places contractual requirements on the Parties and it will terminate in 2028. Renewal or extension of the DYYP will trigger a new Storage and Recovery Program application process and the terms of the renewed or extended DYYP storage agreement will need to be consistent with the SMP at the time the new Storage and Recovery Program application is considered by Watermaster. Storage and Recovery Programs utilize storage above the FMSB. The 800,000 afy contained in the FMSB will be revised no later than 2025 and it may be increased or decreased based on the managed storage requirements of the Parties.

d. ***In the last paragraph of Section 2.1, it is noted that "the use of managed storage greater than 1,000,000 af may be possible provided the storing entity…demonstrates that the program has broad mutual benefit."***

   i. ***What is the basis for this requirement? The Peace Agreement does not require all Storage and Recovery Programs provide broad mutual benefit. Broad mutual benefit is only necessary if Watermaster acts to condition, curtail or prohibit Local Storage to provide priority to Storage and Recovery Program(s).***

   Response. Section 5.2(c)(iv)(b) of the Peace Agreement provides that Watermaster shall prioritize its efforts to regulate and condition the storage and recovery of water developed in a Storage and Recovery Program for the mutual benefit of the Parties to the Judgment and give first priority to Storage and Recovery Programs that provide broad mutual benefits.

   ii. ***How is broad mutual benefit demonstrated and/or determined?***

   Response. Broad mutual benefit will be determined at the time that application(s) for Storage and Recovery Program storage agreements are received, and it may be determined through Activity B as it is being contemplated in the 2020 OBMP Update.

2. Use of Spreading Basins

a. ***In Appendix B, Watermaster's response to Inland Empire Utilities Agency's (IEUA) Comment No. 1 states that "there is an existing hierarchal scheme for the use of spreading basins." The listed "hierarchal scheme" includes first flood control, second stormwater recharge, third Watermaster replenishment and recharge, and fourth IEUA recycled water recharge. Who developed the hierarchal scheme for the use of spreading basins and where is this scheme documented? To which basins does it apply? Basins may be owned by San Bernardino County Flood Control District, Chino Basin Water Conservation District, or IEUA.***

Response. The priorities are established in Section III of the "Agreement for Operation and Maintenance of Facilities to Implement the Chino Basin Recharge Master Plan". They are also specified by basin in the Operations Manual.

b. ***Additionally, basins and basin improvements in some cases were funded 50% by IEUA to increase recycled water recharge. How does the stated hierarchal scheme recognize the priority of the Parties that have invested financially in the basins?***

Response. See response to comment 2.a. above.

3. ***Mitigation***

a. ***What is the benchmark for mitigation impacts to net recharge and Safe Yield? In other words, is the demonstrated reduction compared against 140,000 afy, 135,000 afy, or another value, such as a theoretical Safe Yield absent stored water?***

Response. The benchmark is estimated net recharge and Safe Yield absent stored water.

b. ***The Storage Framework Investigation concluded that the reduction in Safe Yield (as a percentage of average annual storage space used) ranged from 1.50% to 2.41% for bands 2, 3 and 4. The Storage Management Plan states this value as 2.0 percent. Please clarify if the 2.0 percent is an average across the three bands or if Watermaster is using a different methodology to set the 2.0 percent impact.***

Response. It is an average. For clarity the text of SMP document was revised and it now reads:

> "The 2018 SFI concluded the that the net recharge and Safe Yield of the basin would be reduced annually by about 2.0 percent <u>(ranged from 1.5 to 2.4 percent) of</u> the volume of water stored in a Storage and Recovery Program." (emphasis added)

c. ***Section 2.4.1 suggests prioritizing puts and takes in MZ2 and MZ3, in part due to impacts on "solvent plumes." Solvent plumes are also present in MZ2 and could be impacted by puts and takes in that zone, as could pumping depressions. Each Storage and Recovery***

Program should be individually analyzed to determine acceptable put and take locations.

Response. Comment noted.

d. ***For the process described in the second paragraph of Section 2.4.2, please describe if Watermaster will estimate lifetime reduction in net recharge at the onset of a Storage and Recovery Program, to be deducted annually similar to Local Storage losses, or if another method is envisioned.***

   Response. Watermaster will prepare an initial estimate of "rate" of reduction in net recharge and Safe Yield attributable to a specific Storage and Recovery Program during the application process. Watermaster may update the rate periodically as described in the fourth paragraph of Section 2.4.2 (SMP version 2) and through periodic updates of the SMP as described in Section 2.6.

4. Scope and Timing of Environmental Review

The Appropriative Pool formally requested that Watermaster proceed with the environmental review of storage management, including working with the Appropriative Pool's technical consultant. Watermaster has indicated that it intends to incorporate the Storage Management Plan into the current Optimum Basin Management Plan (OBMP) update effort, and then pursue environmental review on the package. However, the OBMP update effort is not subject to the same demonstrated time sensitivities as the Storage Management Plan, and negotiations have not yet begun on the activities to be included in an implementation plan. Ontario requests that Watermaster, responsive to the Pool's request, perform environmental review of the Storage Management Plan independent of and ahead of any environmental review that may be needed for the OBMP update.

Response. Comment noted.

5. Frequency of Updates

What is the basis for setting the minimum frequency at every five years? Performing the update every ten years concurrently with Safe Yield recalculations will provide a timelier and more comprehensive picture of storage projections. The five-year requirement is excessive and presents an unnecessary cost to the paying stakeholders. If conditions change or if the need arises, additional updates can be performed. Ontario recommends a minimum frequency of every ten years for updates.

Response. Comment noted.

6. Characterization of Material Physical Injury

a. In Footnote 7 defining Material Physical Injury, storage and recovery is incorrectly listed as "Storage, and Recovery." In the definition in Peace I, the term "storage and recovery" is not capitalized (in other words, is not a defined term) and is not separated into two actions by the placement of the comma.

Response. The text of SMP document was revised and it now reads:

> "Material Physical Injury" means material injury that is attributable to the Recharge, Transfer, storage and recovery, management, movement or Production of water, or implementation of the OBMP, including, but not limited to, degradation of water quality, liquefaction, land subsidence, increases in pump lift (lower water levels), and adverse impacts associated with rising Groundwater." (emphasis added)

b. Section 1.2 states that "for the planned use of managed storage by the Parties up to 700,000 af…there would be no MPI with the exception of a reduction of net recharge and Safe Yield…." A reduction of net recharge and Safe Yield is not included in the definition of Material Physical Injury.

Response. The SMP document has been revised to characterize the reduction in net recharge and Safe Yield attributable to managed storage activities as an adverse impact. The text now reads:

> "The 2018 SFI projected that for the planned use of managed storage by the Parties up to 700,000 af that Hydraulic Control would be maintained, that there would be no MPI and that there would be an adverse impact from the reduction of net recharge and Safe Yield attributable to the use of managed storage." (emphasis added)

c. Section 2.4.2 includes "reduction in Safe Yield" in the list of "MPIs to be addressed" in the first paragraph. A reduction in Safe Yield is not included in the definition of Material Physical Injury.

Response. The SMP document has been revised to characterize the reduction in net recharge and Safe Yield attributable to managed storage activities as an adverse impact.

7. ***Types of Storage Accounts Storage Agreements***

   a. ***Section 1.1 lists "four types of storage accounts" under "three types of storage agreements." It is unclear what the three types of storage agreements are, and the four types of storage accounts include "Local Storage" separate from "Local Supplemental" and "Excess Carryover." By definition, Local Storage includes Excess Carryover and Local Supplemental. Please clarify this statement.***

      Response. The text of the SMP document was revised and now reads:

      > "Since the Judgment came into effect, Watermaster developed rules and regulations, standard storage agreements, and related forms. <u>There are three types of storage agreements that result in five types of storage accounts: Excess Carryover, Local Supplemental-Recycled, Local Supplemental-Imported, Pre-2000 Quantified Supplemental, and Storage and Recovery.</u> An Excess Carryover account includes a Party's unproduced rights in the Safe Yield (Safe Yield for Overlying Non-Agricultural Pool Parties and Operating Safe Yield for Appropriative Pool Parties) and Basin Water acquired from other Parties. Local Supplemental Water accounts includes imported and recycled water that is recharged by a Party and similar water acquired from other Parties. A Storage and Recovery account includes Supplemental Water and is intended to produce a "broad and mutual benefit to the Parties to the Judgment. <u>Watermaster tracks the puts, takes, losses, and end of year storage totals for all of these storage accounts, and reports on this accounting in the annual assessment process</u>." (emphasis added)

   b. ***Please include a citation for the quotation at the top of page 1-3*****.**

      Response. The SMP document was revised to include the citation. The citation reads: "See paragraph 5.2(c)(iv)(b) of the Peace Agreement"

November 22, 2019 comment letter from the City of Upland

Comment No. 1. Section 1.2, Page 1-4. City's comment reads: **" Reduction of net recharge appears to be characterized herein as Material Physical Injury (MPI).** (a) **However, in Section 2.3.2 and at the November 6, 2019 2020 SMP workshop, reduction of net recharge is characterized as an adverse impact and mitigated for within the Safe Yield recalculation.** (b) **With the typical duration between Safe Yield recalculations being approximately 10-years, why isn't the mitigation for reduction of net recharge calculated annually to respond to the annual fluctuations in storage volume (as proposed in Section 2.4.2 for Storage and Recovery Programs)?** (c) **What are the advantages and disadvantages for mitigating for reduction in net recharge being embedded in Safe Yield versus on an annual basis?"**

Response. (a) – The text in the SMP has been modified to describe reductions in net recharge and Safe Yield as an adverse impact. (b) The Court's April 2017 order establishes the SY recalculation methodology; the recalculation considers the volume of wet water in Storage over the coming decade. (c) See part (b).

Comment No. 2. Section 1.2, Page 1-5. City's comment reads: **" Generally, what is the technical basis for allowing the Dry Year Yield Program (DYYP) to exceed puts and takes? What was the technical basis for allowing the DYYP takes to exceed 40,000 acre-feet (AF) in 2009? Is that approved by Watermaster as an administrative procedure or is that circulated through the Pools and board for approval?"**

Response. When MWD wants to exceed the 25,000 AF of annual put set forth in the DYYP agreement, the Parties consider the request through the regular Watermaster process.

Comment No. 3. Section 2.1, Page 2-1. City's comment reads: **" Regarding storage greater than 1,000,000 AF, consider revising and elaborating on that process. More specifically, what constitutes a "bona fide" application. In addition, please consider adding the required CEQA analysis to store above 1,000,000 AF."**

Response. The text in the SMP document was revised to include a footnote containing a definition of a bona fide Storage and Recovery Program application. The footnote reads:

> "A bona fide Storage and Recovery Program application includes the name of the person; the source, quantity and quality of the Supplemental Water; a description of the facilities proposed to be used, operating plan and duration of the proposed Storage and Recovery Program; CEQA documentation; and any other information Watermaster requires to evaluate the application."

The SMP text was also revised to include a requirement to complete a CEQA process for Storage and Recovery Program application that wish to use managed storage space in excess of 1,000,000 af.

Comment No. 4. Section 2.2, Page 2-1. City's comment reads: **" The City's "Upland Basin" is used by Watermaster and IEUA pursuant to an agreement between the three agencies. The agreement stipulates a specific quantity of storage space allocated to Watermaster and IEUA. To date, the agencies have worked cooperatively under said agreement to optimize basin usage, including storage above the dead storage quantity and allowing others to use the City's basin for recharge. The priority of additional recharge above the 200,000 AF in the agreement is subject to negotiation. This section needs to be clarified to recognize that use of some spreading basins is subject to separate agreement(s)."**

Response. The text of the SMP document was revised and it now reads:

> "Watermaster will include provisions in storage agreements to prioritize the use of spreading basins to satisfy Watermaster's recharge and replenishment obligations over the use of spreading basins for other uses <u>subject to limitations provided in existing agreements with the owners of the facilities</u>." (emphasis added)

Comment No. 5. Section 2.3.1, Pages 2-1 and 2-2 . City's comment reads: **" The limitations placed on agencies within MZ1 due to the potential to cause MPI will likely be in effect for "more than 20-years" according to Watermaster (Appendix B, Comment No. 5, Page B-2) appear to pose a long-term constraint on the ability of agencies within MZ1 to manage water. This limitation on transfers should also allow for a reconsideration on a case by case basis, over the next 20-years or more, by Watermaster to ensure there will be no MPI.**

For example, if a proposed transfer or lease from a Party that pumps outside of MZ1 to a Party that pumps in MZ1 demonstrates groundwater levels remain greater than the new land subsidence metric (i.e. new land subsidence won't occur per 2018 SFI Section 2.2.1), then consideration should be given by Watermaster."

Response. Comment noted.

Comment No. 6. Section 2.3.2, Page 2-2. City's comment reads: **" Same comments as above regarding mitigation for reduction of net recharge."**

Response. Comment noted.

Comment No. 7. Section 2.5, Page 2-4. City's comment reads: **" Define the term "evergreen agreement". Please provide clarification on the automatic adjustment (i.e. can be adjusted both up and down)."**

Response. Evergreen in this context signifies an agreement to store water that accommodates changes in the quantity of water in storage within FMSB, without requiring a new storage application.

November 20, 2019 comment letter from the Monte Vista Water District

Comment No. 1. MVWD comment: **"The SMP should specify which portions are proposed for incorporation into the 2020 Optimum Basin Management Program (OBMP) Implementation Plan as an amendment to the Peace Agreement. It may make more sense for Peace Agreement Parties to negotiate an amendment to the Peace Agreement (OBMP Implementation Plan) prior to approving the SMP, as the SMP must be consistent with the Peace Agreement, whether or not it is amended and only through consent of the Peace Agreement Parties."**

Response. The entire document is planned to be included in the 2020 OBMP IP.

Comment No. 2. MVWD comment: **"The SMP should acknowledge the priority of storage for Storage and Recovery Programs to the extent that Local Storage may be curtailed or prohibited (Peace Agreement 5.2 (b)(xi))."**

Response. The SMP has been drafted to provide the Parties with the use of all necessary storage for Local and Storage and Recovery activities consistent with the Parties' preferences and needs.

Comment No. 3. MVWD comment: **"The SMP should direct Watermaster to fully mitigate any reduction in Safe Yield due to either historical or projected storage activities in a manner that is equitably applied to all applicable storage activities so that Safe Yield is kept whole in respect to these storage activities."**

Response. Watermaster considers that the effects of storage activities in Safe Yield are addressed by the recalculation of Safe Yield pursuant to the Technical Memorandum methodology approved by the Court's April 28, 2017 order. Watermaster staff has been informed that the Appropriative Pool has reached agreement among Parties on how to compensate for individual storage activity effects on Safe Yield reduction.

Comment No. 4. MVWD comment: **"The SMP should focus on water stored in the basin that is subject to an agreement with Watermaster under the Judgment. This includes Local Storage (Excess Carryover and Supplemental), Storage and Recovery, and Preemptive Replenishment. Carryover is part of a producing Party's annual production right and not subject to an agreement with Watermaster. If Carryover is in excess of a Party's annual share of safe yield, the Party may then store the excess Carryover in a Local Storage (Excess Carryover) account under agreement with Watermaster. In contrast, water under a preemptive replenishment agreement is water stored in the basin under agreement with Watermaster; therefore, its management should be included in the SMP."**

Response. The Safe Storage Capacity identified in the OBMP IP included Carryover, which is “wet water” in storage. Similarly, the SMP provides for management of water in storage regardless of whether an agreement with Watermaster is required.

Comment No. 5. MVWD comment: **“For purposes of brevity and to avoid any potential confusion, the SMP should avoid describing the process and requirements for determining material physical injury (MPI), and instead refer to relevant sections of the Peace Agreement and Rules and Regulations governing MPI determination.”**

Response. Comment noted.

Comment No. 6. MVWD comment: **“The SMP should, under the principle of "beneficiary pays," include the implementation of a storage assessment as a more equitable way to allocate Chino Basin Watermaster costs related to storage.”**

Response. The judgment provides for Watermaster costs to be recovered using production-based assessments.

General response to MVWD redlined version of 2020 Draft Storage Management Plan, Version 2.

MVWD prepared a redline version of the 2020 SMP Version 2 document. The document has been modified to reflect comments received from various parties, this includes MVWD’s edits consistent with the overall document philosophy. Watermaster’s staff general responses to the suggested redline document are listed below:

1. Information included in the Background section is considered useful to the reader.
2. Carryover is “wet water” in the basin and was included in the Safe Storage Capacity in the OBMP IP. While Carryover does not require a storage agreement with Watermaster it is within Watermaster’s management and control, thus it is included in managed storage.
3. Preemptive replenishment accounts will no longer be used after current balances have been depleted.
4. The rebuttable presumption of no MPI was eliminated as part of the Second Amendment to the Peace Agreement.
5. Watermaster estimates the amount of storage to be used by Parties based on their projections will be 800,000 af including DYYP and not 720,000 af.
6. Watermaster is tasked with evaluating transfers and put and take operations before approving them.
7. The SMP provides a high-level description of Storage and Recovery Program requirements including Hydraulic Control impacts, this is intended to be helpful to future Storage and

Recovery Program applications.

8. Watermaster considers it necessary that the SMP be updated at the indicated frequency.

November 20, 2019 comment letter from the Chino Basin Water Bank

Comment No. 1. Comment reads: ***"Based on our understand that the storage space used by the Parties is projected to reach 720 KAF and the combined use of managed storage by the Parties and Metropolitan's DYYP is projected to reach a maximum of about 790 KAF, how was the 800 KAF for the S&R Program derived?"***

Response: Please see Appendix C of the final SMP report. The projected use of managed storage space by the Parties and Metropolitan is just under 800,000 af. The value of 800,000 af was arrived at by rounding up.

Comment No. 2. Comment reads: ***"Why are S&R required to mitigate MPI as if the 800 KAF were fully used, when it potentially is not?"***

Response: This is based on the Peace Agreement paragraph 5.2(c)(xiii) and (ix) that require Watermaster to condition Storage and Recovery Program storage agreements to protect the Parties and the basin from any potential MPI and to consider Broad Mutual Benefits.

Comment No. 3. Comment reads: ***"How do the estimated net recharge of 2.41% and 1.5% as average storage used translate to the annual loss percentages?"***

Response: See response to City of Ontario's comment No. 3.b.

Comment No. 4. Comment reads: ***"What process does Watermaster propose to adjust loss percentages in the future so that S&R Programs will have adequate time to prepare prior to changing conditions going into effect?"***

Response: Watermaster may adopt uniform rules to address triggers, notice, opportunity to respond and to implement corrective actions. Moreover, as part of the Storage and Recovery application and approval process, each Storage and Recovery application may have customized conditions responsive to the characteristics of the specific project.

Appendix C

2019 Update of Water Demand, Water Supply and Managed Storage Projections through 2050

Appendix C – 2019 Update of Water Demand, Water Supply and Managed Storage Projections through 2050

During the development of the 2020 SMP, Watermaster requested the Appropriative Pool Parties to review their water demand, associated water supply plan and their plans to use their stored water that were used in the 2018 SFI and update them if warranted. The planning period for the 2020 SMP is 2020 through 2050. Table C-1 shows the projected groundwater pumping by all Parties along with the recent historical pumping. The groundwater pumping projections for the Appropriative Pool Parties were unchanged from those used in the 2018 SFI except for three Parties: Cities of Chino and Pomona and the Monte Vista Water District (MVWD). The table below summarizes the differences between the pumping projections used in the 2018 SFI and the 2020 SMP. In summary the projected pumping in the 2020 SMP is less than that assumed in the 2018 SMP.

Comparison of total projected pumping for the 2018 SFI and 2020 SMP (afy)

Year	2018 SFI	2020 SMP	2020 SMP – 2018 SFI
2020	144,527	139,519	-5,008
2025	149,468	144,596	-4,872
2030	154,302	151,808	-2,494
2035	167,772	164,600	-3,122
2040	176,765	173,805	-2,969

Table C-2 lists the projected time series of managed storage by the Parties through 2050 based on the pumping projections in Table C-1. Table C-2 is constructed as follows.

- Column 1 lists the planning fiscal year ending on June 30.
- Column 2 list the projected total annual pumping based on the updated total pumping projections listed in Table C-1.
- Columns 3, 4 and 5 contain the projected annual Safe Yield from Scenario 1A of the 2018 SFI, Reoperation water used to partially offset annual Desalter replenishment obligation and the projected annual recycled water recharge.
- Column 6 lists the total annual pumping right which is equal to the sum of columns 3, 4 and 5.
- Column 7 lists the net annual replenishment obligation and is equal to the projected total annual groundwater pumping minus the projected total annual pumping rights. A negative value means that pumping is less than pumping rights and the difference results in an increase in managed storage. A positive value indicates that pumping exceeds pumping rights and a replenishment obligation has occurred that must offset through wet-water recharge and or from managed storage.

- Column 8 lists the annual amount of the replenishment obligation that is satisfied from storage. In the 2018 SFI it was determined that about 80 percent of the replenishment obligation would be satisfied from water in storage accounts and that assumption has not changed.
- Column 9 lists the annual amount of the replenishment obligation that is satisfied through wet-water recharge.
- Column 10 list the time history of end-of-year managed storage. The end-of-year managed storage is numerically equal to the end-of-year managed storage at the end of the prior year minus the net replenishment obligation (column 7) plus wet-water replenishment (column 9).

The maximum managed storage by the Parties is reached is 713,100 af in 2030. After 2030, the managed storage is projected to decline annually and reach about 484,000 af by 2050.

Metropolitan's Dry-Year Yield Program (DYYP) is the only active Storage and Recovery Program in the basin. The DYYP can store up to 100,000 af with maximum puts of 25,000 afy and maximum takes of 33,000 afy. The DYYP storage and recovery agreement provides that puts and takes can exceed these values if agreed to by Watermaster (as was done in fiscal years 2018 and 2009, respectively). The agreement that authorizes the DYYP will expire in 2028.

The combined use of managed storage by the Parties and Metropolitan's DYYP is projected to reach a maximum of about 791,300 af assuming that the DYYP has 100,000 af in storage in 2028 and that subsequent to 2028 Metropolitan removes that water from managed storage at the contract rate of 33,300 afy starting in 2029. This is illustrated in the table below.

Total potential combined end-of-year managed storage of the Parties and Metropolitan (af)

Year	Parties	Metropolitan	Total
2026	664,842	100,000	764,842
2027	678,623	100,000	778,623
2028	691,254	100,000	791,254
2029	702,734	66,667	769,434
2030	713,063	33,333	746,463
2031	713,061	67	713,128

Appendix E

Table C-1 Historical and Projected Groundwater Pumping in the Chino Basin

(af)

Producer	Historical Pumping										Pumping Projection (2019 Update)				
								Statistics (2013-2019)							
	2013	2014	2015	2016	2017	2018	2019	Min	Max	Mean	2020	2025	2030	2035	2040
Overlying Agricultural Pool															
Aggregate Agricultural Pool Pumping	23,946	22,063	17,361	16,904	17,786	18,827	15,572	15,572	23,946	*18,923*	15,678	12,788	9,968	7,907	4,808
Overlying Non-Agricultural Pool															
Ameron	59	18	29	30	25	-	-	18	59	*32*	-	-	-	-	-
Angelica Textile Service	48	37	26	28	20	-	-	20	48	*32*	-	-	-	-	-
California Speedway Corporation	509	436	454	300	410	438	389	300	509	*419*	500	500	500	500	500
California Steel Industries, Inc.	1,303	1,417	1,279	1,187	1,298	1,266	1419	1,187	1,419	*1,310*	1,450	1,450	1,470	1,500	1,530
General Electric Company	1,285	1,626	1,355	917	1,667	957	1127	917	1,667	*1,276*	1,667	1,667	1,667	1,667	1,667
NRG California South LP	470	290	221	204	211	212	18	18	470	*232*	232	232	232	232	232
Riboli Family and San Antonio Winery, Inc.	10	10	7	4	5	6	26	4	26	*10*	10	10	10	10	10
Southern Service Company	-	-	-	-	-	21	23	21	23	*22*	32	32	32	32	32
TAMCO	-	-	-	-	-	18	10	10	18	*14*	32	32	32	32	32
Subtotal Overlying Non-Agricultural Pool Pumping	*3,685*	*3,834*	*3,371*	*2,670*	*3,636*	*2,919*	*3,010*	*2,670*	3,834	*3,304*	*3,923*	*3,923*	*3,943*	*3,973*	*4,003*
Appropriative Pool															
Arrowhead Mountain Spring Water Company	413	379	426	356	367	308	285	285	426	362	400	400	400	400	400
City of Chino	7,022	6,725	6,546	5,010	4,972	5,162	4,315	4,315	7,022	5,679	8,262	9,696	11,058	11,945	14,355
City of Chino Hills	3,039	2,163	3,745	1,633	2,246	2,839	1,608	1,608	3,745	2,468	2,570	3,600	3,600	3,600	3,600
City of Ontario	21,146	21,980	17,675	22,849	24,840	26,280	20,722	17,675	26,280	22,213	12,363	14,514	17,947	23,715	31,016
City of Pomona	12,227	12,909	12,520	9,964	8,067	9,286	10,840	8,067	12,909	10,830	11,309	11,395	11,481	11,568	11,568
City of Upland	2,358	2,822	3,416	2,601	1,260	1,764	2,381	1,260	3,416	2,372	2,800	2,800	2,800	2,800	2,800
Cucamonga Valley Water District	18,740	16,122	14,640	20,537	16,562	6,838	9,624	6,838	20,537	14,723	12,755	13,687	13,859	19,282	19,282
Fontana Water Company	11,752	15,377	13,344	15,317	13,250	11,392	9,961	9,961	15,377	12,913	9,920	10,416	13,153	15,591	17,942
Jurupa Community Services District	17,411	18,406	12,805	9,284	11,498	15,286	13,894	9,284	18,406	14,083	10,310	12,310	14,310	14,310	14,310
Marygold Mutual Water Company	1,250	1,315	1,250	753	619	944	950	619	1,315	1,011	1,241	1,322	1,403	1,484	1,565
Monte Vista Water District	10,324	12,522	7,402	8,371	7,086	6,483	6,631	6,483	12,522	8,403	6,500	6,257	6,397	6,537	6,668
Niagara	1,000	1,343	1,860	1,775	1,532	1,571	1,683	1,000	1,860	1,537	1,537	1,537	1,537	1,537	1,537
San Antonio Water Company	1,540	1,159	1,479	1,031	538	428	376	376	1,540	936	1,232	1,232	1,232	1,232	1,232
San Bernardino County (Olympic Facility)	12	16	11	9	13	11	11	9	16	12	12	12	12	12	12
Golden State Water Company	1,059	736	720	807	850	148	0	0	1,059	617	374	374	374	374	374
Subtotal Appropriative Pool Pumping	*109,292*	*113,974*	*97,840*	*100,297*	*93,699*	*88,740*	*83,280*	*83,280*	*113,974*	*98,160*	*81,585*	*89,552*	*99,564*	*114,387*	*126,661*
Chino Desalter Authority															
Total Desalter Pumping	*27,098*	*29,282*	*30,022*	*28,191*	*28,284*	*30,088*	*31,233*	*27,098*	*31,233*	*29,171*	*40,000*	*40,000*	*40,000*	*40,000*	*40,000*
2020 SMP Projected Total Pumping	164,021	169,153	148,593	148,061	143,405	140,574	133,095	*133,095*	*169,153*	*149,557*	141,186	146,263	153,474	166,266	175,472
Less GE Injection											-1,667	-1,667	-1,667	-1,667	-1,667
2020 SMP Projected Net Total Basin Pumping											139,519	144,596	151,808	164,600	173,805
2018 SFI Projected Net Total Basin Pumping											144,527	149,468	154,302	167,722	176,765
Change in Projected Net Total Basin Pumping from the 2018 SFI Projection											-5,008	-4,872	-2,494	-3,122	-2,960

increase relative to 2018 SFI projection

decrease relative to 2018 SFI projection

20191209 App C Rev Managed Storage Projection .xlsx -- Table C-1 Hist & Proj Pump Sum
Created on 11/9/2016
Printed on 12/9/2019

Table C-2 Projected Groundwater Pumping, Pumping Rights, Replenishment and End-of-Year Volume in Managed Storage – SFI Scenario 1A Revised

(af)

Fiscal Year ending June 30	Projected Groundwater Pumping per 2020 SMP Survey for Normal Year	Pumping Rights				Net Replenishment Obligation[2]	Replenishment from Storage[3]	Replenishment with Wet-Water Recharge	End-of-Year Managed Storage
		Safe Yield[1]	Reoperation Water Use to Offset the Desalter Replenishment Obligation	Recycled Water Recharge	Total				
(1)	(2)	(3)	(4)	(5)	(6) = (3)+(4)+(5)	(7) = (2)-(6)	(8)	(9)	$(10)_t = (10)_{t-1} - (7)_t + (9)_t$
2019									503,275
2020	139,519	135,000	12,500	13,504	161,004	-21,485	0	0	524,760
2021	140,534	140,717	12,500	13,795	167,012	-26,478	0	0	551,237
2022	141,550	140,717	12,500	14,087	167,304	-25,754	0	0	576,991
2023	142,565	140,717	12,500	14,379	167,595	-25,030	0	0	602,021
2024	143,581	140,717	12,500	14,670	167,887	-24,306	0	0	626,327
2025	144,596	140,717	12,500	14,962	168,179	-23,583	0	0	649,910
2026	146,038	140,717	5,000	15,253	160,970	-14,932	0	0	664,842
2027	147,481	140,717	5,000	15,545	161,262	-13,781	0	0	678,623
2028	148,923	140,717	5,000	15,837	161,554	-12,631	0	0	691,254
2029	150,365	140,717	5,000	16,128	161,845	-11,480	0	0	702,734
2030	151,808	140,717	5,000	16,420	162,137	-10,329	0	0	713,063
2031	154,366	137,943	0	16,420	154,363	3	2	1	713,061
2032	156,924	137,943	0	16,420	154,363	2,561	2,049	512	711,012
2033	159,483	137,943	0	16,420	154,363	5,119	4,096	1,024	706,917
2034	162,041	137,943	0	16,420	154,363	7,678	6,142	1,536	700,774
2035	164,600	137,943	0	16,420	154,363	10,236	8,189	2,047	692,585
2036	166,441	137,943	0	16,420	154,363	12,077	9,662	2,415	682,923
2037	168,282	137,943	0	16,420	154,363	13,918	11,135	2,784	671,789
2038	170,123	137,943	0	16,420	154,363	15,759	12,607	3,152	659,181
2039	171,964	137,943	0	16,420	154,363	17,600	14,080	3,520	645,101
2040	173,805	137,943	0	16,420	154,363	19,441	15,553	3,888	629,548
2041	173,805	139,164	0	16,420	155,584	18,221	14,577	3,644	614,971
2042	173,805	139,164	0	16,420	155,584	18,221	14,577	3,644	600,394
2043	173,805	139,164	0	16,420	155,584	18,221	14,577	3,644	585,818
2044	173,805	139,164	0	16,420	155,584	18,221	14,577	3,644	571,241
2045	173,805	139,164	0	16,420	155,584	18,221	14,577	3,644	556,664
2046	173,805	139,164	0	16,420	155,584	18,221	14,577	3,644	542,087
2047	173,805	139,164	0	16,420	155,584	18,221	14,577	3,644	527,510
2048	173,805	139,164	0	16,420	155,584	18,221	14,577	3,644	512,934
2049	173,805	139,164	0	16,420	155,584	18,221	14,577	3,644	498,357
2050	173,805	139,164	0	16,420	155,584	18,221	14,577	3,644	483,780

503,275 af is the estimated volume in managed storage on June 30, 2019

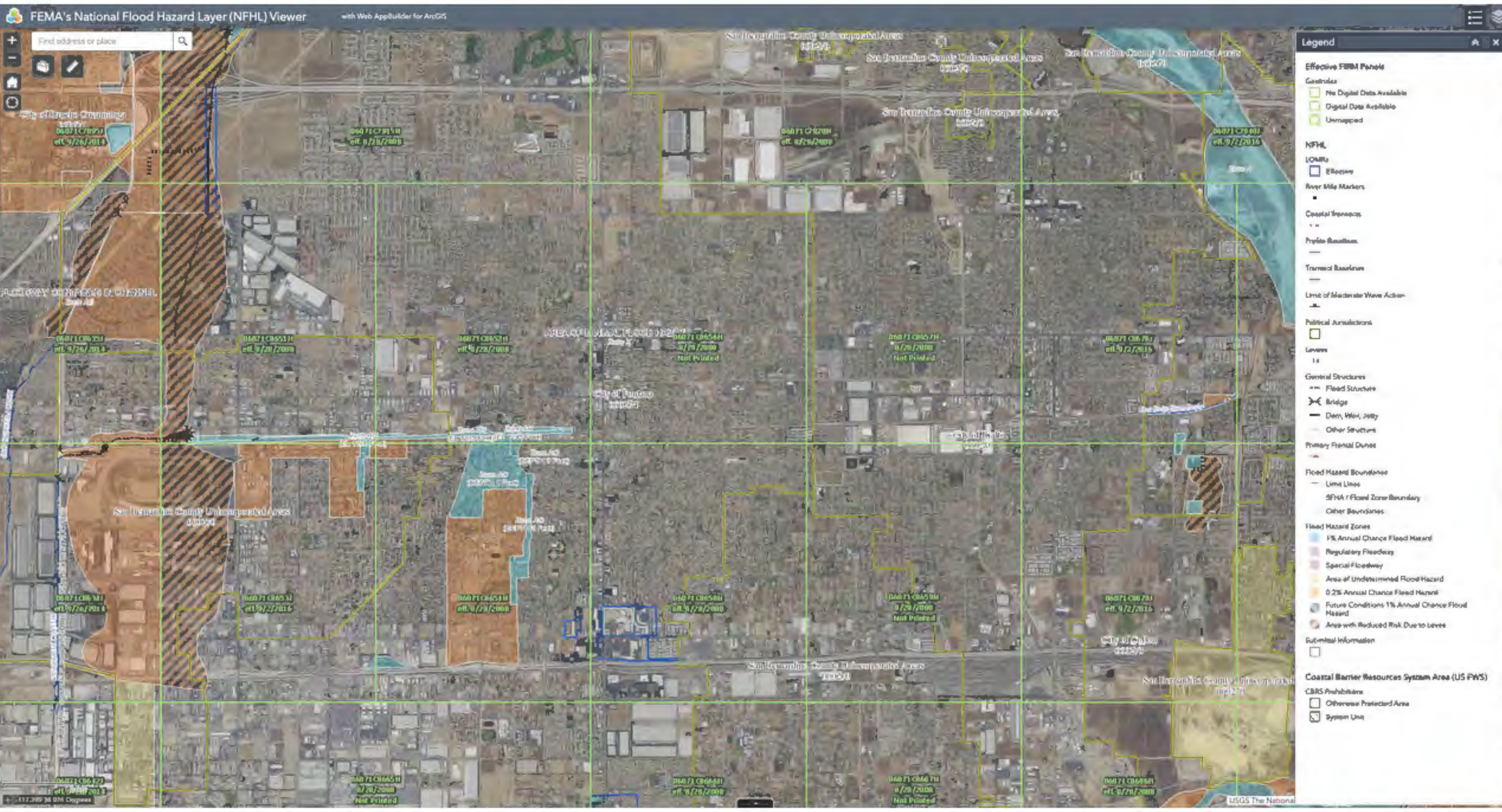
1 -- Safe yield estimate from net recharge estimated in Scenario 1A.

2 -- This is the annual net replenishment obligation based on the assumptions described in the 2018 SFI report; negative values mean aggregate underproduction and an increase in stored water accounts.

3 -- 80 percent of a positive replenishment obligation is satisfied from storage and 20 percent is satisfied by wet-water recharge.

APPENDIX 7

FEMA FIRM Panels


FEMA's National Flood Hazard Layer (NFHL) Viewer
with Web AppBuilder for ArcGIS
Find address or place
Legend
Effective FIRM Panels
No Digital Data Available
Digital Data Available
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LOMRs
Effective
River Mile Markers
Coastal Transects
Profile Baselines
Transect Baselines
Limit of Moderate Wave Action
Political Jurisdictions
Levees
General Structures
Flood Structure
Bridge
Dam, Weir, Jetty
Other Structure
Primary Frontal Dunes
Flood Hazard Boundaries
Limit Lines
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Regulatory Floodway
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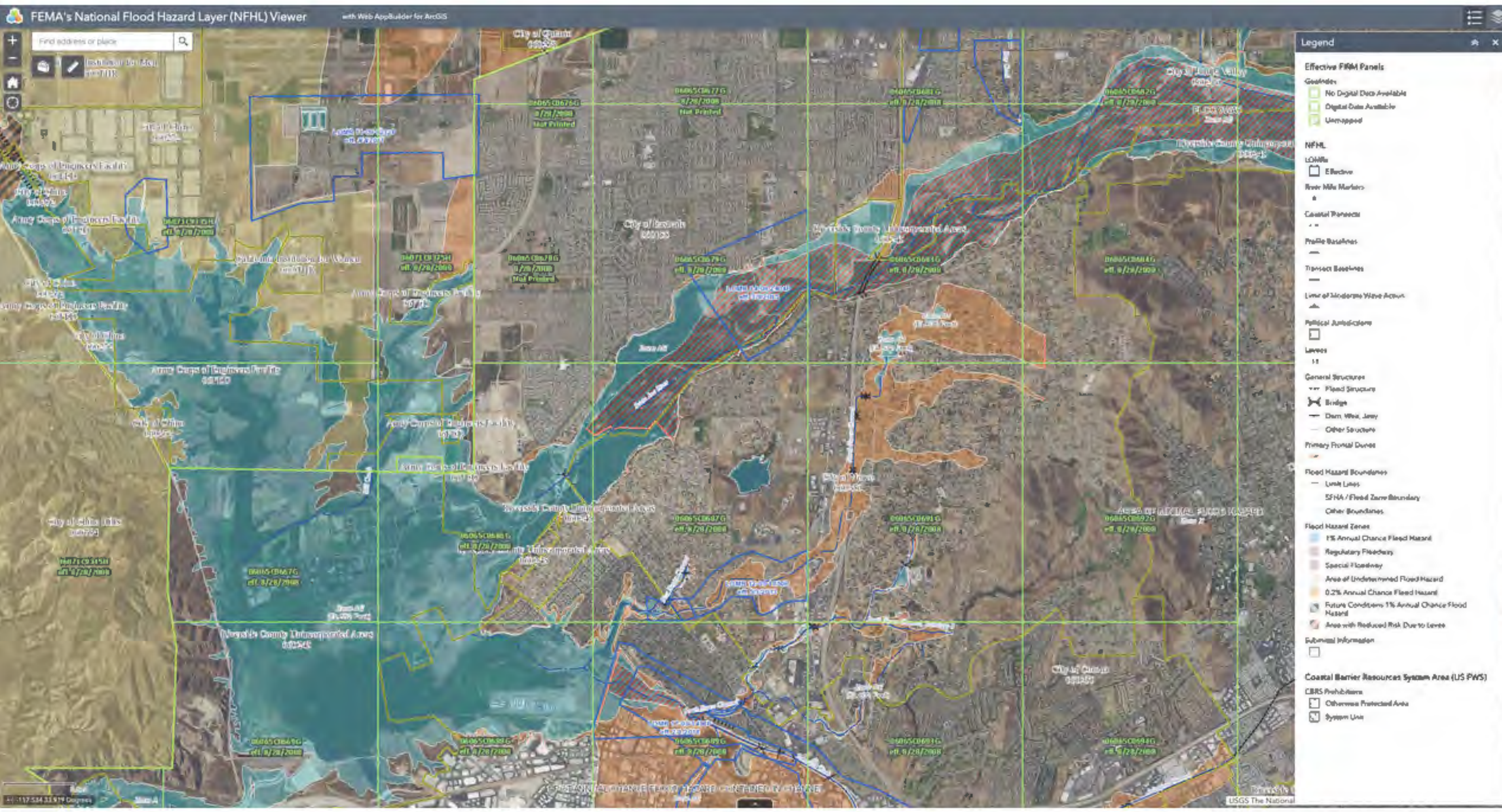
0.2% Annual Chance Flood Hazard
Future Conditions 1% Annual Chance Flood Hazard
Area with Reduced Risk Due to Levee
Submittal Information
Coastal Barrier Resources System Area (US FWS)
CBRS Prohibitions
Otherwise Protected Area
System Unit
USGS The National


FEMA's National Flood Hazard Layer (NFHL) Viewer
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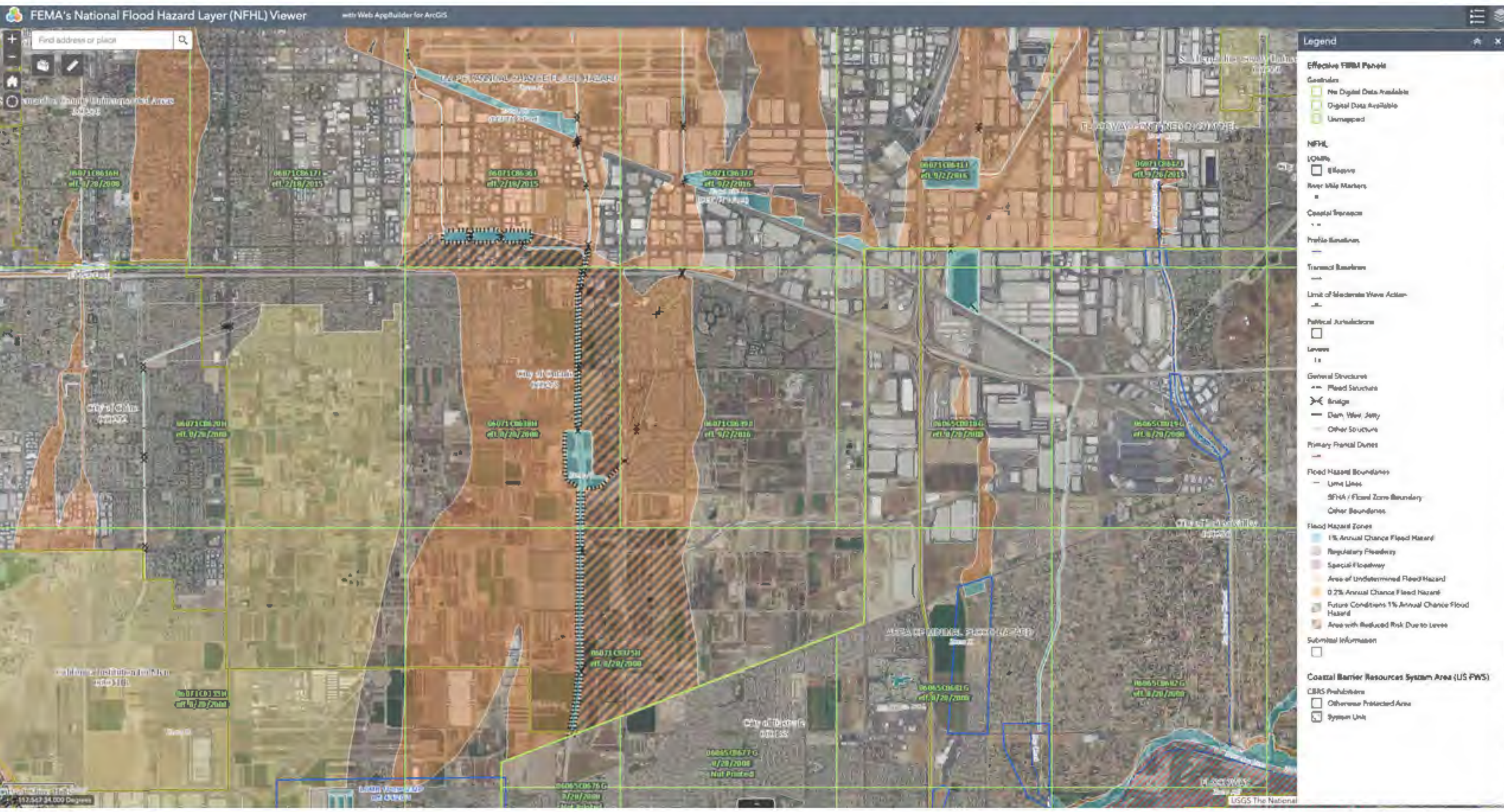
CBRS Prohibitions
Otherwise Protected Area
System Unit
City of Riverside
City of Chino Hills
Riverside County Unincorporated Areas
Army Corps of Engineers Facility
USGS The National



FEMA's National Flood Hazard Layer (NFHL) Viewer
with Web AppBuilder for ArcGIS
Find address or place
City of Ontario
City of Chino
City of Eastvale
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eff. 8/28/2008
06071C8638H
eff. 8/28/2008
06071C8637J
eff. 9/2/2016
06071C9325H
eff. 8/28/2008
Legend
Effective FIRM Panels
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Coastal Transect
Profile Baselines
Transect Baselines
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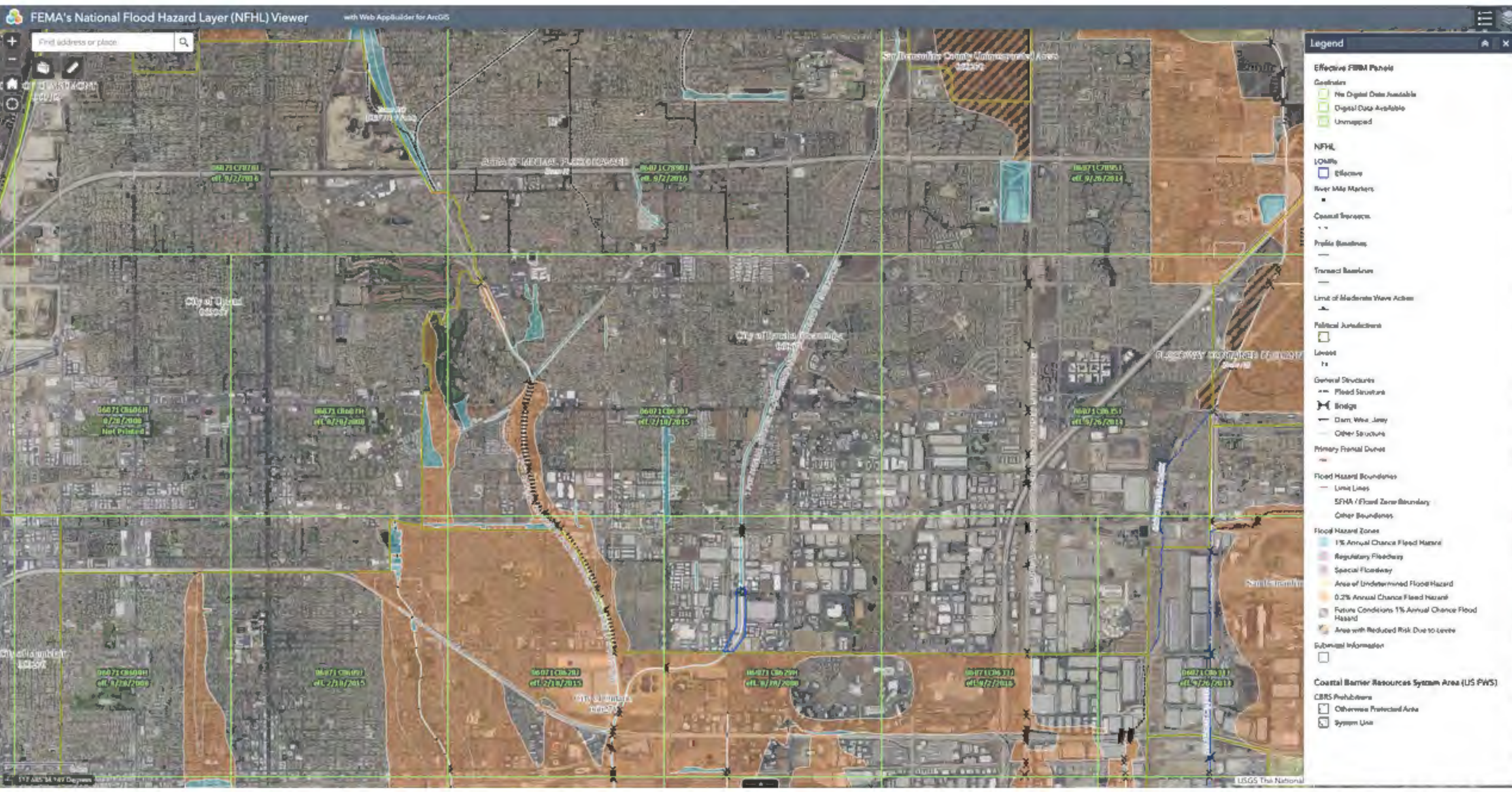

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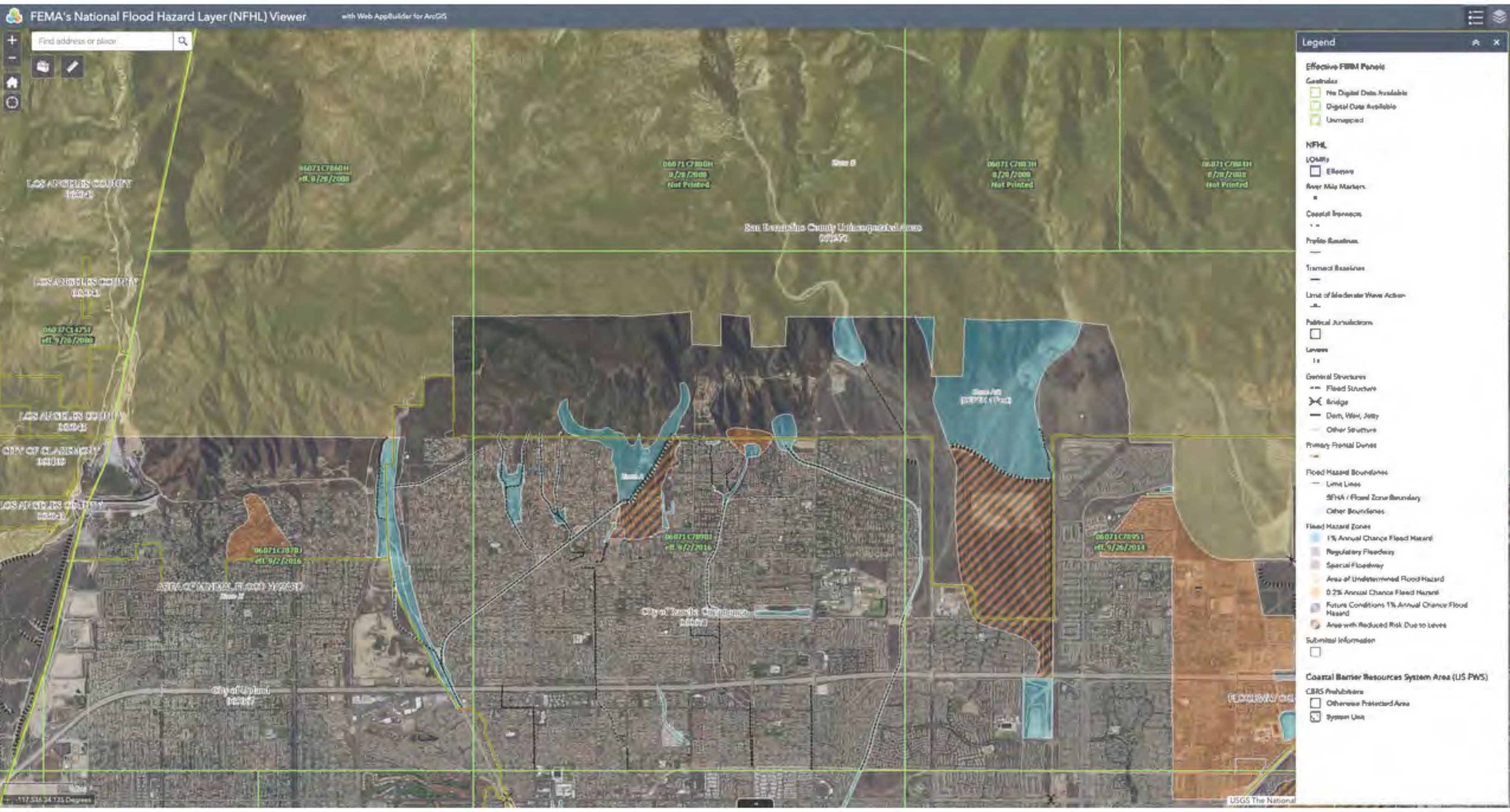

FEMA's National Flood Hazard Layer (NFHL) Viewer
with Web AppBuilder for ArcGIS
Find address or place
LOS ANGELES COUNTY
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LOS ANGELES COUNTY
CITY OF CLAREMONT
LOS ANGELES COUNTY
San Bernardino County Unincorporated Areas
AREA OF MINIMAL FLOOD HAZARD
City of Upland
City of Rancho Cucamonga
USGS The National
Legend
Effective FIRM Panels
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River Mile Markers
Coastal Transects
Profile Baselines
Transect Baselines
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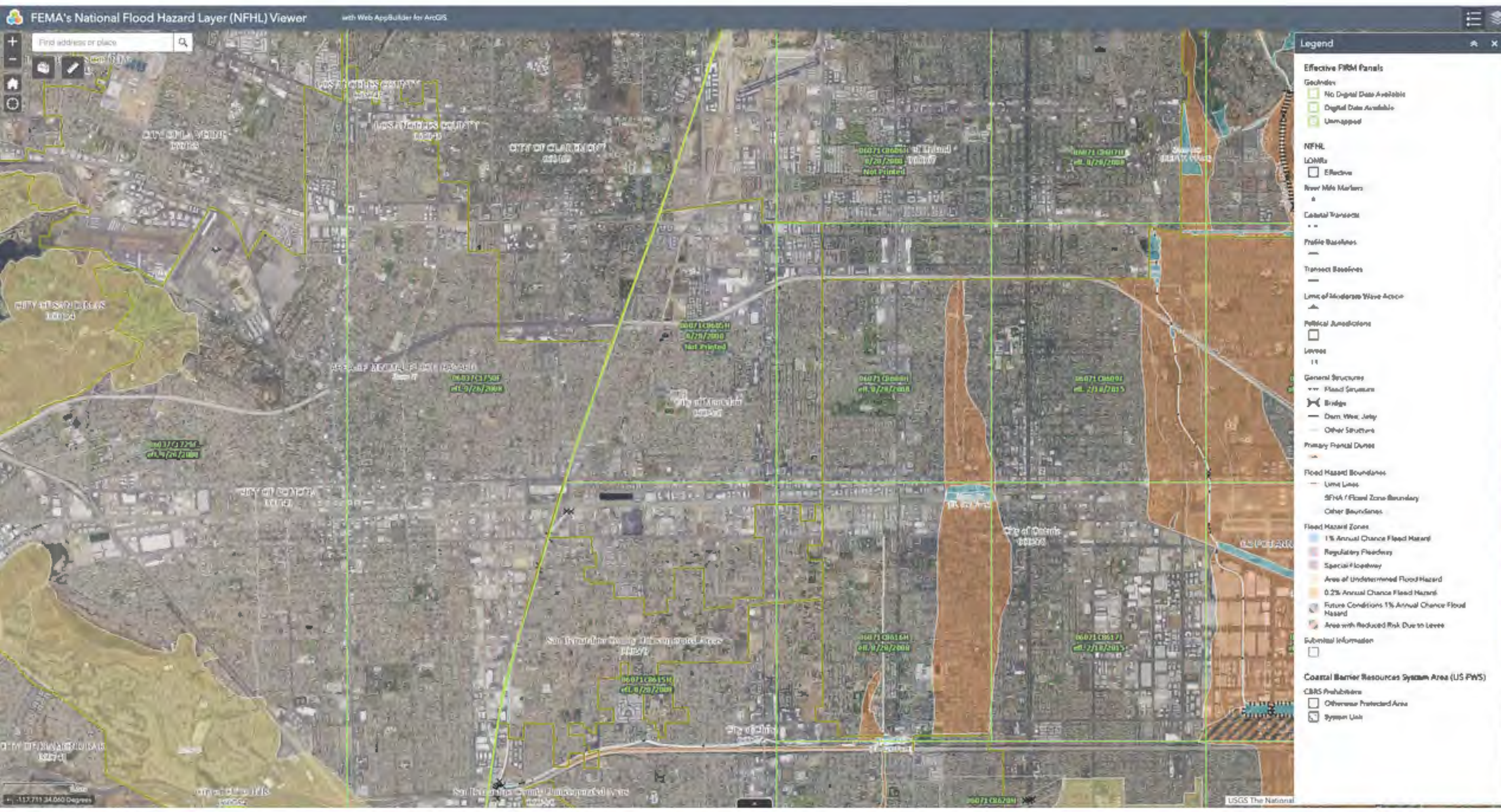
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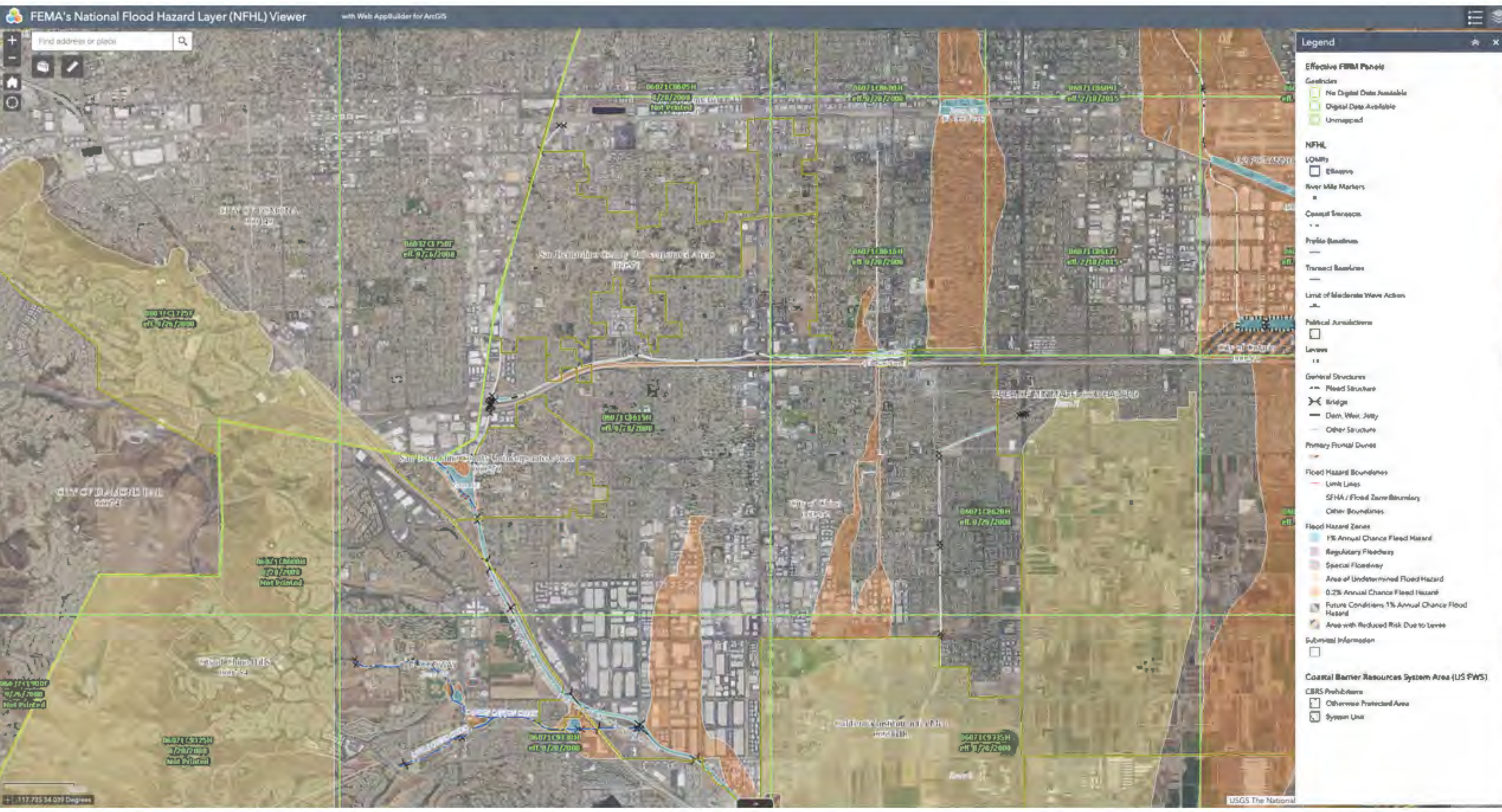
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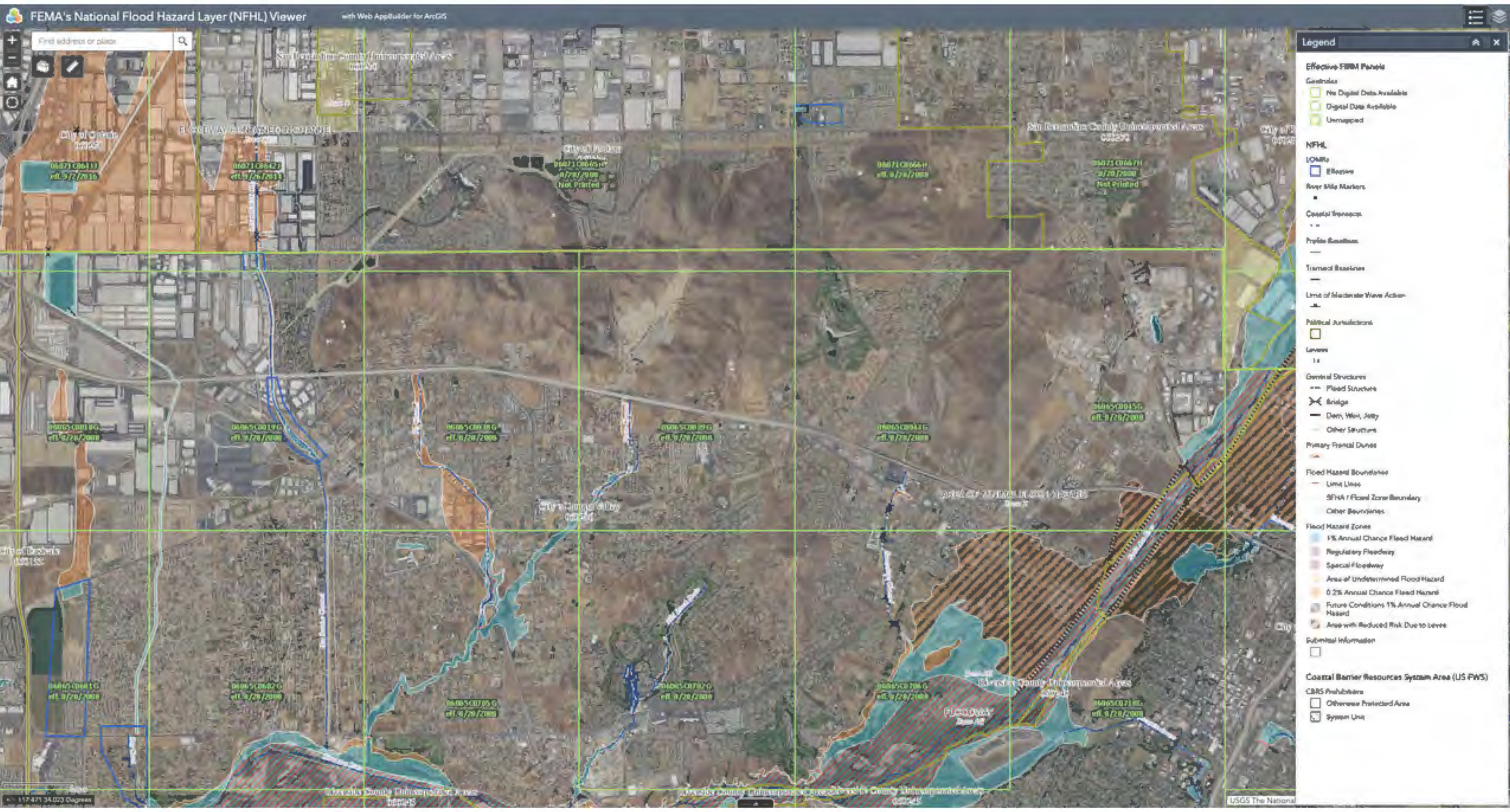
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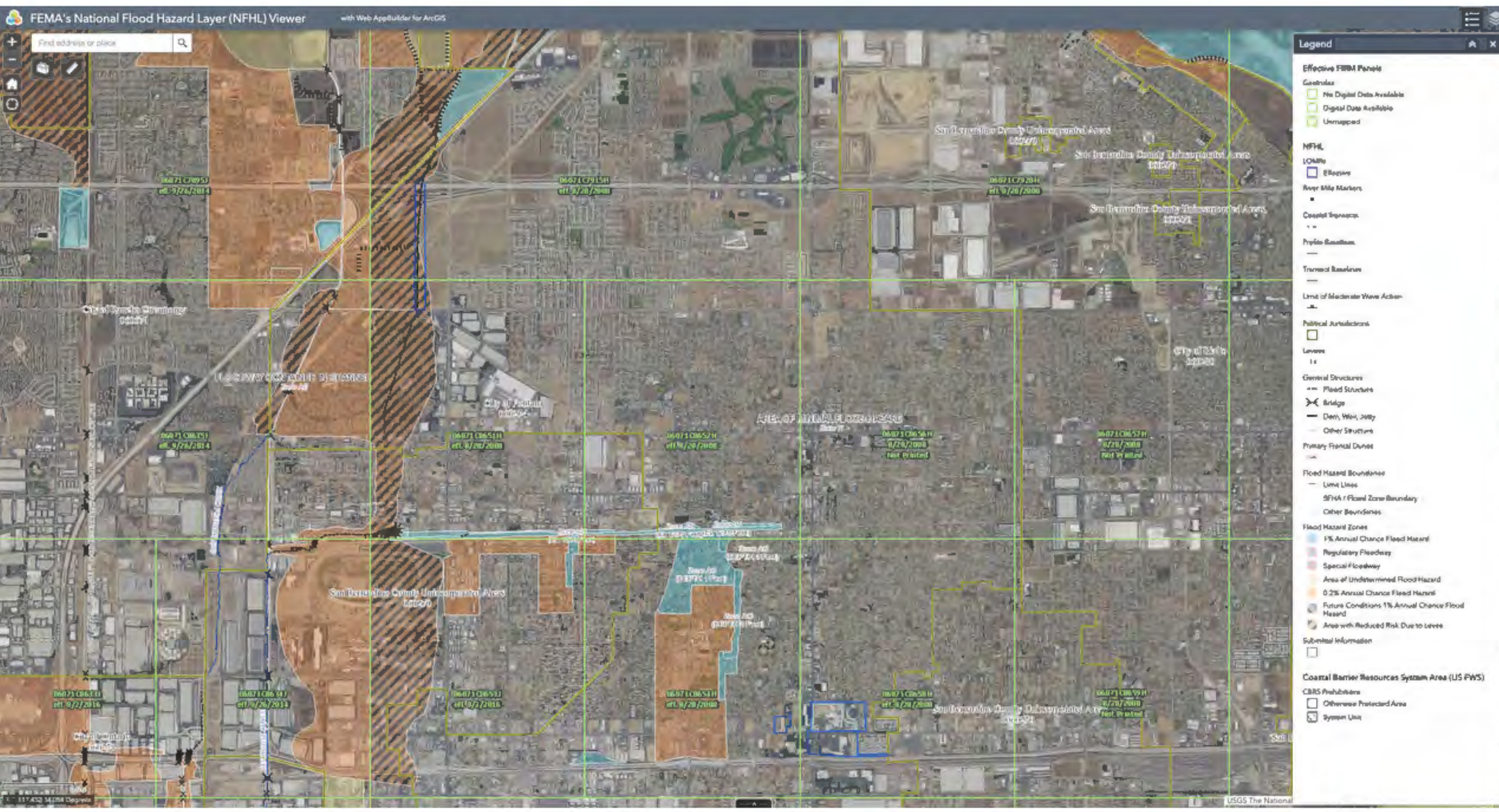

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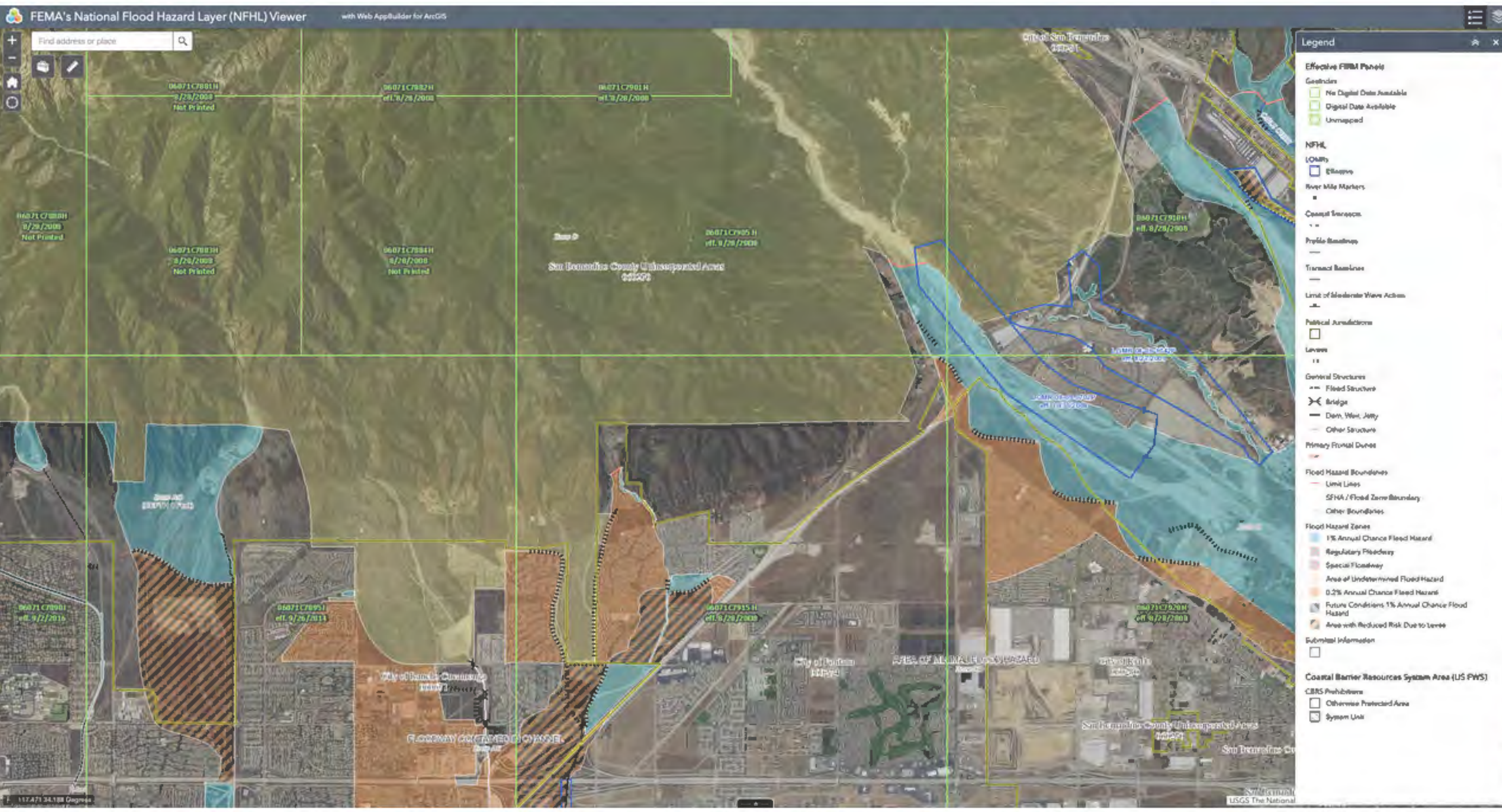

FEMA's National Flood Hazard Layer (NFHL) Viewer
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Find address or place
San Bernardino County Unincorporated Areas
City of Rancho Cucamonga
City of Fontana
Legend
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System Unit

APPENDIX 8

Cultural Resource Monitoring and Treatment Plans

Cultural Resources

Monitoring and Treatment Plan

for the

Project Name

With

AGENCY,

NATIVE AMERICAN TRIBE, and

CULTURAL RESOURCES FIRM (on behalf of Applicant)

MONTH YEAR

I. PROJECT

The APPLICANT is proposing to INSERT PROJECT DESCRIPTION

II. PLAN PURPOSE

The Cultural Resources Monitoring and Treatment Plan (Plan) shall act as a guideline for cultural resource monitoring and the treatment of any cultural resources discovered during Project implementation. [ENTER JUSTIFICATION]. As a result, the LEAD AGENCY incorporated mitigations measures [ENTER HERE] within the Initial Study or ENVIRONMENTAL IMPACT REPORT, which speak to the need for archaeological and tribal monitoring of the project area, as well as the need for this Plan. The protocol outlined in this Plan will be enforced by LEAD AGENCY (Lead Agency) throughout the life of the project.

III. PLAN CHANGES

The Parties that have participated in development of this Plan include the Lead Agency (Lead Agency), APPLICANT, and the NAME OF TRIBE. It is noted by all Parties that the cultural resources monitoring and treatment protocols outlined in this document are subject to change as the project moves forward and project implementation protocol is determined. All changes to the process of project implementation, as detailed in section V, must be delivered to all Parties in writing using the contact information in Appendix A, and section V must be amended accordingly. Additionally, should the Plan require an amendment with regards to the cultural resources monitoring and treatment protocols as a result of the section IV change, then the Plan shall be further revised. Should a change to section V occur during project implementation, work shall be halted until the Plan has been revised and approved by all Parties, and all Parties have taken the necessary steps to implement the new protocol outlined within the Plan.

IV. PRE-CONSTRUCTION MEETINGS (project-dependent)

An Action Planning meeting shall be held with the on-site lead/foreman, a Lead Agency staff member, the lead archaeologist, a NAME OF TRIBE Cultural Resources Department staff member, and any other key personnel at least 10 business days prior to the start of construction. At least 3 business days prior to the Action Planning meeting, the Lead Agency shall disseminate the most current Monitoring and Treatment Plan, the CR and TCR mitigation measures/conditions of approval, and the most current project plans/blueprints/maps. The Action Planning meeting shall include a Cultural Resources Sensitivity Training (CRST) given by a NAME OF TRIBE Cultural Resources Department staff member, during which time the monitoring and treatment guidelines shall be discussed. Additionally, attendees will use the provided documentation to determine the most appropriate process for monitoring during the project and, once decided, this section of the Plan shall be revised and the draft disseminated to all Parties. All Parties must agree to the changes prior to project implementation.

A pre-construction tailgate meeting shall occur on the first day of construction, during which time the most updated Monitoring and Treatment Plan shall be discussed with regards to monitoring process and treatment of cultural resources. Additionally, a CRST session will be given by the NAME OF TRIBE monitor OR a NAME OF TRIBE Cultural Resources Department staff member for all on-site personnel.

Should any new personnel be rotated into/added to the construction schedule, they must undergo the CRST prior to their first shift.

V. MONITORING PROTOCOL

There is agreement among all Parties that the project shall require an archaeological monitor with at least 3 years of regional experience in archaeology and a Tribal monitor representing NAME OF TRIBE to be present for all ground-disturbing activities that occurs within the proposed project area (which includes, but is not limited to, tree/shrub removal and planting, clearing/grubbing, grading, excavation, trenching, compaction, fence/gate removal and installation, drainage and irrigation removal and installation, hardscape installation [benches, signage, boulders, walls, seat walls, fountains, etc.], and archaeological work). A sufficient number of archaeological and Tribal monitors shall be present each work day to ensure that simultaneously occurring ground disturbing activities receive thorough levels of monitoring coverage. The Applicant shall provide compensation (hourly wages, mileage, etc.) for all monitors and the services these individuals provide as part of the monitoring effort for the Project.

ENTER MONITORING PROTOCOL HERE AFTER ACTION PLANNING MEETING

VI. PROCESS FOR DISCOVERIES, TREATMENT, AND DISPOSITION

In the event of a discovery, all Parties shall be notified by phone and email within 48 hours of the discovery. A list of the points of contact is part of this Plan in Appendix A. Each Party is responsible for their individual updates if there are any personnel changes.

<u>NON-FUNERARY CULTURAL MATERIALS</u>

If a pre-contact and/or post-contact cultural resource is discovered during project implementation, ground disturbing activities shall be suspended 60 feet around the resource(s) and an Environmentally Sensitive Area (ESA) physical demarcation/barrier constructed. Representatives from the NAME OF TRIBE Cultural Resources Department (TRIBAL ACRONYM), the Archaeological Monitor/applicant, and the Lead Agency shall confer regarding treatment of the discovered resource. Following, a research design shall be developed by the archaeologist that will include a plan to evaluate the resource for significance under CEQA criteria. The research design shall also acknowledge that, regardless of significance under CEQA, all finds are subject, if feasible, to avoidance/preservation in place as treatment.

It is important to note that TRIBAL ACRONYM monitors do not conduct consultation on behalf of TRIBAL ACRONYM. Consultation will occur with the TRIBAL ACRONYM Cultural Resources Management Department POC, and the implementation of the agreed-upon action will be completed with the assistance of the Native American monitor.

Should any resource(s) not be a candidate for avoidance or preservation in place, and the removal of the resource(s) is necessary, the research design shall include a comprehensive discussion of sampling strategies, resource processing, analysis, and reporting protocols/obligations. Removal of any cultural resource(s) shall be conducted with the presence of a Tribal monitor representing the Tribe, unless otherwise decided by TRIBAL ACRONYM. All plans for analysis shall be reviewed and approved by the applicant and TRIBAL ACRONYM prior to implementation, and all removed material shall be temporarily curated on-site. It is the preference of TRIBAL ACRONYM that removed cultural material be reburied as close to the original find location as possible. However, should reburial within/near the original find location during project implementation not be feasible, then a reburial location for future reburial shall be decided upon by TRIBAL ACRONYM, the landowner, and the Lead Agency, and all finds shall be reburied within this location. Additionally, in this case, reburial shall not occur until all ground-disturbing activities associated with the project have been completed, all monitoring has ceased, all cataloguing and basic recordation of cultural resources have been completed, and a final monitoring report has been issued to Lead Agency, CHRIS, and TRIBAL ACRONYM. All reburials are subject to a reburial agreement that shall be developed between the landowner and TRIBAL ACRONYM outlining the determined reburial process/location, and shall include measures and provisions to protect the reburial area from any future impacts (vis a vis project plans, conservation/preservation easements, etc.).

Should it occur that avoidance, preservation in place, and on-site reburial are not an option for treatment, the landowner shall relinquish all ownership and rights to this material and confer with TRIBAL ACRONYM to identify an American Association of Museums (AAM)-accredited facility within the County that can accession the materials into their permanent collections and provide for the proper care of these objects in accordance with the 1993 CA Curation Guidelines. A curation agreement with an appropriate qualified repository shall be developed between the landowner and museum that legally and physically transfers the collections and associated records to the facility. This agreement shall stipulate the payment of fees necessary for permanent curation of the collections and associated records and the obligation of the Project developer/applicant to pay for those fees.

All draft records/reports containing the significance and treatment findings and data recovery results shall be prepared by the archaeologist and submitted to the Lead Agency and TRIBAL ACRONYM for their review and comment. After approval from all parties, the final reports and site/isolate records are to be submitted to the local CHRIS Information Center, the Lead Agency, and TRIBAL ACRONYM.

FUNERARY CULTURAL MATERIAL AND/OR NATIVE AMERICAN HUMAN REMAINS

In the event that any human remains are discovered within the project area, ground disturbing activities shall be suspended 100 feet around the resource(s) and an Environmentally Sensitive Area (ESA) physical demarcation/barrier constructed. The on-site lead/foreman shall then immediately who shall notify TRIBAL ACRONYM, the applicant/developer, and the Lead Agency. The Lead Agency and the applicant/developer shall then immediately contact the County Coroner regarding the discovery. If the Coroner recognizes the human remains to be those of a Native American, or has reason to believe that they are those of a Native American, the Coroner shall ensure that notification is provided to the NAHC within twenty-four (24) hours of the determination, as required by California Health and Safety Code § 7050.5 (c). The NAHC-identified Most Likely Descendant (MLD), shall be allowed, under California Public Resources Code § 5097.98 (a), to (1) inspect the site of the discovery and (2) make determinations as to how the human remains and funerary objects shall be treated and disposed of with appropriate dignity. The MLD, Lead Agency, and landowner agree to discuss in good faith what constitutes "appropriate dignity" as that term is used in the applicable statutes. The MLD shall complete its inspection and make recommendations within forty-eight (48) hours of the site visit, as required by California Public Resources Code § 5097.98.

Reburial of human remains and/or funerary objects (those artifacts associated with any human remains or funerary rites) shall be accomplished in compliance with the California Public Resources Code § 5097.98 (a) and (b). The MLD in consultation with the landowner, shall make the final discretionary determination regarding the appropriate disposition and treatment of human remains and funerary objects. All parties are aware that the MLD may wish to rebury the human remains and associated funerary objects on or near the site of their discovery, in an area that shall not be subject to future subsurface disturbances. The applicant/developer/landowner should accommodate on-site reburial in a location mutually agreed upon by the Parties.

It is understood by all Parties that unless otherwise required by law, the site of any reburial of Native American human remains or cultural artifacts shall not be disclosed and shall not be governed by public disclosure requirements of the California Public Records Act. The Coroner, parties, and Lead Agencies, will be asked to withhold public disclosure information related to such reburial, pursuant to the specific exemption set forth in California Government Code § 6254 (r).

VII. NON-DISCLOSURE OF DISCOVERIES

It is understood by all Parties that unless otherwise required by law, the site of any reburial of Native American human remains or cultural artifacts shall not be disclosed and shall not be governed by public disclosure requirements of the California Public Records Act. The Coroner, parties, and Lead Agencies, will be asked to withhold public disclosure information related to such reburial, pursuant to the specific exemption set forth in California Government Code § 6254 (r).

Appendix A

Points of Contact for each Party:

TRIBAL NAME

Lead Agency

1. NAME

Cultural Resource Monitoring and Treatment Plan
for the
Optimum Basin Management Program Update

With
IEUA Watermaster,
Gabrieleño Band of Mission Indians: Kizh Nation, and
Tribal Cultural Resource Management

March 2020

I. PROJECT
The Tribal Cultural Resource Management (TCRM) for the Gabrieleño Band of Mission Indians: Kizh Nation is proposing to act as the AB52 Tribal observer and if required archaeological monitoring and/or archaeological mitigation in the event an archaeological discovery.

II. PLAN PURPOSE
This Cultural Resource Monitoring and Treatment Plan(Plan) shall act as a guideline for cultural resource monitoring and the treatment of any cultural resources discovered during Project implementation. As a result, the State Historic Preservation Office (SHPO) approved IEUAincorporated mitigation measures within the Initial Study or Environmental Impact Report should be followed. Addition ally, the areas requiring archaeological and tribal monitoring of the project area, should follow this Plan. The protocol outlined in this Plan will be enforced by IEUS(Lead Agency) throughout the life of the project.

III. PLAN CHANGES
The Parties that have participated in development of this Plan include the IEUA, APPLICANT, and the GabrieleñoBand of Mission Indians: Kizh Nation (Kizh). It is noted by all Parties that the cultural resources monitoring and treatment protocols outlined in this document are subject to change as the project moves forward and project implementation protocol is determined. All changes to the process of project implementation, as detailed in Section V, must be delivered to all Parties in writing using the contact information in Appendix A, and Section V must be

amended accordingly. Additionally, should the Plan require an amendment with regards to the cultural resources monitoring and treatment protocols as a result of the Section IV change, then the Plan shall be further revised. Should a change to Section V occur during project implementation, work shall be halted until the Plan has been revised and approved by all Parties, and all Parties have taken the necessary steps to implement the new protocol outlined within the Plan.

IV. PRE-CONSTRUCTION MEETINGS (Project-dependent)
An Action Planning meeting shall be held with the on-site lead/foreman, a IEUA staff member, the lead archaeologist(if not TCRM staff), a Kizh Cultural Resources Department staff member, and any other key personnel at least 10 business days prior to the start of construction. At least 3business days prior to the Action Planning meeting, the Lead Agency shall disseminate the most current Monitoring and Treatment Plan, the TCR mitigation measures/conditions of approval, and the most current project plans/blueprints/maps. The Action Planningmeeting shall include a Cultural Resources Sensitivity Training (CRST) given by a Kizh Cultural Resources Department staff member, during which time, the monitoring and treatment guidelines shall be discussed. Additionally, attendees will use the provided documentation to determine the most appropriate processfor monitoring during the project and, once decided, this section of the Plan shall be revised and the draft disseminated to all Parties. All Parties must agree to the changes prior to project implementation.

A pre-construction tailgate meeting shall occur on the first day of construction, during which time the most updated Monitoring and Treatment Plan shall be discussed with regards to monitoring process and treatment of cultural resources. Additionally, a CRST session will be given by the Kizh monitor or a Kizh Cultural Resources Department staff member for all on-site personnel. Should any new personnel be rotated into/added to the construction schedule, they must undergo the CRST prior to their first shift.

V. MONITORING PROTOCOL
All Parties agree that the project shall require an outside archaeological monitor (if a TCRM archaeologist is not used) with at least 3 years of regional experience in archaeology and a Tribal monitor representing Kizh to be present for all ground-disturbing activities that occurs within the proposed project area (which includes, but is not limited to, tree/shrub removal and planting, clearing/grubbing, grading, excavation, trenching, compaction, fence/gate removal and installation, drainage and irrigation removal and installation, hardscape installation [benches, signage, boulders, walls, seat walls, fountains, etc.], and archaeological work). A sufficient number of archaeological and Tribal monitors shall be present each work day to ensure that simultaneously occurring ground disturbing activities receive thorough levels of monitoring coverage. The Applicant shall provide compensation (hourly wages, mileage, etc.) for all monitors and the services these individuals provide as part of the monitoring effort for the Project.

[ENTER MONITORING PROTOCOL HERE, AFTER ACTION PLANNING MEETING]

VI. PROCESS FOR DISCOVERIES, TREATMENT, AND DISPOSITION

In the event of a discovery, all Parties shall be notified by phone (voice or text message) and email within 48 hours of the discovery. A list of the points of contact is part of thisPlan in Appendix A. Each Party is responsible for their individual updates if there are any personnel changes.

NON-FUNERARY CULTURAL MATERIALS

If pre-contact and/or historic cultural resources are discovered during project implementation, than ground disturbing activities shall be suspended 60 feet around the resource(s). This region shall be considered an Environmentally Sensitive Area (ESA) and a physical demarcation/barrier will be constructed around it. The ESA shall be avoided until at such time it is considered mitigated or otherwise deemed “not significant” under the criteria outlined by SHPO. Representatives from the KizhCultural Resources Department, the Archaeological Monitor (if different than a TRCM archaeologist), and the Lead Agency shall confer regarding treatment of the discovered resource. Following, a research design shall be developed by the archaeologist that will include a plan to evaluate the resource for significance under the California Environmental Quality Act (CEQA) criteria. The research design shall also acknowledge that, regardless of significance under CEQA, all finds are subject, if feasible, to avoidance/preservation in place as treatment.

It is important to note that in most cases, Kizh tribal monitors do not conduct consultation on behalf of KizhTribe. Consultation should occur with the Kizh Cultural Resources Management Department Point of Contact(POC), and the implementation of the agreed-upon action will be completed with the assistance of the Native American monitor.

Should any resource(s) cannot be avoidance or preservedin place, and the removal of the resource(s) is necessary, the research design shall include a comprehensive discussion of sampling strategies, resource processing, analysis, and reporting protocols/obligations. Removal of any cultural resource(s) shall be conducted with the presence of a Tribal monitor representing the Tribe, unless otherwise decided by Kizh. All plans for analysis shall be reviewed and approved by the applicant and Kizh prior to implementation, and all removed material shall be temporarily curated on-site. It is the preference of Kizh that removed cultural material be reburied (curated in place) as close to the original find location as possible. However, should reburial within/near the original find location during project implementation not be feasible, then a reburial location for future reburial shall be decided upon by Kizhtribe, the landowner, and the Lead Agency, and all finds shall be reburied within this location. Additionally, in this case, reburial shall not occur until all ground-disturbing activities associated with the project have been completed, all monitoring has ceased, all cataloguing and basic recordation of cultural resources have been completed, and a final monitoring report has been issued to Lead Agency, California Historical Resources Information System (CHRIS), and Kizh. All reburials are subject to a reburial agreement that shall be developed between the landowner and Kizh outlining the determined reburial process/location, and shall include measures and provisions to protect the reburial area from any future impacts (vis a vis project plans, conservation/preservation easements, etc.).

Under the Archaeological Resources Protection Act (ARPA) and the Native American Graves Protection and Repatriation Act (NAGPRA), if no Federal, State, County, or City funding is used on this project, any nonfunerary-related artifact can remain in the procession of the land owner. However, under these guidelines, should it occur that avoidance, preservation in place, and on-site reburial are not an option for treatment, the landowner shall relinquish all ownership and rights to these artifacts. Those artifacts shall be kept in an accredited curationfacility within the County that can accession the materials into their permanent collections and provide for the proper care of these objects in accordance with the 1993 CA Curation Guidelines. A curation agreement with an appropriate qualified repository shall be developed between the archaeologist and the curation facility that legally and physically transfers the collections and associated records to the facility. This agreement shall stipulate the payment of fees necessary for permanent curation of the collections and associated records and the obligation of the Project developer/applicant to pay for those fees.

All draft records/reports containing the significance and treatment findings and data recovery results shall be prepared by the archaeologist and submitted to the Lead Agency and Kizh for their review and comment. After approval from all parties, the final reports and site/isolate records are to be submitted to the local CHRIS Information Center, the Lead Agency, and Kizh.

FUNERARY CULTURAL MATERIAL AND/OR NATIVE AMERICAN HUMAN REMAINS
In the event that any human remains are discovered within the project area, ground disturbing activities shall be suspended 100 feet around the resource(s) and an Environmentally Sensitive Area (ESA) physical demarcation/barrier constructed. The on-site lead/foreman shall then immediately who shall notify Kizh, the applicant/developer, and the Lead Agency. The Lead Agency and the applicant/developer shall then immediately contact the County Coroner regarding the discovery. If the Coroner recognizes the human remains to be those of a Native American, or has reason to believe that they are those of a Native American, the Coroner shall ensure that notification is provided to the NAHC within twenty-four (24) hours of the determination, as required by California Health and Safety Code § 7050.5 (c). The NAHC-identified Most Likely Descendant (MLD),shall be allowed, under California Public Resources Code § 5097.98 (a), to (1) inspect the site of the discovery and (2) make determinations as to how the human remains and funerary objects shall be treated and disposed of with appropriate dignity. The MLD, Lead Agency, and landowner agree to discuss in good faith what constitutes "appropriate dignity" as that term is used in the applicable statutes. The MLD shall complete its inspection and make recommendations within forty-eight (48) hours of the site visit, as required by California Public Resources Code § 5097.98.

Reburial of human remains and/or funerary objects (those artifacts associated with any human remains or funerary rites) shall be accomplished in compliance with the California Public Resources Code § 5097.98 (a) and (b). The MLD in consultation with the landowner, shall make the final discretionary determination regarding the appropriate disposition and treatment of human remains and funerary objects. All parties are aware that the MLD may wish to rebury the human remains and associated funerary objects on or near the site of their discovery, in an area that shall not be subject to future subsurface disturbances. The applicant/developer/landowner should accommodate on-site reburial in a location mutually agreed upon by the Parties.

It is understood by all Parties that unless otherwise required by law, the site of any reburial of Native American human remains or cultural artifacts shall not be disclosed and shall not be governed by public disclosure requirements of the California Public Records Act. The Coroner, parties, and Lead Agency will be asked to withhold public disclosure information related to such reburial, pursuant to the specific exemption set forth in California Government Code § 6254 (r).

VII. NON-DISCLOSURE OF DISCOVERIES

It is understood by all Parties that unless otherwise required by law, the site of any reburial of Native American human remains or cultural artifacts shall not be disclosed and shall not be governed by public disclosure requirements of the California Public Records Act. The Coroner, parties, and Lead Agency, will be asked to withhold public disclosure information related to such reburial, pursuant to the specific exemption set forth in California Government Code § 6254 (r).

Appendix A

Points of Contact for each Party:

Gabrieleño Band of Mission Indians: Kizh Nation, POBOX 393 Covina Ca, 91723 (844) 390-0787

IEUA and Watermaster